Bluetooth Gateway API

v1.4.0

FONNCENT
2025.03.15

Revision

Version	Data	Description
1.0.0	2024.12.15	Initial version
1.1.0	2025.01.01	Update opcode
1.2.0	2025.01.15	Add whitelist
1.3.0	2025.01.20	Add scheduling algorithm option
1.4.0	2025.03.15	Add scheduling algorithm option 2

Content

1 Overview

The document describes the Application Programming Interface (API) of Bluetooth gateway.

User application interacts with a Bluetooth gateway through messages. A message is a structured data that can be a request, a response, a command or an event between an application and a gateway.

The message is explained in table 1.1.

Message Type	Direction	Description
Request	Application → Gateway	Initiated by an application
Response	Application ← Gateway	
Command	Application → Gateway	no response
Event	Application ← Gateway	Initiated by a gateway

Table 1.1 Message Definition

According to functions, messages can be divided into system domain messages and Bluetooth domain messages. System domain messages refer to those messages that manage and maintain gateway, while Bluetooth domain messages refer to messages that perform Bluetooth operations.

Messages can be represented in two data formats: JSON string format and Raw binary format.

- JSON string format

JSON (JavaScript Object Notation) is a lightweight data-interchange format that is easy for humans to read and write, and easy for machines to parse and generate. This data format can be used in system domain messages and Bluetooth domain messages.

- Raw binary format

This data format consumes less CPU resources and less transport bandwidth and only be used in Bluetooth domain messages. The format is very suitable for some applications where data throughput is more concerned.

The document describes the JSON string format.

There are two types of message procedure: application-initiated procedure and gateway-initiated procedure.

- Application-initiated procedure

This is the common procedure between an application and a gateway, where a request message is sent to a gateway from an application, and a response message is returned. Most operations use this type of procedure, such as resetting a gateway, starting advertising, starting scanning, and initiating a connection, etc.

The message sequence chart is demonstrated below:

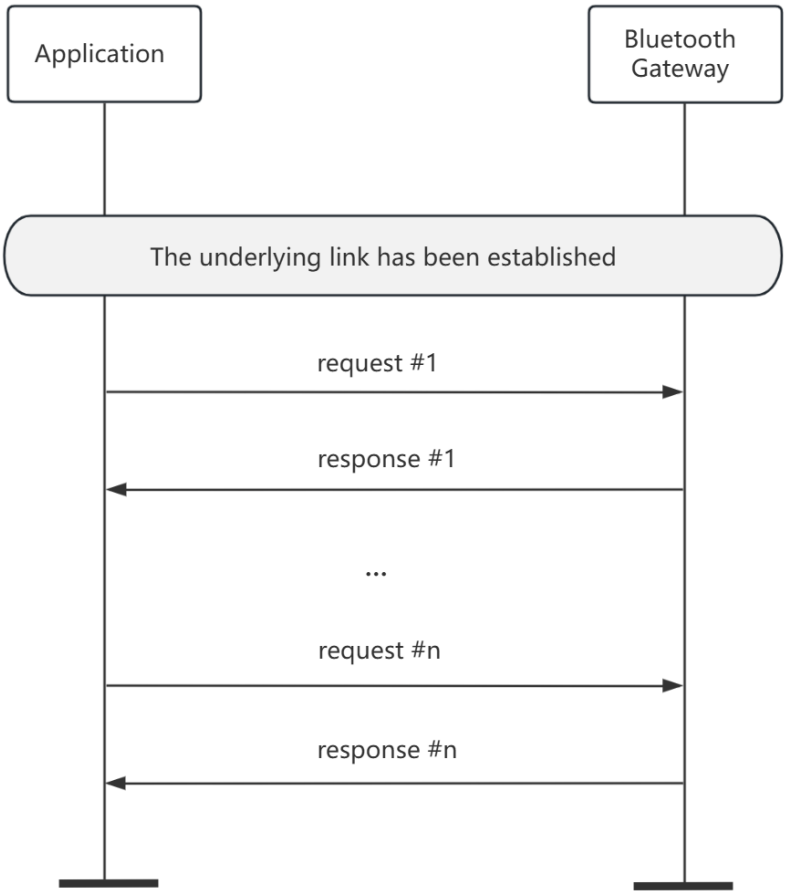

Figure 1.1 Application-initiated procedure

- Gateway-initiated procedure

This is the special procedure, where an event message is sent to an application from a gateway autonomously, possibly followed by a series of request and response messages. Some Bluetooth operations use this type of procedure, such as scan report, GATT notification, security pairing, etc.

The message sequence chart is demonstrated below:

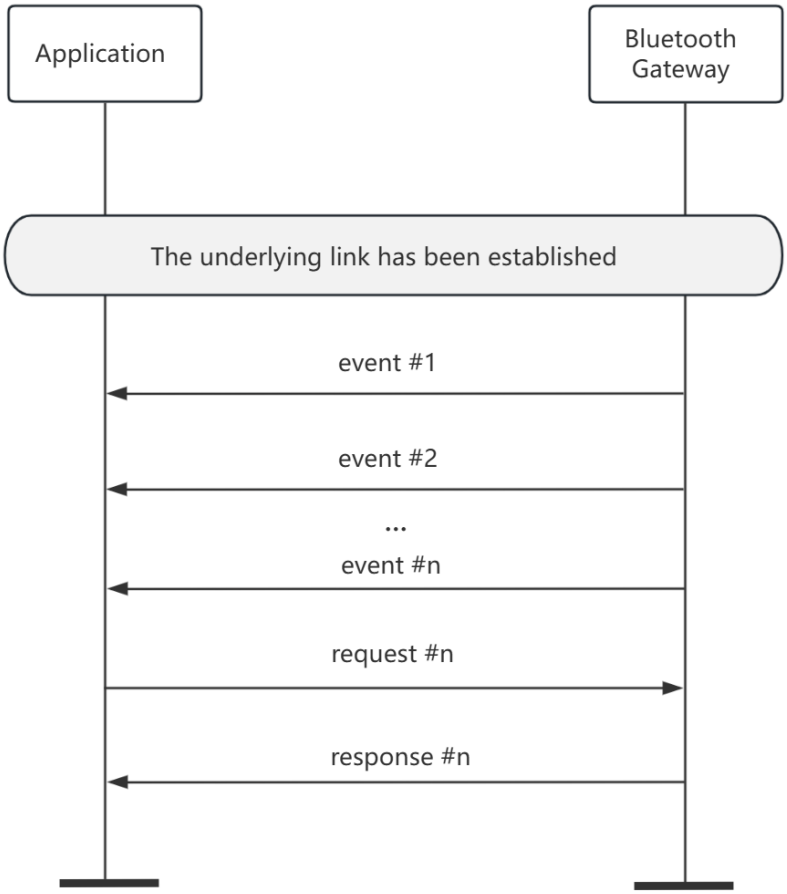

Figure 1.2 Gateway-initiated procedure

■ Flow control and Acknowledgment

The gateway processes received messages in order, that is a next request or command message will not be processed until the previous has been done.

When gateway has handled a request message, a corresponding response message is sent back to application.

When gateway has handled a command message, there is no response.

An event message may occur autonomously.

[Note]:
The gateway can cache received messages in buffers, though it processes in a serial mode. After a message is handled, it will fetch the next one from the buffers.
This means an application can send request messages continuously without waiting for a response.

1.1 Message list

The system domain messages are listed in Table 1.2.

Message	Opcode	Format	Channel	Description
MSG_REJECT	0x0001	JSON, RAW	Private	Common response
MES_EXPECT	0X0003	JSON, RAW	Private	Common event
MSG_REQ_SYS_RESET	0x0010	JSON	Public, Private	Reset gateway
MSG_RSP_SYS_RESET	0x0011	JSON	Public, Private	
MSG_REQ_SYS_MAC	0x0012	JSON	Public, Private	Get gateway MAC
MSG_RSP_SYS_MAC	0x0013	JSON	Public, Private	
MSG_REQ_SYS_INFO	0x0014	JSON	Private	Get system info
MSG_RSP_SYS_INFO	0x0015	JSON	Private	
MSG_REQ_SYS_SET_SETTING	0x0016	JSON	Private	Set system setting
MSG_RSP_SYS_SET_SETTING	0x0017	JSON	Private	
MSG_REQ_SYS_GET_SETTING	0x0018	JSON	Private	Get system setting
MSG_RSP_SYS_GET_SETTING	0x0019	JSON	Private	

Table 1.2 System domain messages

Note:
Channel is only meaningful when the gateway is operating in cloud mode.

The Bluetooth domain messages are listed in Table 1.3.

Message	Opcode	Format	Channel	Description
MSG_REQ_READ_WHITELIST	0x0108	JSON, RAW	Private	Read whitelist
MSG_RSP_READ_WHITELIST	0x0109	JSON, RAW	Private	
MSG_REQ_CLEAR_WHITELIST	0x010a	JSON, RAW	Private	Clear whitelist
MSG_RSP_CLEAR_WHITELIST	0x010b	JSON, RAW	Private	
MSG_REQ_ADD_DEV_TO_WHITELIST	0x010c	JSON, RAW	Private	Add a device to whitelist
MSG_RSP_ADD_DEV_TO_WHITELIST	0x010d	JSON, RAW	Private	
MSG_REQ_RM_DEV_FROM_WHITELIST	0x010e	JSON, RAW	Private	Remove a device from whitelist
MSG_RSP_RM_DEV_FROM_WHITELIST	0x010f	JSON, RAW	Private	
MSG_REQ_ADV_ENABLE	0x0110	JSON, RAW	Private	Advertising enable
MSG_RSP_ADV_ENABLE	0x0111	JSON, RAW	Private	
MSG_REQ_ADV_PARAM	0x0112	JSON, RAW	Private	Set advertising parameters
MSG_RSP_ADV_PARAM	0x0113	JSON, RAW	Private	
MSG_REQ_ADV_DATA	0x0114	JSON, RAW	Private	Set advertising data
MSG_RSP_ADV_DATA	0x0115	JSON, RAW	Private	
MSG_REQ_SCAN_RESPONSE	0x0116	JSON, RAW	Private	Set scan response data
MSG_RSP_SCAN_RESPONSE	0x0117	JSON, RAW	Private	
MSG_REQ_SCAN_ENABLE	0x0120	JSON, RAW	Private	Scan enable
MSG_RSP_SCAN_ENABLE	0x0121	JSON, RAW	Private	
MSG_REQ_SCAN_PARAM	0x0122	JSON, RAW	Private	Set scan parameters
MSG_RSP_SCAN_PARAM	0x0123	JSON, RAW	Private	
MSG_SCAN_REPORT	0x0125	JSON, RAW	Private	Scan report
MSG_REQ_CONNECT	0x0130	JSON, RAW	Private	Connect a device
MSG_RSP_CONNECT	0x0131	JSON, RAW	Private	
MSG_REQ_DISCONNECT	0x0132	JSON, RAW	Private	Disconnect a device
MSG_RSP_DISCONNECT	0x0133	JSON, RAW	Private	
MSG_EVT_DISCONNECT	0x0135	JSON, RAW	Private	Disconnection event
MSG_REQ_CONNLIST	0x0136	JSON, RAW	Private	List all connections
MSG_RSP_CONNLIST	0x0137	JSON, RAW	Private	
MSG_REQ_CONNUPDATE	0x0138	JSON, RAW	Private	Update a connection parameters
MSG_RSP_CONNUPDATE	0x0139	JSON, RAW	Private	
MSG_REQ_CONNDLE	0x013a	JSON, RAW	Private	Update a connection DLE parameters

MSG_RSP_CONNDLE	0x013b	JSON, RAW	Private	
MSG_EVT_DLE_CHANGE	0x013d	JSON, RAW	Private	Connection DLE parameters change event
MSG_REQ_CONNPHY	0x013e	JSON, RAW	Private	Update a connection PHY
MSG_RSP_CONNPHY	0x013f	JSON, RAW	Private	
MSG_EVT_PHY_UPDATE	0x0141	JSON, RAW	Private	Connection PHY update event
MSG_REQ_READ_PHY	0x0142	JSON, RAW	Private	Get a connection PHY
MSG_RSP_READ_PHY	0x0143	JSON, RAW	Private	
MSG_REQ_SET_SCHED_OPT	0x0180	JSON, RAW	Private	Select scheduling algorithm
MSG_RSP_SET_SCHED_OPT	0x0181	JSON, RAW	Private	
MSG_REQ_GET_SCHED_OPT	0x0182	JSON, RAW	Private	Get scheduling algorithm
MSG_RSP_GET_SCHED_OPT	0x0183	JSON, RAW	Private	
MSG_REQ_SET_SCHED_OPT 1_PARAM	0x0184	JSON, RAW	Private	Set scheduling algorithm 1 parameters
MSG_RSP_SET_SCHED_OPT1 _PARAM	0x0185	JSON, RAW	Private	
MSG_REQ_GET_SCHED_OPT 1_PARAM	0x0186	JSON, RAW	Private	Get scheduling algorithm 1 parameters
MSG_RSP_GET_SCHED_OPT 1_PARAM	0x0187	JSON, RAW	Private	
MSG_REQ_SET_SCHED_OPT 2_PARAM	0x0194	JSON, RAW	Private	Set scheduling algorithm 2 parameters
MSG_RSP_SET_SCHED_OPT2 _PARAM	0x0195	JSON, RAW	Private	
MSG_REQ_GET_SCHED_OPT 2_PARAM	0x0196	JSON, RAW	Private	Get scheduling algorithm 2 parameters
MSG_RSP_GET_SCHED_OPT 2_PARAM	0x0197	JSON, RAW	Private	
MSG_REQ_EXCHANGE_MTU	0x0200	JSON, RAW	Private	Exchange ATT MTU
MSG_RSP_EXCHANGE_MTU	0x0201	JSON, RAW	Private	
MSG_REQ_DISCOVER_ATTR	0x0210	JSON, RAW	Private	Discover all GATT attributes
MSG_RSP_DISCOVER_ATTR	0x0211	JSON, RAW	Private	
MSG_REQ_GET_ATTR	0x0212	JSON, RAW	Private	Get all GATT attributes from gateway
MSG_RSP_GET_ATTR	0x0213	JSON, RAW	Private	
MSG_REQ_CLEAR_ATTR	0x0214	JSON, RAW	Private	Clear all GATT attributes from gateway
MSG_RSP_CLEAR_ATTR	0x0215	JSON, RAW	Private	
MSG_REQ_READ_ATTR	0x0240	JSON, RAW	Private	Read data on an attribute

MSG_RSP_READ_ATTR	0x0241	JSON, RAW	Private	
MSG_REQ_WRITE_ATTR	0x0250	JSON, RAW	Private	Write data on an attribute
MSG_RSP_WRITE_ATTR	0x0251	JSON, RAW	Private	
MSG_REQ_WRITECMD_ATTR	0x0252	JSON, RAW	Private	Write data on an attribute without response
MSG_RSP_WRITECMD_ATTR	0x0253	JSON, RAW	Private	
MSG_NOTIFICATION	0x0261	JSON, RAW	Private	GATT Notification f
MSG_INDICATION	0x0263	JSON, RAW	Private	GATT Indication
MSG_REQ_PAIR	0x0300	JSON, RAW	Private	Start a paring process
MSG_RSP_PAIR	0x0301	JSON, RAW	Private	
MSG_EVT_PAIR	0X0303	JSON, RAW	Private	An event that prompts an incoming paring
MSG_REQ_REPAIR	0x0304	JSON, RAW	Private	Restart a paring process
MSG_RSP_REPAIR	0x0305	JSON, RAW	Private	
MSG_EVT_NUMERIC_CONFIRM_PENDING	0x0307	JSON, RAW	Private	An event that prompts user to confirm a numeric comparison or not
MSG_NUMERIC_CONFIM	0x0308	JSON, RAW	Private	An input that confirms a numeric comparison
MSG_EVT_PASSKEY_DISPLAY	0x030b	JSON, RAW	Private	An event that displays a passkey
MSG_EVT_PASSKEY_INPUT	0x030d	JSON, RAW	Private	An event that prompts user to input a passkey
MSG_PASSKEY_INPUT	0x030e	JSON, RAW	Private	A passkey input
MSG_REJECT_PAIRING	0x0310	JSON, RAW	Private	Reject a paring process
MSG_REQ_GET_KEYS	0x0330	JSON, RAW	Private	Get pairing keys
MSG_RSP_GET_KEYS	0x0331	JSON, RAW	Private	
MSG_REQ_CLEAR_KEYS	0x0332	JSON, RAW	Private	Clear pairing keys
MSG_RSP_CLEAR_KEYS	0x0333	JSON, RAW	Private	

Table 1.3 Bluetooth domain messages

Note:
Channel is only meaningful when the gateway is operating in cloud mode.

This API document is applicable to FONNCENT BGA100, BGA300 and other series of gateways, regardless of which mode (standalone mode, cloud mode) they operate in.
Please refer to:
BGA100 User Guide.
BGA300 User Guide.

2 JSON string format

2.1 Overview

This data format uses standard JSON syntax.

All messages are divided into two groups, system domain messages and Bluetooth domain messages.

[Note]:
In the message notation below,
n: represents an integer number
"x": represents a string
{}: represents an object
[ ]: represents an array

2.2 System

2.2.1 MSG_REJECT

```
{
    "chip": 0,
    "opcode": 1,
    "status": n,
    "rejected_opcode": n
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	1	Message opcode
"status"	n	Error code, integer
"rejected_opcode"	n	The rejected message opcode, integer

Description:
The message is a common response.
The chip parameter is only valid in Bluetooth related operation, and it will be ignored in other cases.
The opcode parameter acts as the message identity.
The status parameter is a response result, where 0 means success, other value means a failure.

2.2.2 MSG_EXPECT

```
{
    "chip": 0,
    "opcode": 3,
    "expected_opcode": n,
    "description": "x"
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	3	Message opcode
"expected_opcode"	n	The expected message opcode, integer
"description"	"x"	Any string

Description:
The message is a common event. It is used to notify user a new operation is expected.

2.2.3 MSG_REQ_SYS_RESET

```
{
    "opcode": 16
}
```

Name	Value	Parameter Description
"opcode"	16	Message opcode

Description:
The message is used to reset a gateway.

2.2.4 MSG_RSP_SYS_RESET

```
{
    "opcode": 17
    "status": n
}
```

Name	Value	Parameter Description
"opcode"	17	Message opcode
"status"	n	Error code

Description:
The message is the corresponding response message.

2.2.5 MSG_REQ_SYS_MAC

```
{
    "opcode": 18
}
```

Name	Value	Parameter Description
"opcode"	18	Message opcode

Description:
The message is used to discover Bluetooth gateways.

2.2.6 MSG_RSP_SYS_MAC

```
{
    "opcode": 19,
    "status": n,
    "mac": "xx:xx:xx:xx:xx:xx"
}
```

Name	Value	Parameter Description
"opcode"	19	Message opcode
"status"	n	Error code
"mac"	"xx:xx:xx:xx:xx:xx"	Gateway MAC address

Description:
The message returns a gateway's MAC address. The mac is valid only when status is 0.

2.2.7 MSG_REQ_SYS_INFO

```
{
    "opcode": 20
}
```

Name	Value	Parameter Description
"opcode"	20	Message opcode

Description:
The message is used to get a gateway's information.

2.2.8 MSG_RSP_SYS_INFO

```
{
    "opcode": 21,
    "status": n,
    "model": "x",
    "mac": "xx:xx:xx:xx:xx:xx",
    "ip": "x.x.x.x",
    "application_version": "x.x.x",
    "bt_version": "x.x.x",
    "bt_addr": "xx:xx:xx:xx:xx:xx",
    "bt_state": "x",
    "bt_conn_num": n,
    "online_time": n
}
```

Name	Value	Parameter Description
"opcode"	21	Message opcode
"status"	n	Error code
"model"	"x"	Gateway model, e.g. "a100"
"mac"	"xx:xx:xx:xx:xx:xx"	Gateway MAC address
"ip"	"x.x.x.x"	Gateway IPv4 address
"application_version"	"x.x.x"	Application version, e.g. "1.0.0"
"bt_version"	"x.x.x"	Bluetooth version, e.g. "1.0.0"
"bt_addr"	"xx:xx:xx:xx:xx:xx"	Bluetooth address
"bt_state"	"x"	Bluetooth state, e.g. "scanning"
"bt_conn_num"	n	Bluetooth connected devices
"online_time"	n	Gateway online time in seconds since last startup

Description:

The message returns a gateway's information. The information is valid only when status is 0. The message is also used as a heartbeat message.

2.2.9 MSG_REQ_SYS_SET_SETTING

```
{
    "opcode": 22,
    "networks": n,
    "ap_secmode": n,
    "ap_ssid": "x",
    "ap_password": "x",
    "ntp_server": "x",
    "timezone": "x",
    "workmode": n,
    "api_format": n,
    "brk_url": "x",
    "brk_username": "x",
    "brk_password": "x",
    "notify_enable": n,
    "notify_interval": n
}
```

Name	Value	Parameter Description
"opcode"	22	Message opcode
"networks"	n	Network option, bit field b0: wifi b1: ethernet b2: 4g
"ap_secmode"	n	Remote AP security mode: 0: OPEN 1: WEP 2: WPA_PSK 3: WPA2 PSK
"ap_ssid"	"x"	Remote AP SSID
"ap_password"	"x"	Remote AP password
"ntp_server"	"x"	NTP server, e.g. "ntp.aliyun.com"
"timezone"	"x"	Timezone, e.g. "CST-8"
"workmode"	n	0: standalone 1: cloud
"api_format"	n	0: json string 1: raw binary
"brk_url"	"x"	MQTT broker url
"brk_username"	"x"	Client username authenticated by remote MQTT broker
"brk_password"	"x"	Client password authenticated by remote MQTT broker

"notify_enable"	n	Heartbeat enable 0: disable 1: enable
"notify_interval"	n	Heartbeat interval in seconds

Description:

The message is used to configure gateway.

To use conveniently, the following format is supported:

```
{
    "opcode": 22,
    "ap_secmode": n,
    "ap_ssid": "x",
    "ap_password": "x"
}
or
{
    "opcode": 22,
    "brk_url": "x",
    "brk_username": "x",
    "brk_password": "x"
}
```

2.2.10 MSG_RSP_SYS_SET_SETTING

```
{
    "opcode": 23，
    "status": n
}
```

Name	Value	Parameter Description
"opcode"	23	Message opcode
"status"	n	Error code

Description:
The message is the corresponding response message.

2.2.11 MSG_REQ_SYS_GET_SETTING

```
{
    "opcode": 24
}
```

Name	Value	Parameter Description
"opcode"	24	Message opcode

Description:
The message is used to get a gateway's settings.

2.2.12 MSG_RSP_SYS_GET_SETTING

```
{
    "opcode": 25,
    "status": n,
    "networks": n,
    "ap_secmode": n,
    "ap_ssid": "x",
    "ap_password": "x",
    "ntp_server": "x",
    "timezone": "x",
    "workmode": n,
    "api_format": n,
    "brk_url": "x",
    "brk_username": "x",
    "brk_password": "x",
    "notify_enable": n,
    "notify_interval": n
}
```

Name	Value	Parameter Description
"opcode"	25	Message opcode
"status"	n	Error code
"networks"	n	Network option, bit XORed b0: wifi b1: ethernet b2: 4g
"ap_secmode"	n	Remote AP security mode: 0: OPEN 1: WEP 2: WPA_PSK 3: WPA2 PSK
"ap_ssid"	"x"	Remote AP SSID
"ap_password"	"x"	Remote AP password
"ntp_server"	"x"	NTP server, e.g. "ntp.aliyun.com"
"timezone"	"x"	Timezone, e.g. "CST-8"
"workmode"	n	0: standalone 1: cloud
"api_format"	n	0: json string 1: raw binary
"brk_url"	"x"	MQTT broker url
"brk_username"	"x"	Client username authenticated by remote MQTT broker

"brk_password"	"x"	Client password authenticated by remote MQTT broker
"notify_enable"	n	Heartbeat enable 0: disable 1: enable
"notify_interval"	n	Heartbeat interval in seconds

Description:
The message returns a gateway's settings.

2.3 Bluetooth

2.3.1 MSG_REQ_READ_WHITELIST

```
{
    "chip":    0,
    "opcode": 264
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	264	Message opcode

Description:
The message is used to read the whitelist info.

2.3.2 MSG_RSP_READ_WHITELIST

```
{
    "chip":    0,
    "opcode": 265,
    "status": n,
    "size": n
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	265	Message opcode
"status"	n	Error code
"size"	n	Whitelist size
"num"	n	Device number
"devs"	[{}, {}]	Device

Description:
The message is the corresponding response message.

2.3.3 MSG_REQ_CLEAR_WHITELIST

```
{
    "chip":    0,
    "opcode": 266
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	266	Message opcode

Description:
The message is used to clear the whitelist.

2.3.4 MSG_RSP_CLEAR_WHITELIST

```
{
    "chip":    0,
    "opcode": 267,
    "status": n
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	267	Message opcode
"status"	n	Error code

Description:
The message is the corresponding response message.

2.3.5 MSG_REQ_ADD_DEV_TO_WHITELIST

```
{
    "chip":    0,
    "opcode": 268,
    "addr_type": n,
    "addr": "xx:xx:xx:xx:xx:xx"
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	268	Message opcode
"addr_type"	n	Address type 0: public 1: random
"addr"	"xx:xx:xx:xx:xx:xx"	Address

Description:
The message is used to add a device to whitelist.

2.3.6 MSG_RSP_ADD_DEV_TO_WHITELIST

```
{
    "chip":    0,
    "opcode": 269,
    "status": n
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	269	Message opcode
"status"	n	Error code

Description:
The message is the corresponding response message.

2.3.7 MSG_REQ_RM_DEV_FROM_WHITELIST

```
{
    "chip":    0,
    "opcode": 270,
    "addr_type": n,
    "addr": "xx:xx:xx:xx:xx:xx"
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	270	Message opcode
"addr_type"	n	Address type 0: public 1: random
"addr"	"xx:xx:xx:xx:xx:xx"	Address

Description:

The message is used to remove a device from whitelist.

2.3.8 MSG_RSP_RM_DEV_FROM_WHITELIST

```
{
    "chip":    0,
    "opcode": 271,
    "status": n
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	271	Message opcode
"status"	n	Error code

Description:
The message is the corresponding response message.

2.3.9 MSG_REQ_ADV_ENABLE

```
{
    "chip":    0,
    "opcode": 272,
    "enable": n
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	272	Message opcode
" enable"	0 1	Disable Enable

Description:
The message is used to start or stop advertising.

2.3.10 MSG_RSP_ADV_ENABLE

```
{
    "chip":    0,
    "opcode": 273,
    "status": n
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	272	Message opcode
"status"	n	Error code

Description:
The message is the corresponding response message.

2.3.11 MSG_REQ_ADV_PARAM

```
{
    "chip":    0,
    "opcode": 274,
    "min_interval": n,
    "max_interval": n,
    " type": n,
    " own_addr_type": n,
    " peer_addr_type": n,
    "peer_addr": "xx:xx:xx:xx:xx:xx",
    " channel_map": n,
    " filter_policy": n
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	274	Message opcode
min_interval	n	Minimum advertising interval for undirected and low duty cycle directed advertising. Range: 0x0020 to 0x4000 Units: 0.625ms
max_interval	n	Maximum advertising interval for undirected and low duty cycle directed advertising. Range: 0x0020 to 0x4000 Units: 0.625ms
type	n	Advertising type. 0: Connectable and scannable undirected advertising 1: Connectable high duty cycle directed advertising 2: Scannable undirected advertising 3: Non connectable undirected advertising 4: Connectable low duty cycle directed advertising
own_addr_type	n	Own address type 0: Public address 1: Random address

peer_addr_type	n	Peer address type, only valid when type is 1 or 4 0: Public address 1: Random address
peer_addr	"xx:xx:xx:xx:xx:xx"	Peer address, only valid when type is 1 or 4
channel_map	n	Advertising channel, bit field b0: channel 37 b1: channel 38 b2: channel 39 other bits: reserved
filter_policy	n	Advertising filter policy, ignored when type is 1 or 4. 0: Process scan and connection requests from all devices 1: Process connection requests from all devices and scan requests only from devices that are in the whitelist. 2: Process scan requests from all devices and connection requests only from devices that are in the whitelist. 3: Process scan and connection requests only from devices in the whitelist. other values: reserved

Description:

The message is used to set the advertising parameters.

2.3.12 MSG_RSP_ADV_PARAM

```
{
    "chip": 0,
    "opcode": 275,
    "status": n
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	275	Message opcode
"status"	n	Error code

Description:
The message is the corresponding response message.

2.3.13 MSG_REQ_ADV_DATA

```
{
    "chip":    0,
    "opcode": 276,
    "data": "x"
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	276	Message opcode
data	"x"	Data in hex string

Description:
The message is used to set the data field in advertising packets.

2.3.14 MSG_RSP_ADV_DATA

```
{
    "chip": 0,
    "opcode": 277,
    "status": n
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	277	Message opcode
"status"	n	Error code

Description:
The message is the corresponding response message.

2.3.15 MSG_REQ_SCAN_RESPONSE

```
{
    "chip":    0,
    "opcode": 278,
    "data": "x"
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	278	Message opcode
data	"x"	Data in hex string

Description:
The message is used to set the data field in scan response.

2.3.16 MSG_RSP_SCAN_RESPONSE

```
{
    "chip": 0,
    "opcode": 279,
    "status": n
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	279	Message opcode
"status"	n	Error code

Description:
The message is the corresponding response message.

2.3.17 MSG_REQ_SCAN_ENABLE

```
{
    "chip":    0,
    "opcode": 288,
    "enable": n,
    "filter_duplicates": n
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	288	Message opcode
enable	n	0: disable 1: enable
filter_duplicates	n	0: Duplicate filtering disable 1: Duplicate filtering enable

Description:

The message is used to start or stop scanning for legacy advertising packets.

2.3.18 MSG_RSP_SCAN_ENABLE

```
{
    "chip": 0,
    "opcode": 289,
    "status": n
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	289	Message opcode
"status"	n	Error code

Description:
The message is the corresponding response message.

2.3.19 MSG_REQ_SCAN_PARAM

```
{
    "chip": 0,
    "opcode": 290,
    "type": n,
    "interval": n,
    "window": n,
    "own_addr_type": n
    " filter_policy": n
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	290	Message opcode
type	n	Scan type 0x00: passive Scanning 0x01: active Scanning
interval	n	Scan interval Range: 0x0004 to 0x4000 Units: 0.625ms
window	n	Scan window Range: 0x0004 to 0x4000 Units: 0.625ms
own_addr_type	n	Own address type 0: Public address 1: Random address
filter_policy	n	Scan filter policy 0x00: Basic unfiltered scanning 0x01: Basic filtered scanning other values: reserved

Description:
The message is used to set the scan parameters.

2.3.20 MSG_RSP_SCAN_PARAM

```
{
    "chip": 0,
    "opcode": 291,
    "status": n
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	291	Message opcode
"status"	n	Error code

Description:
The message is the corresponding response message.

2.3.21 MSG_SCAN_REPORT

```
{
    "chip":    0,
    "opcode": 293,
    "evt_type": n,
    "addr_type": n,
    "addr": "xx:xx:xx:xx:xx:xx",
    "rssi": n,
    "length": n,
    "data": "x"
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	293	Message opcode
"evt_type"	n	Event type 0: Connectable and scannable undirected advertising 1: Connectable directed advertising 2: Scannable undirected advertising 3: Non connectable undirected advertising 4: Scan Response
"addr_type"	n	Address type 0: public 1: random
"addr"	"xx:xx:xx:xx:xx:xx"	Address
"rssi"	n	Range: -127 to +20 Units: dBm
"length"	n	Data length
"data"	"x"	Data in hex string

Description:
The message is the scan report.

2.3.22 MSG_REQ_CONNECT

```
{
    "chip":    0,
    "opcode": 304,
    "peer_addr_type": n,
    "peer_addr": "xx:xx:xx:xx:xx:xx"
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	304	Message opcode
"peer_addr_type"	n	Peer address type 0: public 1: random
"peer_addr"	"xx:xx:xx:xx:xx:xx"	Peer address

Description:
The message is used to start a connection procedure.

2.3.23 MSG_RSP_CONNECT

```
{
    "chip":    0,
    "opcode": 305,
    "status": n,
    "handle": n,
    "role": n,
    "peer_addr_type": n,
    "peer_addr": "xx:xx:xx:xx:xx:xx",
    "interval": n,
    "latency": n,
    "supervision_timeout": n,
    "master_clock_accuracy": n
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	305	Message opcode
"status"	n	Error code
"handle"	n	Connection handle
"role"	n	Connection role 0: Gateway is Central 1: Gateway is Peripheral
"peer_addr_type"	n	Peer address type 0: public 1: random
"peer_addr"	"xx:xx:xx:xx:xx:xx"	Peer address
"interval"	n	Connection interval Units: 1.25ms
"latency"	n	Connection latency
"supervision_timeout"	n	Supervision Timeout Units: 10ms
"master_clock_accuracy"	n	Central clock accuracy, only valid for a peripheral 0: 500 ppm 1: 250 ppm 2: 150 ppm 3: 100 ppm 4: 75 ppm 5: 50 ppm

		6: 30 ppm 7: 20 ppm

Description:
The message is the corresponding response message.

2.3.24 MSG_REQ_DISCONNECT

```
{
    "chip":    0,
    "opcode": 306,
    "peer_addr_type": n,
    "peer_addr": "xx:xx:xx:xx:xx:xx"
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	306	Message opcode
"peer_addr_type"	n	Peer address type 0: public 1: random
"peer_addr"	"xx:xx:xx:xx:xx:xx"	Peer address

Description:
The message is used to disconnect a connection.

2.3.25 MSG_RSP_DISCONNECT

```
{
    "chip":    0,
    "opcode": 307,
    "status": n,
    "peer_addr_type": n,
    "peer_addr": "xx:xx:xx:xx:xx:xx",
    "reason": n
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	307	Message opcode
"status"	n	Error code
"peer_addr_type"	n	Peer address type 0: public 1: random
"peer_addr"	"xx:xx:xx:xx:xx:xx"	Peer address
"reason"	n	Reason code

Description:
The message is the corresponding response message.

2.3.26 MSG_EVT_DISCONNECT

```
{
    "chip":    0,
    "opcode": 309,
    "status": n,
    "peer_addr_type": n,
    "peer_addr": "xx:xx:xx:xx:xx:xx",
    "reason": n
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	309	Message opcode
"status"	n	Error code
"peer_addr_type"	n	Peer address type 0: public 1: random
"peer_addr"	"xx:xx:xx:xx:xx:xx"	Peer address
"reason"	n	Reason code

Description:
The message is a disconnection event.

2.3.27 MSG_REQ_CONNLIST

```
{
    "chip":    0,
    "opcode": 310
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	310	Message opcode

Description:
The message is used to get a connection list.

2.3.28 MSG_RSP_CONNLIST

```
{
    "chip":    0,
    "opcode": 311,
    "status": n,
    "conn_num": n,
    "conns": [{}, {}]
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	311	Message opcode
"status"	n	Error code
"conn_num"	n	Total number of connections
"conns"	[{}, {}]	An array of n objects, where n is the total number of connections, and each object represents a connection.

Description:
The message is the corresponding response message.

An example of this message is shown below:

```
{
    "chip": 0,
    "opcode": 311,
    "status": 0,
    "conn_num": 2,
    "conns": [
        {
            "handle": 0,
            "role": 0,
            "peer_addr_type": 0,
            "peer_addr": "C0:D1:E2:00:00:01",
            "interval": 32,
            "latency": 0,
            "supervision_timeout": 500,
            "max_tx_octets": 251,
            "max_tx_time": 2120,
            "max_rx_octets": 251,
            "max_rx_time": 2120,
```

```
            "tx_phy": 0,
            "rx_phy": 0,
            "encryption": 0
        },
        {
            "handle": 1,
            "role": 0,
            "peer_addr_type": 0,
            "peer_addr": "C0:D1:E2:00:00:02",
            "interval": 32,
            "latency": 0,
            "supervision_timeout": 500,
            "max_tx_octets": 251,
            "max_tx_time": 2120,
            "max_rx_octets": 251,
            "max_rx_time": 2120,
            "tx_phy": 0,
            "rx_phy": 0,
            "encryption": 0
        }
    ]
}
```

2.3.29 MSG_REQ_CONNUPDATE

```
{
    "chip":    0,
    "opcode": 312,
    "peer_addr_type": n,
    "peer_addr": "xx:xx:xx:xx:xx:xx",
    "min_interval": n,
    "max_interval": n,
    "latency": n,
    "supervision_timeout": n
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	312	Message opcode
"peer_addr_type"	n	Peer address type 0: public 1: random
"peer_addr"	"xx:xx:xx:xx:xx:xx"	Peer address
"min_interval"	n	Minimum connection interval Units: 1.25ms
"max_interval"	n	Maximum connection interval Units: 1.25ms
"latency"	n	Connection latency Range: 0x0000 to 0x01F3
"supervision_timeout"	n	Supervision Timeout Units: 10ms

Description:

The message is used to change the connection parameters.

2.3.30 MSG_RSP_CONNUPDATE

```
{
    "chip":    0,
    "opcode": 313,
    "status": n,
    "peer_addr_type": n,
    "peer_addr": "xx:xx:xx:xx:xx:xx",
    "interval": n,
    "latency": n,
    "supervision_timeout": n

}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	313	Message opcode
"status"	n	Error code
"peer_addr_type"	n	Peer address type 0: public 1: random
"peer_addr"	"xx:xx:xx:xx:xx:xx"	Peer address
"interval"	n	Connection interval Units: 1.25ms
"latency"	n	Connection latency
"supervision_timeout"	n	Supervision Timeout Units: 10ms

Description:
The message is the corresponding response message.

2.3.31 MSG_REQ_CONNDLE

```
{
    "chip":    0,
    "opcode": 314,
    "peer_addr_type": n,
    "peer_addr": "xx:xx:xx:xx:xx:xx",
    "tx_octets": n
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	314	Message opcode
"peer_addr_type"	n	Peer address type 0: public 1: random
"peer_addr"	"xx:xx:xx:xx:xx:xx"	Peer address
"tx_octets"	n	Preferred maximum number of payload octets that the gateway should include in a single Link Layer Data PDU on this connection. Range: 0x001B to 0x00FB

Description:
The message is used to suggest the maximum transmission payload size to be used for Link Layer Data PDUs on a given connection.

2.3.32 MSG_RSP_CONNDLE

```
{
    "chip":    0,
    "opcode": 315,
    "status": n,
    "peer_addr_type": n,
    "peer_addr": "xx:xx:xx:xx:xx:xx"
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	315	Message opcode
"status"	n	Error code
"peer_addr_type"	n	Peer address type 0: public 1: random
"peer_addr"	"xx:xx:xx:xx:xx:xx"	Peer address

Description:

The message is the corresponding response message.

2.3.33 MSG_EVT_DLE_CHANGE

```
{
    "chip":    0,
    "opcode": 317,
    "peer_addr_type": n,
    "peer_addr": "xx:xx:xx:xx:xx:xx",
    "max_tx_octets": n,
    "max_tx_time": n,
    "max_rx_octets": n,
    "max_rx_time": n
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	317	Message opcode
"peer_addr_type"	n	Peer address type 0: public 1: random
"peer_addr"	"xx:xx:xx:xx:xx:xx"	Peer address
"max_tx_octets"	n	The maximum number of payload octets in a Link Layer Data PDU that the gateway will send on this connection. Range: 0x001B to 0x00FB
"max_tx_time"	n	The maximum time that the gateway will take to send a Link Layer packet containing an Link Layer Data PDU on this connection. Range: 0x0148 to 0x4290 Units: us
"max_rx_octets"	n	The maximum number of payload octets in a Link Layer packet that the gateway expects to receive on this connection. Range: 0x001B to 0x00FB
"max_rx_time"	n	The maximum time that the gateway expects to take to receive a Link Layer packet on this connection. Range: 0x0148 to 0x4290 Units: us

Description:
The message is an event message used to notify a change to either the maximum Link Layer Data PDU Payload length or the maximum transmission time of packets containing Link Layer Data PDUs in either direction.

2.3.34 MSG_REQ_CONNPHY

```
{
    "chip":    0,
    "opcode": 318,
    "peer_addr_type": n,
    "peer_addr": "xx:xx:xx:xx:xx:xx",
    "tx_phys": n,
    "rx_phys": n,
    "phy_options": n
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	318	Message opcode
"peer_addr_type"	n	Peer address type 0: public 1: random
"peer_addr"	"xx:xx:xx:xx:xx:xx"	Peer address
"tx_phys"	n	The transmitter PHY, bit field b0: Application prefers to use the LE 1M b1: Application prefers to use the LE 2M b2: Application prefers to use the LE Coded other bits: reserved
"rx_phys"	n	The receiver PHY, bit field b0: Application prefers to use the LE 1M b1: Application prefers to use the LE 2M b2: Application prefers to use the LE Coded other bits: reserved
"phy_options"	n	PHY option 0: Application has no preferred coding when transmitting on the LE Coded PHY 1: Application prefers that S=2 coding be used when transmitting on the LE Coded PHY 2: Application prefers that S=8 coding be used when transmitting on the LE Coded PHY other values: reserved

Description:
The message is used to set the PHY preferences for a connection.

2.3.35 MSG_RSP_CONNPHY

```
{
    "chip":    0,
    "opcode": 319,
    "status": n,
    "peer_addr_type": n,
    "peer_addr": "xx:xx:xx:xx:xx:xx",
    "tx_phy": n,
    "rx_phy": n
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	319	Message opcode
"status"	n	Error code
"peer_addr_type"	n	Peer address type 0: public 1: random
"peer_addr"	"xx:xx:xx:xx:xx:xx"	Peer address
"tx_phy"	n	The transmitter PHY 0x01: LE 1M 0x02: LE 2M 0x03: LE Coded other values: reserved
"rx_phy"	n	The receiver PHY 0x01: LE 1M 0x02: LE 2M 0x03: LE Coded other values: reserved

Description:

The message is the corresponding response message.

2.3.36 MSG_EVT_PHY_UPDATE

```
{
    "chip":    0,
    "opcode": 321,
    "status": n,
    "peer_addr_type": n,
    "peer_addr": "xx:xx:xx:xx:xx:xx",
    "tx_phy": n,
    "rx_phy": n
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	321	Message opcode
"status"	n	Error code
"peer_addr_type"	n	Peer address type 0: public 1: random
"peer_addr"	"xx:xx:xx:xx:xx:xx"	Peer address
"tx_phy"	n	The transmitter PHY 0x01: LE 1M 0x02: LE 2M 0x03: LE Coded other values: reserved
"rx_phy"	n	The receiver PHY 0x01: LE 1M 0x02: LE 2M 0x03: LE Coded other values: reserved

Description:

The message is an event message used to indicate that the transmitter PHY or receiver PHY has changed.

2.3.37 MSG_REQ_READ_PHY

```
{
    "chip":    0,
    "opcode": 322,
    "peer_addr_type": n,
    "peer_addr": "xx:xx:xx:xx:xx:xx"
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	322	Message opcode
"peer_addr_type"	n	Peer address type 0: public 1: random
"peer_addr"	"xx:xx:xx:xx:xx:xx"	Peer address

Description:

The message is used to read the current transmitter PHY and receiver PHY of a connection.

2.3.38 MSG_RSP_READ_PHY

```
{
    "chip":    0,
    "opcode": 323,
    "status": n,
    "peer_addr_type": n,
    "peer_addr": "xx:xx:xx:xx:xx:xx",
    "tx_phy": n,
    "rx_phy": n
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	323	Message opcode
"status"	n	Error code
"peer_addr_type"	n	Peer address type 0: public 1: random
"peer_addr"	"xx:xx:xx:xx:xx:xx"	Peer address
"tx_phy"	n	The transmitter PHY 0x01: LE 1M 0x02: LE 2M 0x03: LE Coded other values: reserved
"rx_phy"	n	The receiver PHY 0x01: LE 1M 0x02: LE 2M 0x03: LE Coded other values: reserved

Description:

The message is the corresponding response message.

2.3.39 MSG_REQ_SET_SCHED_OPT

```
{
    "chip":    0,
    "opcode": 384,
    "opt": n
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	384	Message opcode
"opt"	n	Bluetooth scheduling algorithm option 0: scheduling algorithm 0 1: scheduling algorithm 1 2: scheduling algorithm 2 other values: reserved

Description:
The message is used to select Bluetooth scheduling algorithm.

- Scheduling algorithm 0

This is the default option.
When this option is on, the gateway works in default mode, that support most Bluetooth operation.

- Scheduling algorithm 1

When this option is on, the gateway only works in scanner and central mode.

This algorithm supports both scanning and connection simultaneously, and ensures that the two operations do not interfere with each other. The algorithm supports to poll multi peripherals based on the idea of balanced time division, which ensures that all peripherals share roughly equal bandwidth resources. This algorithm ensures that the ease of connection will not change with the increase of peripherals.

The algorithm is very suitable to scenario where the high scanning performance and data throughput are needed simultaneously.

- Scheduling algorithm 2

When this option is on, the gateway only works in central mode.

This algorithm shares the idea of algorithm 1, but supports better parameters, thus providing higher data throughput.

The algorithm is very suitable to scenario where only high data throughput is needed.

2.3.40 MSG_RSP_SET_SCHED_OPT

```
{
    "chip":    0,
    "opcode": 385,
    "status": n
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	385	Message opcode
"status"	n	Error code

Description:
The message is the corresponding response message.

2.3.41 MSG_REQ_GET_SCHED_OPT

```
{
    "chip":    0,
    "opcode": 386
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	386	Message opcode

Description:
The message is used to get Bluetooth scheduling algorithm option.

2.3.42 MSG_RSP_GET_SCHED_OPT

```
{
    "chip":    0,
    "opcode": 387,
    "status": n,
    "opt": n
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	387	Message opcode
"status"	n	Error code
"opt"	n	Bluetooth scheduling algorithm option

Description:

The message is the corresponding response message.

2.3.43 MSG_REQ_SET_SCHED_OPT1_PARAM

```
{
    "chip":    0,
    "opcode": 388,
    "conn_interval": n,
    "conn_slot": n,
    "conn_num": n
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	388	Message opcode
"conn_interval"	n	Connection interval Units: 0.625ms
"conn_slot"	n	Connection slot, the max time a connection will occupy in a connection event Units: 0.625ms
"conn_num"	n	Max number of connections

Description:
The message is used to set the Bluetooth scheduling algorithm 1 parameters.

[Note]:
The parameters restrictions:
conn_num * conn_slot < conn_interval

2.3.44 MSG_RSP_SET_SCHED_OPT1_PARAM

```
{
    "chip":    0,
    "opcode": 389,
    "status": n
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	389	Message opcode
"status"	n	Error code

Description:
The message is the corresponding response message.

2.3.45 MSG_REQ_GET_SCHED_OPT1_PARAM

```
{
    "chip":    0,
    "opcode": 390
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	390	Message opcode

Description:

The message is used to get the Bluetooth scheduling algorithm 1 parameters.

2.3.46 MSG_RSP_GET_SCHED_OPT1_PARAM

```
{
    "chip":    0,
    "opcode": 391,
    "status": n
    "conn_interval": n,
    "conn_slot": n,
    "conn_num": n
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	391	Message opcode
"status"	n	Error code
"conn_interval"	n	Connection interval Units: 0.625ms
"conn_slot"	n	Connection slot, the max time a connection will occupy in a connection event Units: 0.625ms
"conn_num"	n	Max number of connections

Description:
The message is the corresponding response message.

2.3.47 MSG_REQ_SET_SCHED_OPT2_PARAM

```
{
    "chip":    0,
    "opcode": 404,
    "conn_slot": n,
    "conn_num": n
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	404	Message opcode
"conn_slot"	n	Connection slot, the max time a connection will occupy in a connection event Units: 0.625ms
"conn_num"	n	Max number of connections

Description:
The message is used to set the Bluetooth scheduling algorithm 2 parameters.

2.3.48 MSG_RSP_SET_SCHED_OPT2_PARAM

```
{
    "chip":    0,
    "opcode": 405,
    "status": n
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	405	Message opcode
"status"	n	Error code

Description:
The message is the corresponding response message.

2.3.49 MSG_REQ_GET_SCHED_OPT2_PARAM

```
{
    "chip":    0,
    "opcode": 406
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	406	Message opcode

Description:
The message is used to get the Bluetooth scheduling algorithm 2 parameters.

2.3.50 MSG_RSP_GET_SCHED_OPT2_PARAM

```
{
    "chip":    0,
    "opcode": 407,
    "status": n
    "conn_slot": n,
    "conn_num": n
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	407	Message opcode
"status"	n	Error code
"conn_slot"	n	Connection slot, the max time a connection will occupy in a connection event Units: 0.625ms
"conn_num"	n	Max number of connections

Description:
The message is the corresponding response message.

2.3.51 MSG_REQ_EXCHANGE_MTU

```
{
    "chip":    0,
    "opcode": 512,
    "peer_addr_type": n,
    "peer_addr": "xx:xx:xx:xx:xx:xx"
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	512	Message opcode
"peer_addr_type"	n	Peer address type 0: public 1: random
"peer_addr"	"xx:xx:xx:xx:xx:xx"	Peer address

Description:

The message is used to exchange ATT MTU with a peer.

2.3.52 MSG_RSP_EXCHANGE_MTU

```
{
    "chip":    0,
    "opcode": 513,
    "status": n,
    "peer_addr_type": n,
    "peer_addr": "xx:xx:xx:xx:xx:xx",
    "mtu": n
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	513	Message opcode
"status"	n	Error code
"peer_addr_type"	n	Peer address type 0: public 1: random
"peer_addr"	"xx:xx:xx:xx:xx:xx"	Peer address
"mtu"	n	ATT MTU

Description:
The message is the corresponding response message.

2.3.53 MSG_REQ_DISCOVER_ATTR

```
{
    "chip":    0,
    "opcode": 528,
    "peer_addr_type": n,
    "peer_addr": "xx:xx:xx:xx:xx:xx"
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	528	Message opcode
"peer_addr_type"	n	Peer address type 0: public 1: random
"peer_addr"	"xx:xx:xx:xx:xx:xx"	Peer address

Description:
The message is used to discover all GATT attributes of a peer, including services, includes, characteristics and descriptors.

2.3.54 MSG_RSP_DISCOVER_ATTR

```
{
    "chip":    0,
    "opcode": 529,
    "status": n,
    "peer_addr_type": n,
    "peer_addr": "xx:xx:xx:xx:xx:xx",
    "attr_num": n
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	529	Message opcode
"status"	n	Error code
"peer_addr_type"	n	Peer address type 0: public 1: random
"peer_addr"	"xx:xx:xx:xx:xx:xx"	Peer address
"attr_num"	n	The total number of attributes

Description:
The message is the corresponding response message.
The peer GATT attributes are stored in gateway, and only the total number is returned here.
Application should run another message, MSG_REQ_GET_ATTR, to fetch the attributes.

2.3.55 MSG_REQ_GET_ATTR

```
{
    "chip":    0,
    "opcode": 530,
    "peer_addr_type": n,
    "peer_addr": "xx:xx:xx:xx:xx:xx"
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	530	Message opcode
"peer_addr_type"	n	Peer address type 0: public 1: random
"peer_addr"	"xx:xx:xx:xx:xx:xx"	Peer address

Description:

The message is used to get all GATT attributes of a peer, including services, includes, characteristics and descriptors.

2.3.56 MSG_RSP_GET_ATTR

```
{
    "chip": 0,
    "opcode": 531,
    "status": n,
    "peer_addr_type": n,
    "peer_addr": "xx:xx:xx:xx:xx:xx",
    "attr_num": n,
    "attrs": [{}, {}]
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	531	Message opcode
"status"	n	Error code
"peer_addr_type"	n	Peer address type 0: public 1: random
"peer_addr"	"xx:xx:xx:xx:xx:xx"	Peer address
"attr_num"	n	Total number of attributes
"attrs"	[{}, {}]	An array of n objects, where n is the total number of attributes, and each object represents an attribute.

Description:
The message is the corresponding response message.

2.3.57 MSG_REQ_CLEAR_ATTR

```
{
    "chip":    0,
    "opcode": 532,
    "peer_addr_type": n,
    "peer_addr": "xx:xx:xx:xx:xx:xx"
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	532	Message opcode
"peer_addr_type"	n	Peer address type 0: public 1: random
"peer_addr"	"xx:xx:xx:xx:xx:xx"	Peer address

Description:

The message is used to clear all GATT attributes of a peer in gateway.

2.3.58 MSG_RSP_CLEAR_ATTR

```
{
    "chip":    0,
    "opcode": 533,
    "status": n,
    "peer_addr_type": n,
    "peer_addr": "xx:xx:xx:xx:xx:xx"
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	533	Message opcode
"status"	n	Error code
"peer_addr_type"	n	Peer address type 0: public 1: random
"peer_addr"	"xx:xx:xx:xx:xx:xx"	Peer address

Description:

The message is the corresponding response message.

2.3.59 MSG_REQ_READ_ATTR

```
{
    "chip":    0,
    "opcode": 576,
    "peer_addr_type": n,
    "peer_addr": "xx:xx:xx:xx:xx:xx",
    "attr_handle": n
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	576	Message opcode
"peer_addr_type"	n	Peer address type 0: public 1: random
"peer_addr"	"xx:xx:xx:xx:xx:xx"	Peer address
"attr_handle"	n	Attribute handle

Description:

The message is used to read an attribute of a peer.

2.3.60 MSG_RSP_READ_ATTR

```
{
    "chip": 0,
    "opcode": 577,
    "status": n,
    "peer_addr_type": n,
    "peer_addr": "xx:xx:xx:xx:xx:xx",
    "attr_handle": n,
    "length": n,
    "data": "x"
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	577	Message opcode
"status"	n	Error code
"peer_addr_type"	n	Peer address type 0: public 1: random
"peer_addr"	"xx:xx:xx:xx:xx:xx"	Peer address
"attr_handle"	n	Attribute handle
"length"	n	Data length
"data"	"x"	Data in hex string

Description:
The message is the corresponding response message.

2.3.61 MSG_REQ_WRITE_ATTR

```
{
    "chip":    0,
    "opcode": 592,
    "peer_addr_type": 0,
    "peer_addr": "xx:xx:xx:xx:xx:xx",
    "attr_handle": n,
    "data": "x"
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	592	Message opcode
"peer_addr_type"	n	Peer address type 0: public 1: random
"peer_addr"	"xx:xx:xx:xx:xx:xx"	Peer address
"attr_handle"	n	Attribute handle
"data"	"x"	Data in hex string

Description:
The message is used to write data to an attribute of a peer.

2.3.62 MSG_RSP_WRITE_ATTR

```
{
    "chip":    0,
    "opcode": 593,
    "status": n,
    "peer_addr_type": n,
    "peer_addr": "xx:xx:xx:xx:xx:xx",
    "attr_handle": n
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	593	Message opcode
"status"	n	Error code
"peer_addr_type"	n	Peer address type 0: public 1: random
"peer_addr"	"xx:xx:xx:xx:xx:xx"	Peer address
"attr_handle"	n	Attribute handle

Description:
The message is the corresponding response message.

2.3.63 MSG_REQ_WRITECMD_ATTR

```
{
    "chip":    0,
    "opcode": 594,
    "peer_addr_type": 0,
    "peer_addr": "xx:xx:xx:xx:xx:xx",
    "attr_handle": n,
    "data": "x"
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	594	Message opcode
"peer_addr_type"	n	Peer address type 0: public 1: random
"peer_addr"	"xx:xx:xx:xx:xx:xx"	Peer address
"attr_handle"	n	Attribute handle
"data"	"x"	Data in hex string

Description:
The message is used to perform an operation, write without response, on an attribute of a peer.

2.3.64 MSG_RSP_WRITECMD_ATTR

```
{
    "chip":    0,
    "opcode": 555,
    "status": n,
    "peer_addr_type": n,
    "peer_addr": "xx:xx:xx:xx:xx:xx",
    "attr_handle": n
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	555	Message opcode
"status"	n	Error code
"peer_addr_type"	n	Peer address type 0: public 1: random
"peer_addr"	"xx:xx:xx:xx:xx:xx"	Peer address
"attr_handle"	n	Attribute handle

Description:
The message is the corresponding response message.

2.3.65 MSG_NOTIFICATION

```
{
    "chip":    0,
    "opcode": 609,
    "peer_addr_type": n,
    "peer_addr": "xx:xx:xx:xx:xx:xx",
    "attr_handle": n,
    "length": n,
    "data": "x"
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	609	Message opcode
"peer_addr_type"	n	Peer address type 0: public 1: random
"peer_addr"	"xx:xx:xx:xx:xx:xx"	Peer address
"attr_handle"	n	Attribute handle
"length"	n	Data length
"data"	"x"	Data in hex string

Description:
The message is a GATT notification event.

2.3.66 MSG_INDICATION

```
{
    "chip":    0,
    "opcode": 611,
    "peer_addr_type": n,
    "peer_addr": "xx:xx:xx:xx:xx:xx",
    "attr_handle": n,
    "length": n,
    "data": "x"
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	611	Message opcode
"peer_addr_type"	n	Peer address type 0: public 1: random
"peer_addr"	"xx:xx:xx:xx:xx:xx"	Peer address
"attr_handle"	n	Attribute handle
"length"	n	Data length
"data"	"x"	Data in hex string

Description:

The message is a GATT indication event.

2.3.67 MSG_REQ_PAIR

```
{
    "chip": 0,
    "opcode": 768,
    "peer_addr_type": n,
    "peer_addr": "xx:xx:xx:xx:xx:xx"
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	768	Message opcode
"peer_addr_type"	n	Peer address type 0: public 1: random
"peer_addr"	"xx:xx:xx:xx:xx:xx"	Peer address

Description:

The message is used to start a pairing procedure.

2.3.68 MSG_RSP_PAIR

```
{
    "chip": 0,
    "opcode": 769,
    "status": n,
    "peer_addr_type": n,
    "peer_addr": "xx:xx:xx:xx:xx:xx"
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	769	Message opcode
"status"	n	Error code
"peer_addr_type"	n	Peer address type 0: public 1: random
"peer_addr"	"xx:xx:xx:xx:xx:xx"	Peer address

Description:
The message is the corresponding response message.

2.3.69 MSG_EVT_PAIR

```
{
    "chip": 0,
    "opcode": 771,
    "status": n,
    "peer_addr_type": n,
    "peer_addr": "xx:xx:xx:xx:xx:xx"
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	771	Message opcode
"status"	n	Error code
"peer_addr_type"	n	Peer address type 0: public 1: random
"peer_addr"	"xx:xx:xx:xx:xx:xx"	Peer address

Description:
The message is an event message indicating a completion of a pairing procedure.

2.3.70 MSG_REQ_REPAIR

```
{
    "chip": 0,
    "opcode": 772,
    "peer_addr_type": n,
    "peer_addr": "xx:xx:xx:xx:xx:xx"
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	772	Message opcode
"peer_addr_type"	n	Peer address type 0: public 1: random
"peer_addr"	"xx:xx:xx:xx:xx:xx"	Peer address

Description:
The message is used to restart a pairing procedure.

2.3.71 MSG_RSP_REPAIR

```
{
    "chip": 0,
    "opcode": 773,
    "status": n,
    "peer_addr_type": n,
    "peer_addr": "xx:xx:xx:xx:xx:xx"
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	773	Message opcode
"status"	n	Error code
"peer_addr_type"	n	Peer address type 0: public 1: random
"peer_addr"	"xx:xx:xx:xx:xx:xx"	Peer address

Description:
The message is the corresponding response message.

2.3.72 MSG_EVT_NUMERIC_CONFIRM_PENDING

```
{
    "chip": 0,
    "opcode": 775,
    "status": n,
    "peer_addr_type": n,
    "peer_addr": "xx:xx:xx:xx:xx:xx",
    "numeric": n
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	775	Message opcode
"status"	n	Error code
"peer_addr_type"	n	Peer address type 0: public 1: random
"peer_addr"	"xx:xx:xx:xx:xx:xx"	Peer address
"numeric"	n	A six-digit numeric value

Description:

The message is an event message displaying a six-digit numeric value.

When the event is received, an application should respond with a command, MSG_NUMERIC_CONFIM or MSG_REJECT_PAIRING, to continue a pairing procedure.

2.3.73 MSG_NUMERIC_CONFIRM

```
{
    "chip": 0,
    "opcode": 776,
    "peer_addr_type": n,
    "peer_addr": "xx:xx:xx:xx:xx:xx"
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	776	Message opcode
"peer_addr_type"	n	Peer address type 0: public 1: random
"peer_addr"	"xx:xx:xx:xx:xx:xx"	Peer address

Description:
The message is a command message used to confirm a numeric comparison value.

2.3.74 MSG_EVT_PASSKEY_DISPLAY

```
{
    "chip": 0,
    "opcode": 779,
    "status": n,
    "peer_addr_type": n,
    "peer_addr": "xx:xx:xx:xx:xx:xx",
    "passkey": n
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	779	Message opcode
"status"	n	Error code
"peer_addr_type"	n	Peer address type 0: public 1: random
"peer_addr"	"xx:xx:xx:xx:xx:xx"	Peer address
" passkey "	n	Passkey

Description:
The message is an event message displaying a passkey.

2.3.75 MSG_EVT_PASSKEY_INPUT

```
{
    "chip": 0,
    "opcode": 781,
    "status": n,
    "peer_addr_type": n,
    "peer_addr": "xx:xx:xx:xx:xx:xx"
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	781	Message opcode
"status"	n	Error code
"peer_addr_type"	n	Peer address type 0: public 1: random
"peer_addr"	"xx:xx:xx:xx:xx:xx"	Peer address

Description:
The message is an event message indicating a passkey waiting to be input.
When the event is received, an application should respond with a command, MSG_EVT_PASSKEY_INPUT or MSG_REJECT_PAIRING, to continue a pairing procedure.

2.3.76 MSG_PASSKEY_INPUT

```
{
    "chip": 0,
    "opcode": 782,
    "peer_addr_type": n,
    "peer_addr": "xx:xx:xx:xx:xx:xx",
    "passkey": n
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	782	Message opcode
"peer_addr_type"	n	Peer address type 0: public 1: random
"peer_addr"	"xx:xx:xx:xx:xx:xx"	Peer address
"passkey"	n	Passkey

Description:

The message is a command message used to input a passkey.

2.3.77 MSG_REJECT_PAIRING

```
{
    "chip": 0,
    "opcode": 784,
    "peer_addr_type": n,
    "peer_addr": "xx:xx:xx:xx:xx:xx"
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	784	Message opcode
"peer_addr_type"	n	Peer address type 0: public 1: random
"peer_addr"	"xx:xx:xx:xx:xx:xx"	Peer address

Description:
The message is a command message used to reject a pairing procedure.

2.3.78 MSG_REQ_GET_KEYS

```
{
    "chip": 0,
    "opcode": 816,
    "peer_addr_type": n,
    "peer_addr": "xx:xx:xx:xx:xx:xx"
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	816	Message opcode
"peer_addr_type"	n	Peer address type 0: public 1: random
"peer_addr"	"xx:xx:xx:xx:xx:xx"	Peer address

Description:
The message is used to get pairing keys about a peer.

2.3.79 MSG_RSP_GET_KEYS

```
{
    "chip": 0,
    "opcode": 817,
    "status": n,
    "peer_addr_type": n,
    "peer_addr": "xx:xx:xx:xx:xx:xx",
    "keys": {}
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	817	Message opcode
"status"	n	Error code
"peer_addr_type"	n	Peer address type 0: public 1: random
"peer_addr"	"xx:xx:xx:xx:xx:xx"	Peer address
"keys"	{}	Keys information

Description:
The message is the corresponding response message.

2.3.80 MSG_REQ_CLEAR_KEYS

```
{
    "chip": 0,
    "opcode": 818,
    "peer_addr_type": n,
    "peer_addr": "xx:xx:xx:xx:xx:xx"
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	818	Message opcode
"peer_addr_type"	n	Peer address type 0: public 1: random
"peer_addr"	"xx:xx:xx:xx:xx:xx"	Peer address

Description:
The message is used to clear pairing information about a peer.

If an application wants to restart a pairing procedure with a peer, it should call the message first, then start a new pairing.

2.3.81 MSG_RSP_CLEAR_KEYS

```
{
    "chip": 0,
    "opcode": 819,
    "status": n,
    "peer_addr_type": n,
    "peer_addr": "xx:xx:xx:xx:xx:xx"
}
```

Name	Value	Parameter Description
"chip"	0	Bluetooth chip id 0: for BGA100, BGA300 other value: reserved
"opcode"	819	Message opcode
"status"	n	Error code
"peer_addr_type"	n	Peer address type 0: public 1: random
"peer_addr"	"xx:xx:xx:xx:xx:xx"	Peer address

Description:
The message is the corresponding response message.

3 Error code

3.1 Overview

The error code is a two bytes unsigned integer.

All error codes are divided into two groups, system domain error codes and Bluetooth domain error codes.

3.2 System

#(Dec)	#(Hex)	Description
0	0x0000	Success
1	0x0001	Invalid argument
2	0x0002	Out of memory
3	0x0003	I/O error
4	0x0004	Requested resource not found
5	0x0005	Operation not permitted
6	0x0006	Device or resource busy
7	0x0007	Operation timed out
8	0x0008	Requested resource already exist
255	0x00ff	unspecified

3.3 Bluetooth

■ HCI related error codes:

#(Dec)	#(Hex)	Description
257	0x0101	Unknown HCI Command
258	0x0102	Unknown Connection Identifier
259	0x0103	Hardware Failure
260	0x0104	Page Timeout
261	0x0105	Authentication Failure
262	0x0106	PIN or Key Missing
263	0x0107	Memory Capacity Exceeded
264	0x0108	Connection Timeout
265	0x0109	Connection Limit Exceeded
266	0x010A	Synchronous Connection Limit To A Device Exceeded
267	0x010B	Connection Already Exists
268	0x010C	Command Disallowed
269	0x010D	Connection Rejected due to Limited Resources
270	0x010E	Connection Rejected Due To Security Reasons
271	0x010F	Connection Rejected due to Unacceptable BD_ADDR
272	0x0110	Connection Accept Timeout Exceeded
273	0x0111	Unsupported Feature or Parameter Value
274	0x0112	Invalid HCI Command Parameters
275	0x0113	Remote User Terminated Connection
276	0x0114	Remote Device Terminated Connection due to Low Resources
277	0x0115	Remote Device Terminated Connection due to Power Off
278	0x0116	Connection Terminated By Local Host
279	0x0117	Repeated Attempts
280	0x0118	Pairing Not Allowed
281	0x0119	Unknown LMP PDU
282	0x011A	Unsupported Remote Feature
283	0x011B	SCO Offset Rejected
284	0x011C	SCO Interval Rejected
285	0x011D	SCO Air Mode Rejected
286	0x011E	Invalid LMP Parameters / Invalid LL Parameters
287	0x011F	Unspecified Error

288	0x0120	Unsupported LMP Parameter Value / Unsupported LL Parameter Value
289	0x0121	Role Change Not Allowed
290	0x0122	LMP Response Timeout / LL Response Timeout
291	0x0123	LMP Error Transaction Collision / LL Procedure Collision
292	0x0124	LMP PDU Not Allowed
293	0x0125	Encryption Mode Not Acceptable
294	0x0126	Link Key cannot be Changed
295	0x0127	Requested QoS Not Supported
296	0x0128	Instant Passed
297	0x0129	Pairing With Unit Key Not Supported
298	0x012A	Different Transaction Collision
299	0x012B	Reserved for future use
300	0x012C	QoS Unacceptable Parameter
301	0x012D	QoS Rejected
302	0x012E	Channel Classification Not Supported
303	0x012F	Insufficient Security
304	0x0130	Parameter Out Of Mandatory Range
305	0x0131	Reserved for future use
306	0x0132	Role Switch Pending
307	0x0133	Reserved for future use
308	0x0134	Reserved Slot Violation
309	0x0135	Role Switch Failed
310	0x0136	Extended Inquiry Response Too Large
311	0x0137	Secure Simple Pairing Not Supported By Host
312	0x0138	Host Busy - Pairing
313	0x0139	Connection Rejected due to No Suitable Channel Found
314	0x013A	Controller Busy
315	0x013B	Unacceptable Connection Parameters
316	0x013C	Advertising Timeout
317	0x013D	Connection Terminated due to MIC Failure
318	0x013E	Connection Failed to be Established / Synchronization Timeout
319	0x013F	Previously used
320	0x0140	Coarse Clock Adjustment Rejected but Will Try to Adjust Using Clock Dragging
321	0x0141	Type0 Submap Not Defined
322	0x0142	Unknown Advertising Identifier

323	0x0143	Limit Reached
324	0x0144	Operation Cancelled by Host
325	0x0145	Packet Too Long

■ ATT channel related error codes:

# (Dec)	#(Hex)	Description
513	0x0201	Invalid Handle
514	0x0202	Read Not Permitted
515	0x0203	Write Not Permitted
516	0x0204	Invalid PDU
517	0x0205	Insufficient Authentication
518	0x0206	Request Not Supported
519	0x0207	Invalid Offset
520	0x0208	Insufficient Authorization
521	0x0209	Prepare Queue Full
522	0x020A	Attribute Not Found
523	0x020B	Attribute Not Long
524	0x020C	Encryption Key Size Too Short1
525	0x020D	Invalid Attribute Value Length
526	0x020E	Unlikely Error
527	0x020F	Insufficient Encryption
528	0x0210	Unsupported Group Type
529	0x0211	Insufficient Resources
530	0x0212	Database Out Of Sync
531	0x0213	Value Not Allowed

■ SMP related error codes

# (Dec)	#(Hex)	Description
769	0x0301	Passkey Entry Failed
770	0x0302	OOB Not Available
771	0x0303	Authentication Requirements
772	0x0304	Confirm Value Failed
773	0x0305	Pairing Not Supported
774	0x0306	Encryption Key Size
775	0x0307	Command Not Supported
776	0x0308	Unspecified Reason
777	0x0309	Repeated Attempts
778	0x030A	Invalid Parameters
779	0x030B	DHKey Check Failed
780	0x030C	Numeric Comparison Failed
781	0x030D	BR/EDR pairing in progress
782	0x030E	Cross-transport Key Derivation/ Generation not allowed
783	0x030F	Key Rejected