OPL1000

ULTRA-LOW POWER 2.4GHZ WI-FI + BLUETOOTH SMART SOC

BLE to WiFi Application Development Guide

OPULINKS

REVISION HISTORY

Date	Version	Contents Updated
2018/4/1	0.1	• Initial Release
2018/6/19	0.2	• Add message chart and add new command IDs
2018/6/20	0.3	• Modify WIFI status part
2018/7/19	0.4	• Add document application scope, abbr., reference etc.
2018/8/01	0.5	• Add OTA
2018/9/07	0.6	• Add WiFi OTA
2019/7/10	0.7	• Modify blewifi example path

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1. INTRODUCTION

1.1. Scope of Document Application

This document outlines the process of WIFI AP connection through BLE, the API port used and message procedure. Corresponding to the demonstration project, "SDK\APS_PATCH\examples\system\blewifi", of OPL1000 SDK Package.

About the BLE config WIFI AP Demo is described in "OPL1000-Demo-BLE-setup-network-guide.pdf" document ,a document located in the Demo\BLE_Config_AP directory.

1.2. Abbreviations

Abbr.	Explanation
BLE	Bluetooth Energy
WIFI	Wireless Fidelity

1.3. References

[1] OPL1000-Demo-BLE-setup-network-guide.pdf

2. List of Command ID

Name	Value	Description
BLEWIFI_REQ_SCAN	0x0000	The app sends a request of scan command to driver.
BLEWIFI_REQ_CONNECT	0x0001	The app sends a request of connect command to driver.
BLEWIFI_REQ_DISCONNECT	0x0002	The app sends a request of disconnect command to driver.
BLEWIFI_REQ_RECONNECT	0x0003	The app sends a request of reconnect command to driver.
BLEWIFI_REQ_READ_DEVICE_INFO	0x0004	The app sends a request of get device information.
BLEWIFI_REQ_WRITE_DEVICE_INFO	0x0005	The app sends a request of set device information.
BLEWIFI_REQ_WIFI_STATUS	0x0006	The app send a request of get Wi-Fi status
BLEWIFI_REQ_RESET	0x0007	The app send a request of reset Wi-Fi record
BLEWIFI_RSP_SCAN_REPORT	0x1000	Driver reports an event of scan results to app.
BLEWIFI_RSP_SCAN_END	0x1001	Driver reports an event of scan end to app, to notify app to stop to receive scan result events.
BLEWIFI_RSP_CONNECT	0x1002	Driver reports an event of connect to app.
BLEWIFI_RSP_DISCONNECT	0x1003	Driver reports an event of disconnect to app.
BLEWIFI_RSP_RECONNECT	0x1004	Driver reports an event of reconnect to app.
BLEWIFI_RSP_READ_DEVICE_INFO	0x1005	Driver reports data of device information.
BLEWIFI_RSP_WRITE_DEVICE_INFO	0x1006	Driver reports an event about

Name	Value	Description
		whether the data is set successfully or not.
BLEWIFI_RSP_WIFI_STATUS	0x1007	Driver report an event of Wi-Fi status of device to app.
BLEWIFI_RSP_RESET	0x1008	Driver report an event reset results to app.
BLEWIFI_REQ_OTA_VERSION	0x100	The app sends a request of get device FW information
BLE_RSP_OTA_VERSION	0x1100	Device FW information
BLE_REQ_OTA_UPGRADE	0x101	The start of upgrade
BLE_RSP_OTA_UPGRADE	0x1101	Response of upgrade request
BLE_REQ_OTA_RAW	0x102	Patch image raw data
BLE_RSP_OTA_RAW	0x1102	Response of OTA raw request
BLE_REQ_OTA_END	0x103	The end of upgrade
BLE_RSP_OTA_END	0x1103	Response of OTA end request
WIFI_REQ_OTA_TRIGGER	0x200	Start WiFi OTA
WIFI_RSP_OTA_TRIGGER	0x1200	Response WiFi OTA request
WIFI_REQ_OTA_DEVICE_VERSION	0x201	Device FW information
WIFI_RSP_OTA_DEVICE_VERSION	0x1201	Response Device FW information
WIFI_REQ_OTA_SERVER_VERSION	0x202	Server Device FW information
WIFI_RSP_OTA_SERVER_VERSION	0x1202	Response Server Device FW information
IP STATUS NOTIFY	0x2000	IP Status Notify

3. The Usage of Command ID

3.1. SCAN REQUEST

Bytes	2	2	1	1
	cmd_id	data_length	show_hidden	scan_type
	Header		Data	

- CMD_ID: Command ID, please refer to Command ID section.
- Data_Length: Size of data.
- Show_hidden: Enable to scan AP whose SSID is hidden; enable (1), disable (0).
- Scan_type: Scan type, active or passive; active (0), passive (1).

Example for frame format:

Bytes	2	2	1	1
	cmd_id	data_length	show_hidden	scan_type
Value	0x0000	0x0002	01	00

3.2. SCAN REPORT RESPONSE

Bytes	2	2	1	1~32	6	1	1	1
	cmd_id	data_length	Ssid_length	ssid	bssid	Auth_mode	Rssi	Connected
	Header			Data				

- CMD_ID: Command ID, please refer to Command ID section.

- Data_Length: Size of data.
- Ssid_length: Length of the SSID.
- Ssid: Stores the predefined SSID.
- Bssid: AP's MAC address.
- Auth_mode: This defines the wireless authentication mode to indicate the Wi-Fi device authentication attribute. Open (0), WEP (1), WPA_PSK (2), WPA2_PSK (3), WPA_WPA_2_PSK (4), WPA2_ENTERPRISE (5).
- Rssi: Records the RSSI value when probe response is received.
- Connected: AP was connected before. (0 not connected before, 1 connected before)

Example for frame format:

Bytes	2	2	1	1~32	6	1	1
	cmd_id	data_length	Ssid_length	Ssid	bssid	Auth_mode	Rssi
Value	0x1000	0x0017	08	44 2d 4c 69 6e 6b 5f 44	74 DA DA E7 08 F1	03	1E

1
Connected
01

3.3. SCAN RESPONSE END

Bytes	2	2
	cmd_id	data_length
	Header	

- CMD_ID: Command ID, please refer to Command ID section.
- Data_Length: Size of data.

Example for frame format:

Bytes	2	2
	cmd_id	data_length
Value	0x1001	0x0000

3.4. CONNECT REQUEST

Bytes	2	2	6	1	1	8~63
	cmd_id	data_length	bssid	Connected	password_length	password
	Header			Data		

- CMD_ID: Command ID, please refer to Command ID section.
- Data_Length: Size of data.
- Bssid: AP's MAC address.
- Password_length: The length of the password.
- Password: The password of the target AP.
- Connected: AP was connected before. (0 not connected before, 1 connected before)

Example for frame format:

Bytes	2	2	6	1	1
	cmd_id	data_length	bssid	Connected	password_length
Value	0x0001	0x00F0	74 DA DA E7 08 F1	01	08

8~63
password

01 02 03 04 05 06 07 08

3.5. CONNECT RESPONSE

Bytes	2	2	1
	cmd_id	data_length	status
	Header		Data

- CMD_ID: Command ID, please refer to Command ID section.
- Data_Length: Size of data.
- Status: Return success (0) or failed reason code (1).

Example for frame format:

Bytes	2	2	1
	cmd_id	data_length	status
Value	0x1002	0x0001	00

3.6. DISCONNECT REQUEST

Bytes	2	2
	cmd_id	data_length
	Header	

- CMD_ID: Command ID, please refer to Command ID section.
- Data_Length: Size of data.

Example for frame format:

Bytes	2	2
	cmd_id	data_length
Value	0x0002	0x0000

3.7. DISCONNECT RESPONSE

Bytes	2	2	1
	cmd_id	data_length	status
	Header		Data

- CMD_ID: Command ID, please refer to Command ID section.
- Data_Length: Size of data.
- Status: Return success (0) or failed reason code (1).

Example for frame format:

Bytes	2	2	1
	cmd_id	data_length	status
Value	0x1003	0x0001	00

3.8. RECONNECT REQUEST

Byte	2	2
	cmd_id	data_length
	Header	

- CMD_ID: Command ID, please refer to Command ID section.
- Data_Length: Size of data.

Example for frame format:

Byte	2	2

	cmd_id	data_length
Value	0x0003	0x0000

3.9. RECONNECT RESPONSE

Byte	2	2	1
	cmd_id	data_length	status
	Header		Data

- CMD_ID: Command ID, please refer to Command ID section.
- Data_Length: Size of data.
- Status: Return success (0) or failed reason code (1).

Example for frame format:

Byte	2	2	1
	cmd_id	data_length	status
Value	0x1004	0x0001	00

3.10. READ DEVICE INFORMATION REQUEST

Byte	2	2
	cmd_id	data_length
	Header	

- CMD_ID: Command ID, please refer to Command ID section.
- Data_Length: Size of data.

Example for frame format:

Byte	2	2
	cmd_id	data_length
Value	0x0004	0x0000

3.11. READ DEVICE INFORMATION RESPONSE

Bytes	2	2	6	1	0~32
	cmd_id	data_length	Device_id	name_length	Manufacture_name
	Header		Data		

- CMD_ID: Command ID, please refer to Command ID section.
- Data_Length: Size of data.
- Device_Id: The device MAC address.
- Name_Length: The length of the manufacture name.
- Manufacture_Name: The device manufacture name.

Example for frame format:

Bytes	2	2	6	1	7
	cmd_id	data_length	Device_id	name_length	Manufacture_name
Value	0x1005	0x000E	AA BB CC DD EE FF	07	Example

3.12. WRITE DEVICE INFORMATION REQUEST

Bytes	2	2	6	1	0~32
	cmd_id	data_length	Device_id	name_length	Manufacture_name
	Header			Data	

- CMD_ID: Command ID, please refer to Command ID section.
- Data_Length: Size of data.
- Device_Id: The device MAC address.
- Name_Length: The length of the manufacture name.
- Manufacture_Name: The device manufacture name.

Example for frame format:

Bytes	2	2	6	1	8
	cmd_id	data_length	Device_id	name_length	Manufacture_name
Value	0x0005	0x000F	AA BB CC DD EE FF	08	Example2

3.13. WRITE DEVICE INFORMATION RESPONSE

Bytes	2	2	1
	cmd_id	data_length	status
	Header		Data

- CMD_ID: Command ID, please refer to Command ID section.
- Data_Length: Size of data.
- Status: Return success (0) or failed reason code (1).

Example for frame format:

Bytes	2	2	1
	cmd_id	data_length	status
Value	0x1006	0x0001	00

3.14. WIFI STATUS REQUEST

Bytes	2	2
	cmd_id	data_length

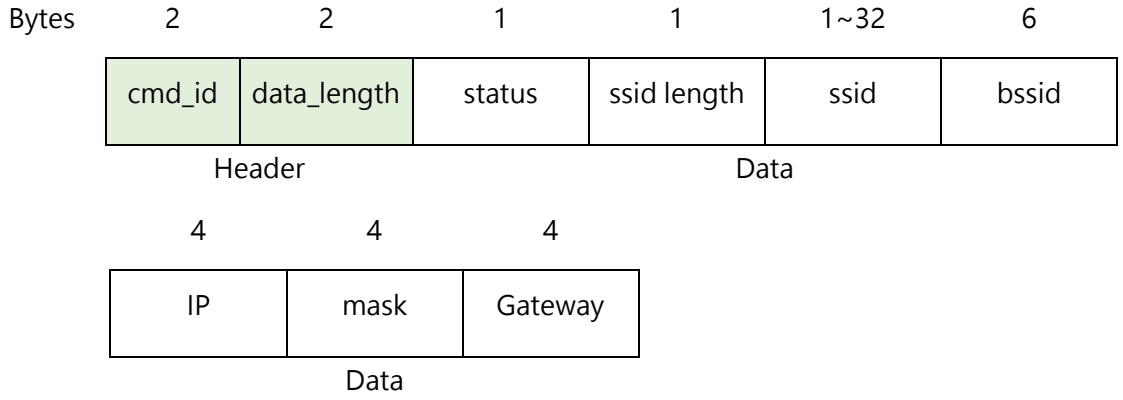
Header

- CMD_ID : command ID, please refer to section of Command ID.
- Data_Length : size of data

Example for frame format:

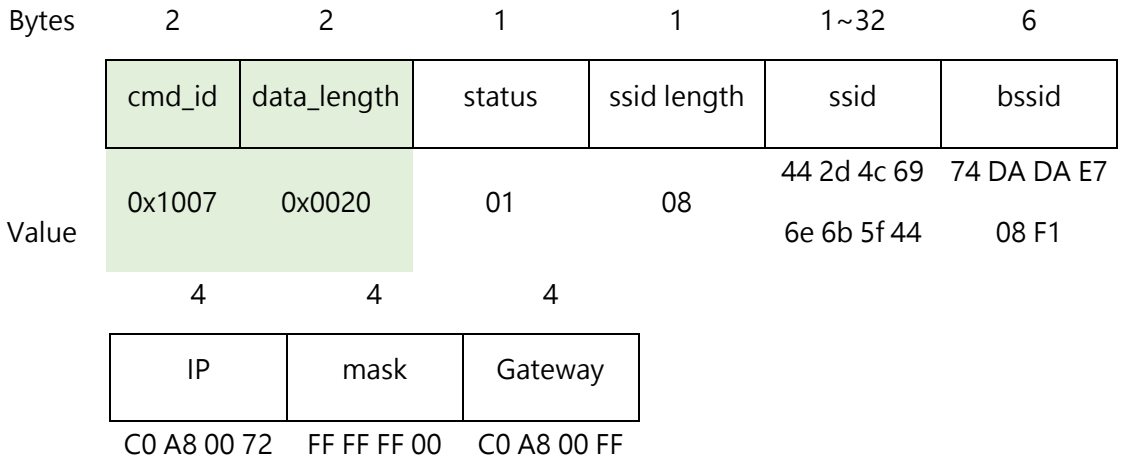
Bytes	2	2
	cmd_id	data_length
Value	0x0006	0x0000

3.15. WIFI STATUS RESPONSE



- CMD_ID : command ID, please refer to section of Command ID.
- Data_Length : size of data
- Status : return success (0) or failed reason code (1)
- Ssid_length: Length of the SSID.
- Ssid: Stores the predefined SSID.
- Bssid: AP's MAC address.
- IP: The IP address of device.
- Mask: The mask IP address of device.
- Gateway: The gateway IP address which get to device.

Example for frame format:



3.16. RESET REQUEST

Bytes	2	2
	cmd_id	data_length
	Header	

- CMD_ID : command ID, please refer to section of Command ID.
- Data_Length : size of data

Example for frame format:

Bytes	2	2
	cmd_id	data_length
Value	0x0007	0x0000

3.17. RESET RESPONSE

Bytes	2	2	1
	cmd_id	data_length	status
	Header		Data

- CMD_ID : command ID, please refer to section of Command ID.
- Data_Length : size of data
- Status : return success (0) or failed reason code (1)

Example for frame format:

Bytes	2	2	1
	cmd_id	data_length	status
Value	0x1008	0x0001	00

3.18. BLE OTA VERSION REQUEST

Byte 2 2

cmd_id	data_length

Header

- CMD_ID : command ID, please refer to section of Command ID.
- Data_Length : size of data

3.19. BLE OTA VERSION RESPONSE

Byte 2 2 1 2 2 2 2 4

cmd_id	data_length	status	Project ID	Chip ID	FW ID	FW checksum	FW size

Header Data

- CMD_ID : command ID, please refer to section of Command ID.
- Data_Length : size of data
- Status : return success (0) or failed reason code
- Project ID:
  - OPL1000: 1000
  - OPL2000: 2000
  - OPL3000: 3000
- Chip ID:
  - A0: 0
  - A1: 1
  - A2: 2
  - B0: 1000
  - B1: 1001
- FW ID: serial number (1 ~ 65535)
- Checksum: checksum of patch image (Not include header)
- FW size: size of patch image

3.20. BLE OTA UPGRADE REQUEST

Byte	2	2	2	64
	cmd_id	data_length	Max_rx	FW_Header
	Header			

- CMD_ID : command ID, please refer to section of Command ID.
- Data_Length : size of data
- Max_rx: The maximum rx packet count.
- FW_Header: Firmware Header

3.21. BLE OTA UPGRADE RESPONSE

Byte	2	2	1
	cmd_id	data_length	status
	Header		

- CMD_ID : command ID, please refer to section of Command ID.
- Data_Length : size of data
- Status : return success (0) or failed reason code

3.22. BLE OTA RAW DATA REQUEST

Byte	2	2	1 ~ 256
	cmd_id	data_length	Raw data
	Header		

- CMD_ID : command ID, please refer to section of Command ID.
- Data_Length : size of data
- Raw data : raw data of fw image that is include image header

3.23. BLE OTA RAW DATA RESPONSE

Byte 2 2

cmd_id	data_length

Header

- CMD_ID : command ID, please refer to section of Command ID.
- Data_Length : size of data

3.24. BLE OTA END REQUEST

Byte 2 2 1

cmd_id	data_length	reason

Header

- CMD_ID : command ID, please refer to section of Command ID.
- Data_Length : size of data
- Reason : The reason of stop OTA fw upgrade

3.25. BLE OTA END RESPONSE

Byte 2 2 1

cmd_id	data_length	reason

Header

- CMD_ID : command ID, please refer to section of Command ID.
- Data_Length : size of data
- Reason : The reason of stop OTA fw upgrade

3.26. WiFi OTA TRIGGER REQUEST

Bytes	2	2
	cmd_id	data_length
	Header	

- CMD_ID : command ID, please refer to section of Command ID.
- Data_Length : size of data

Example for frame format:

Bytes	2	2
	cmd_id	data_length
Value	0x200	0x0000

3.27. WiFi OTA TRIGGER RESPONSE

Bytes	2	2	1
	cmd_id	data_length	status
	Header		Data

- CMD_ID : command ID, please refer to section of Command ID.
- Data_Length : size of data
- Status : return success (0) or failed reason code (1)

Example for frame format:

Bytes	2	2	1
	cmd_id	data_length	status
Value	0x1200	0x0001	00

3.28. WiFi OTA DEVICE VERSION REQUEST

Bytes	2	2
	cmd_id	data_length
	Header	

- CMD_ID : command ID, please refer to section of Command ID.
- Data_Length : size of data

Example for frame format:

Bytes	2	2
	cmd_id	data_length
Value	0x201	0x0000

3.29. WiFi OTA DEVICE VERSION RESPONSE

Bytes	2	2	2
	cmd_id	data_length	FW ID
	Header		Data

- CMD_ID : command ID, please refer to section of Command ID.
- Data_Length : size of data
- FW ID: serial number (1 ~ 65535)

Example for frame format:

Bytes	2	2	2
	cmd_id	data_length	FW

Value	0x1201	0x0001	1

3.30. WiFi OTA SERVER VERSION REQUEST

Bytes	2	2
	cmd_id	data_length
	Header	

- CMD_ID : command ID, please refer to section of Command ID.
- Data_Length : size of data

Example for frame format:

Bytes	2	2
	cmd_id	data_length
Value	0x202	0x0000

3.31. WiFi OTA SERVER VERSION RESPONSE

Bytes	2	2	2
	cmd_id	data_length	FW ID
	Header		Data

- CMD_ID : command ID, please refer to section of Command ID.
- Data_Length : size of data
- FW ID: serial number (1 ~ 65535)

Example for frame format:

Bytes	2	2	2

	cmd_id	data_length	FW
Value	0x1202	0x0001	1

3.32. IP STATUS NOTIFY

Bytes	2	2	1	1	1~32	6
	cmd_id	data_length	status	ssid length	ssid	bssid
	Header		Data			

4	4	4
IP	mask	Gateway
Data		

- CMD_ID : command ID, please refer to section of Command ID.
- Data_Length : size of data
- Status : return success (0) or failed reason code (1)
- Ssid_length: Length of the SSID.
- Ssid: Stores the predefined SSID.
- Bssid: AP's MAC address.
- IP: The IP address of device.
- Mask: The mask IP address of device.
- Gateway: The gateway IP address which get to device.

Example for frame format:

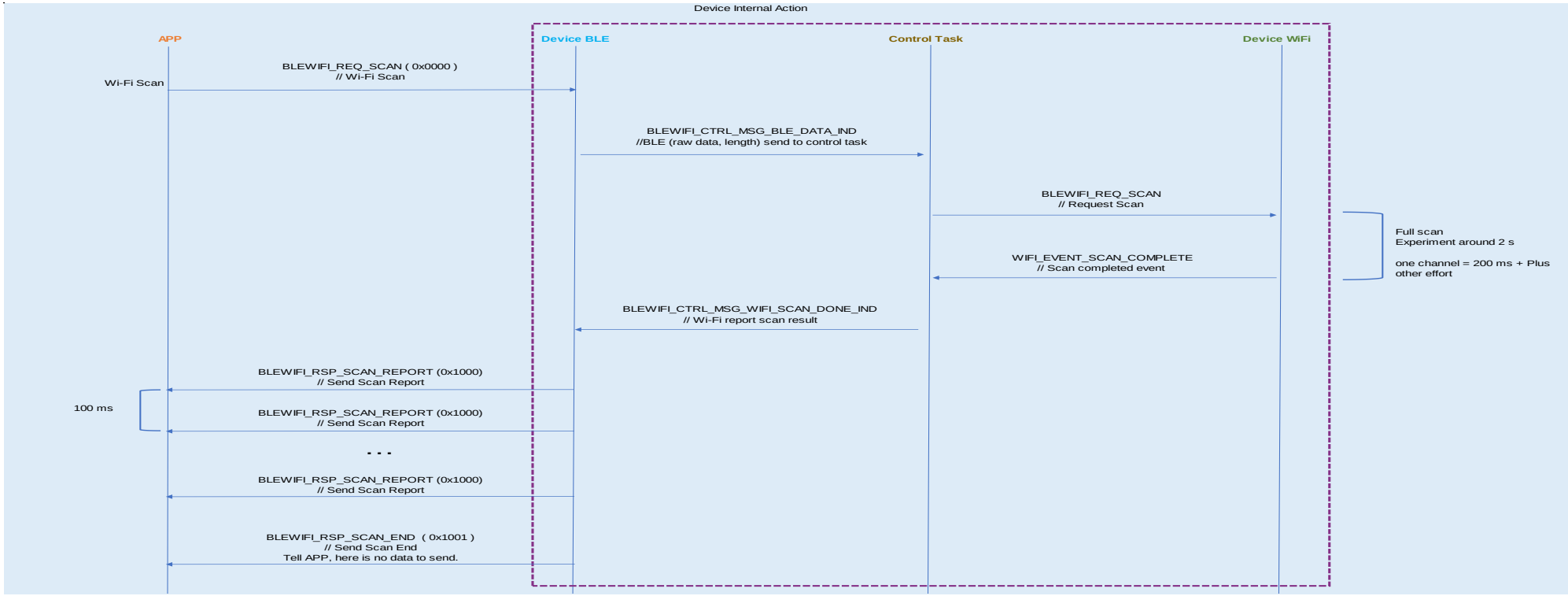
Bytes	2	2	1	1	1~32	6
	cmd_id	data_length	status	ssid length	ssid	bssid
Value	0x2000	0x0020	00	08	44 2d 4c 69 6e 6b 5f 44	74 DA DA E7 08 F1

4	4	4

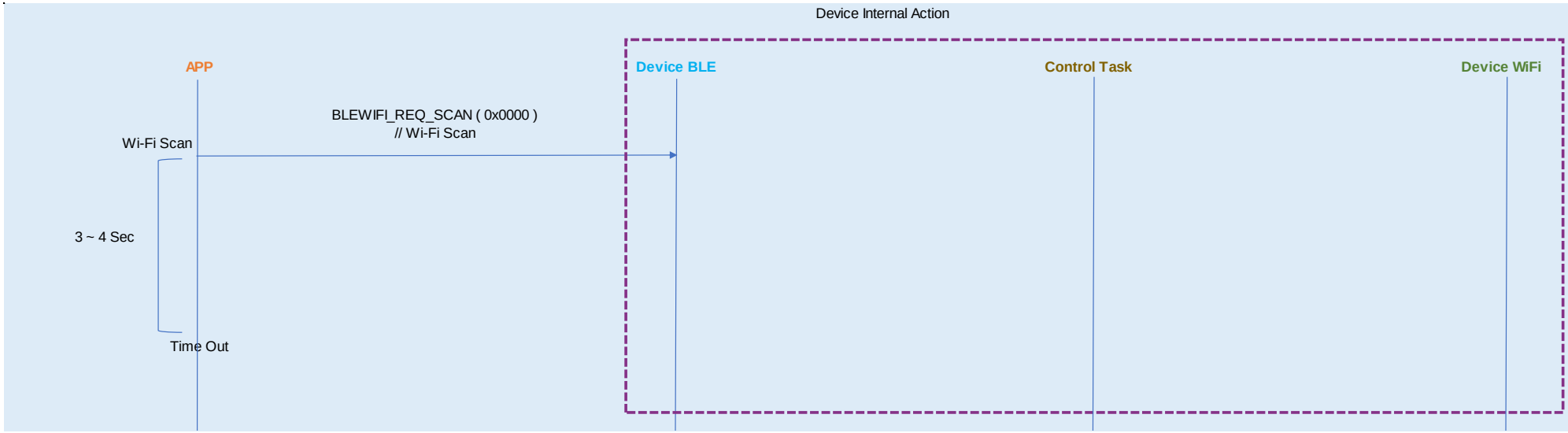
IP	mask	Gateway
C0 A8 00 72	FF FF FF 00	C0 A8 00 FF

4. Message Chart

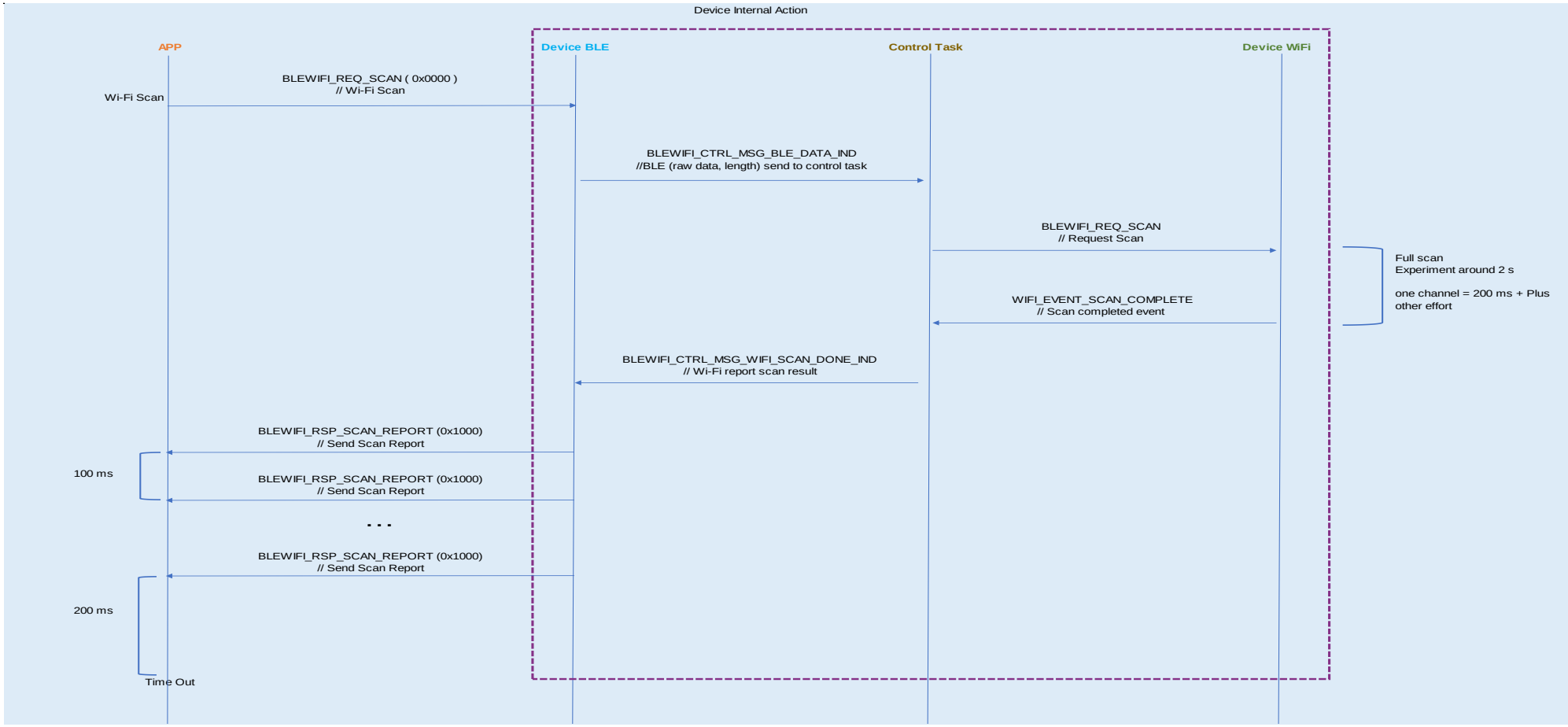
4.1. Wi-Fi Scan



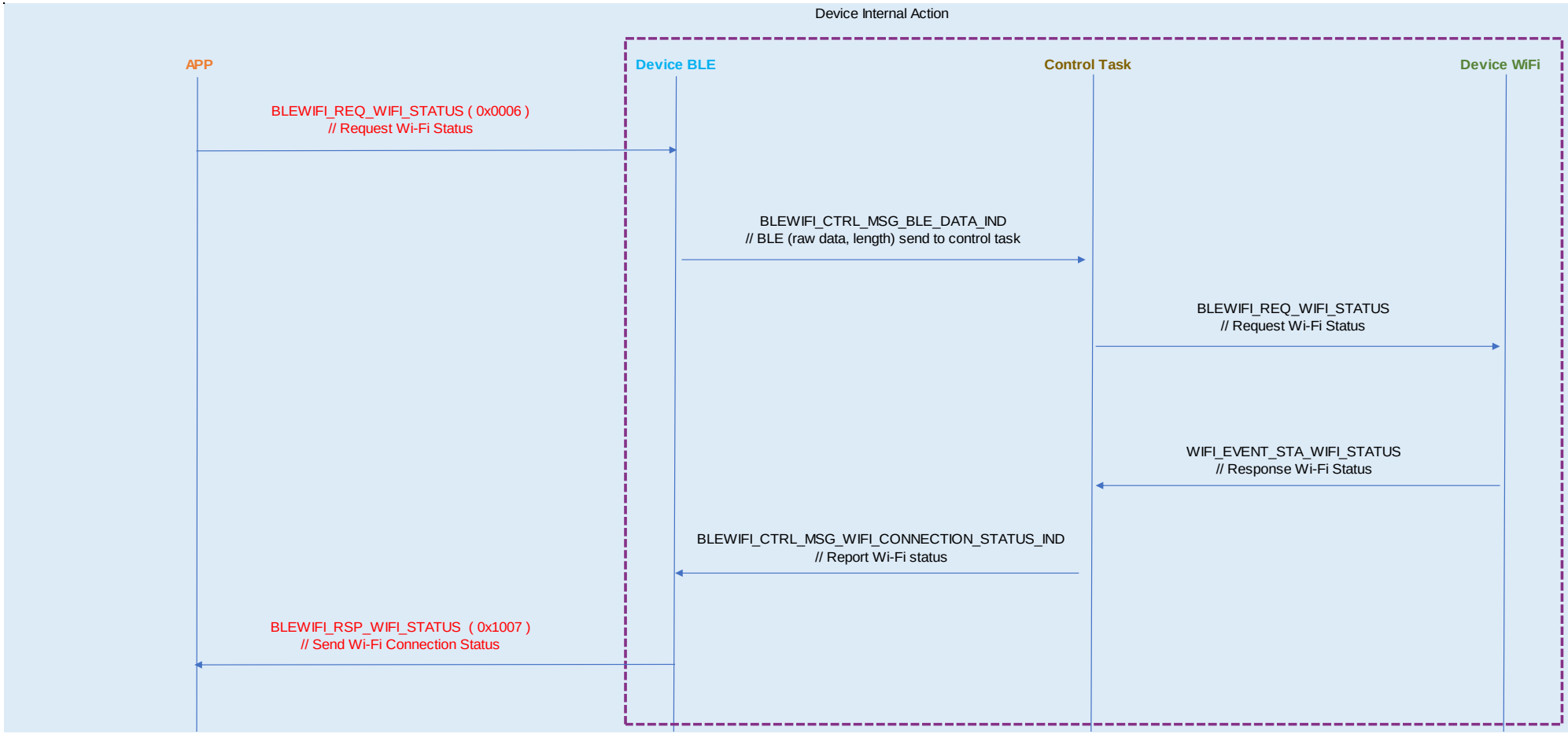
4.2. Wi-Fi Scan (TimeOut)



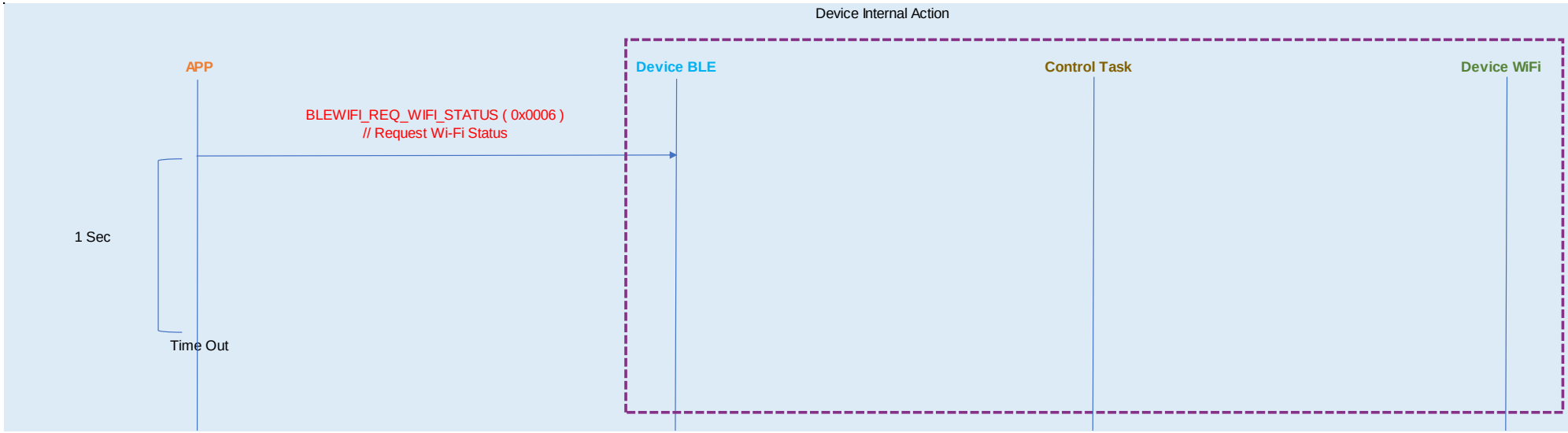
4.3. Wi-Fi Scan (REPORT TimeOut)



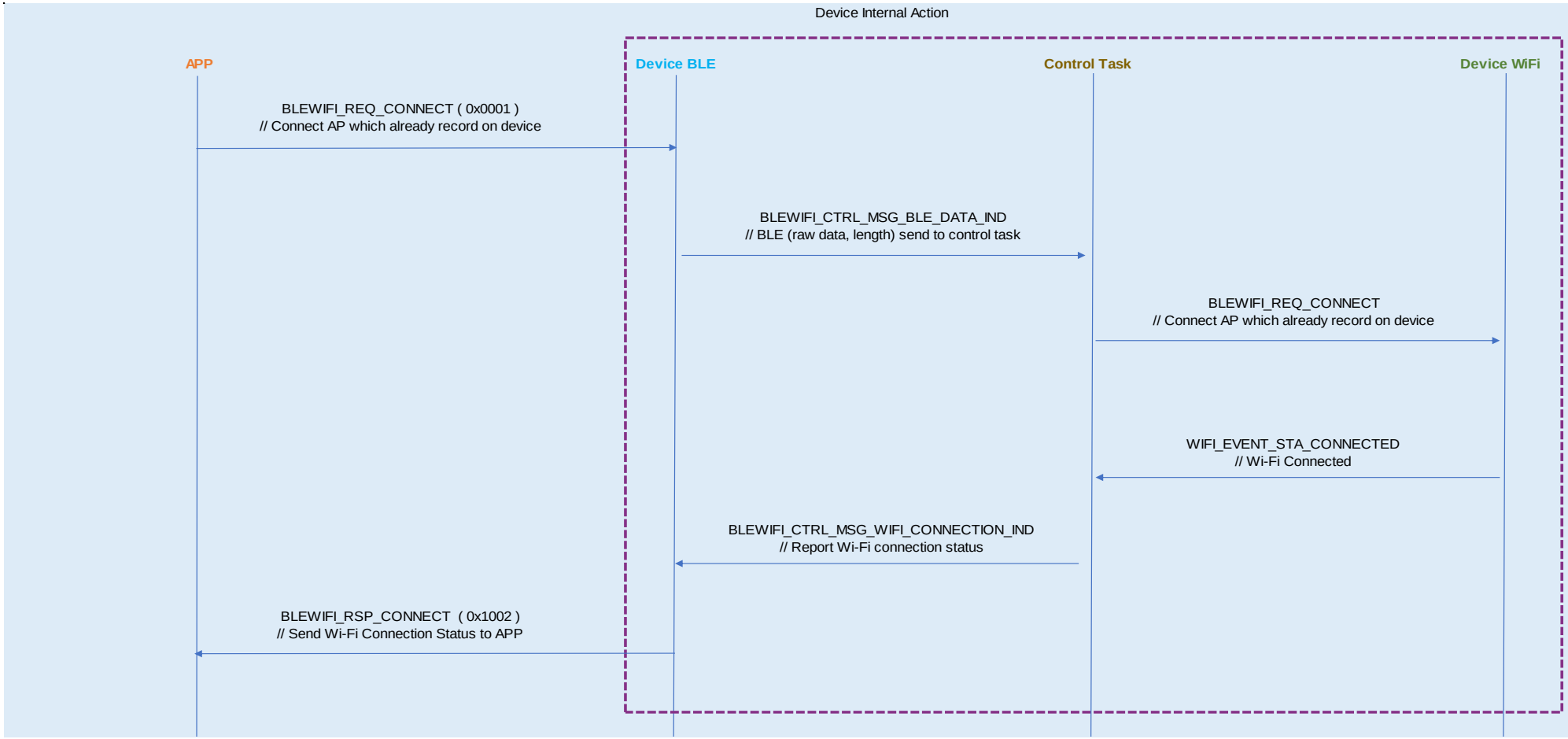
4.4. Wi-Fi Status



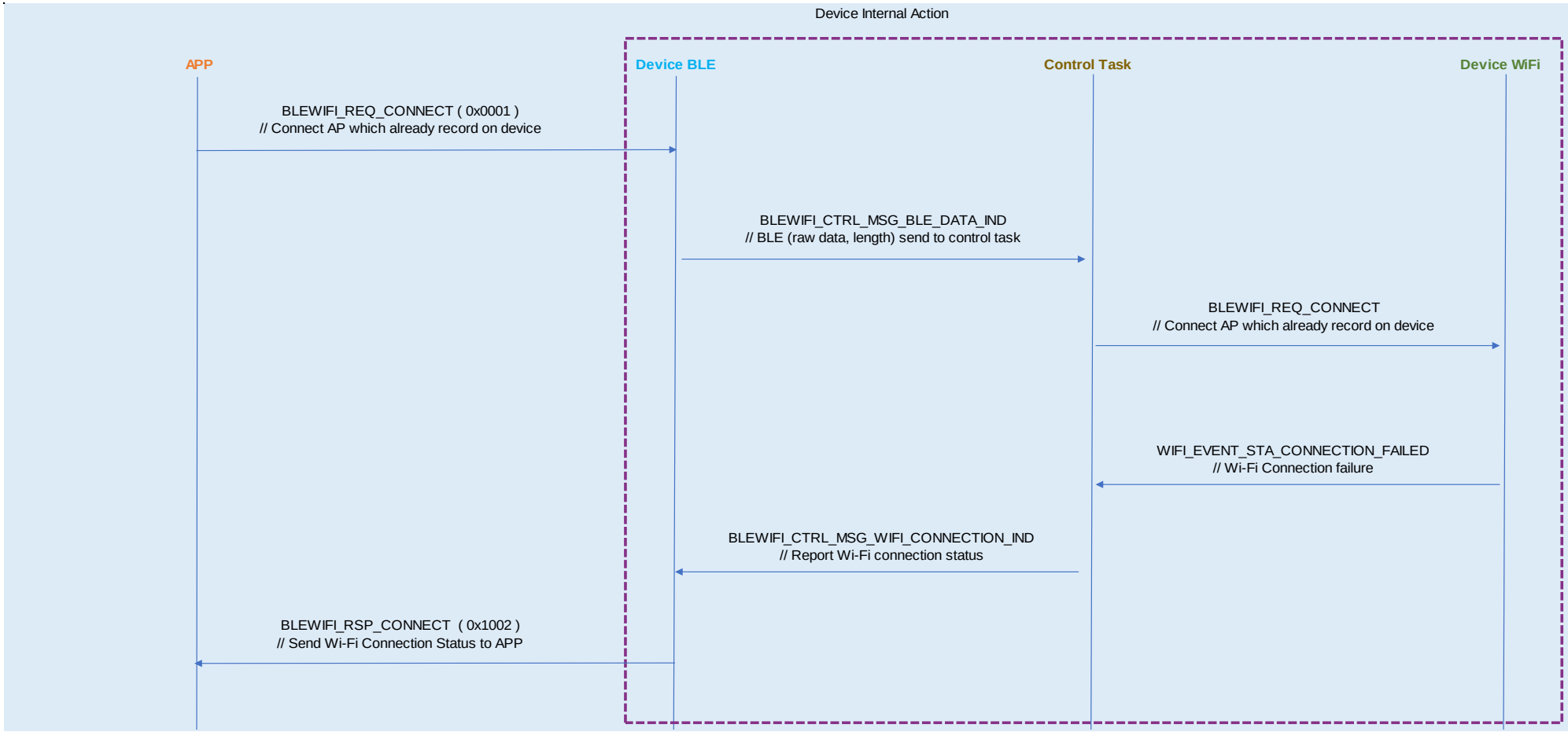
4.5. Wi-Fi Status (TimeOut)



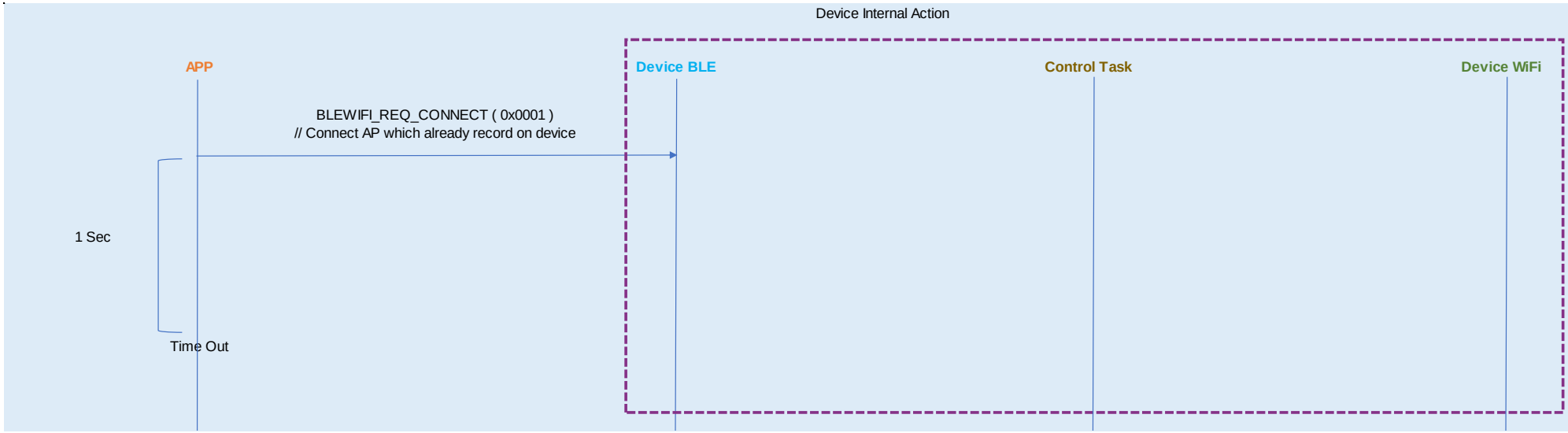
4.6. Wi-Fi Connect



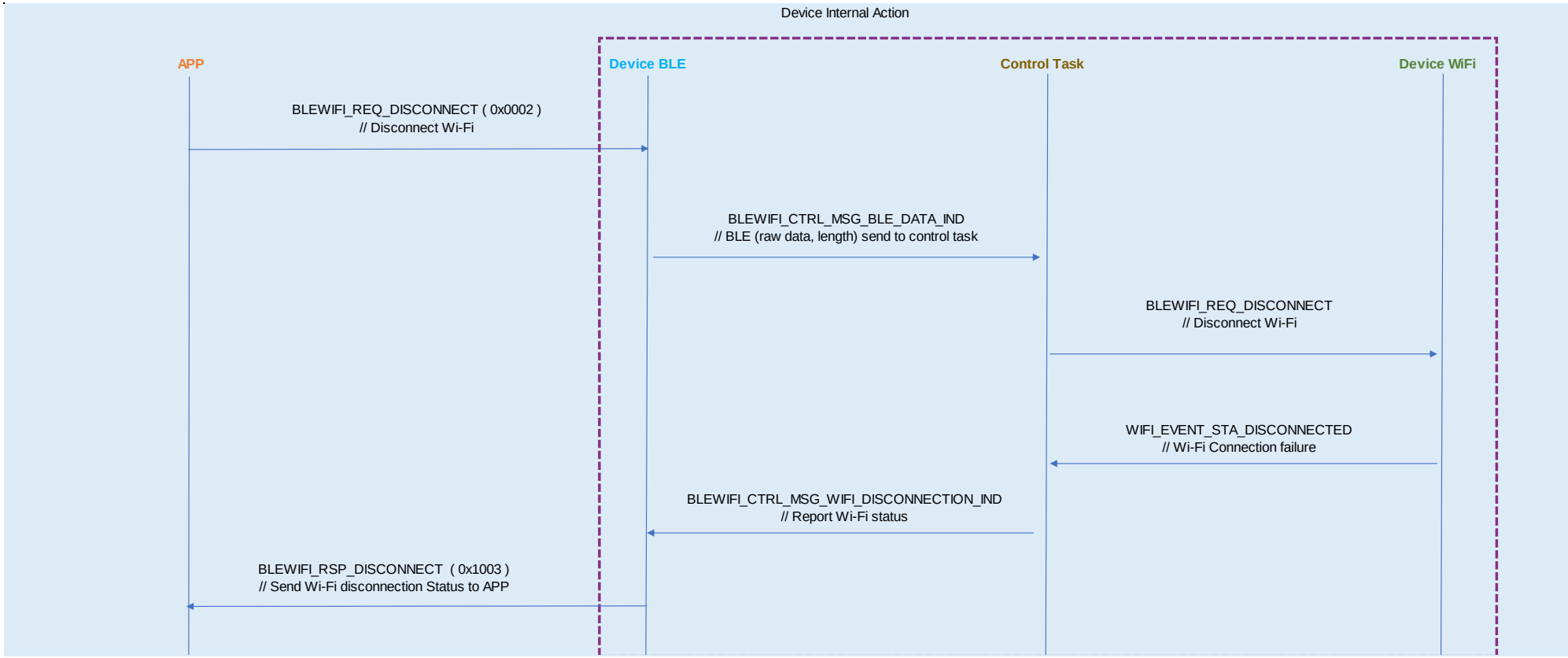
4.7. Wi-Fi Connect (Failure)



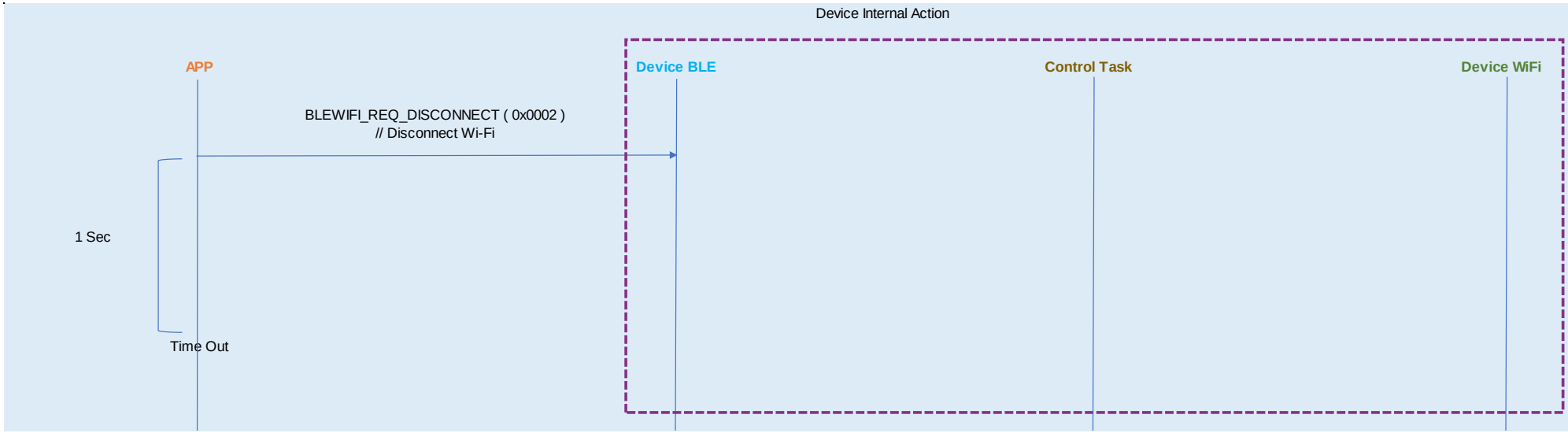
4.8. Wi-Fi Connect (TimeOut)



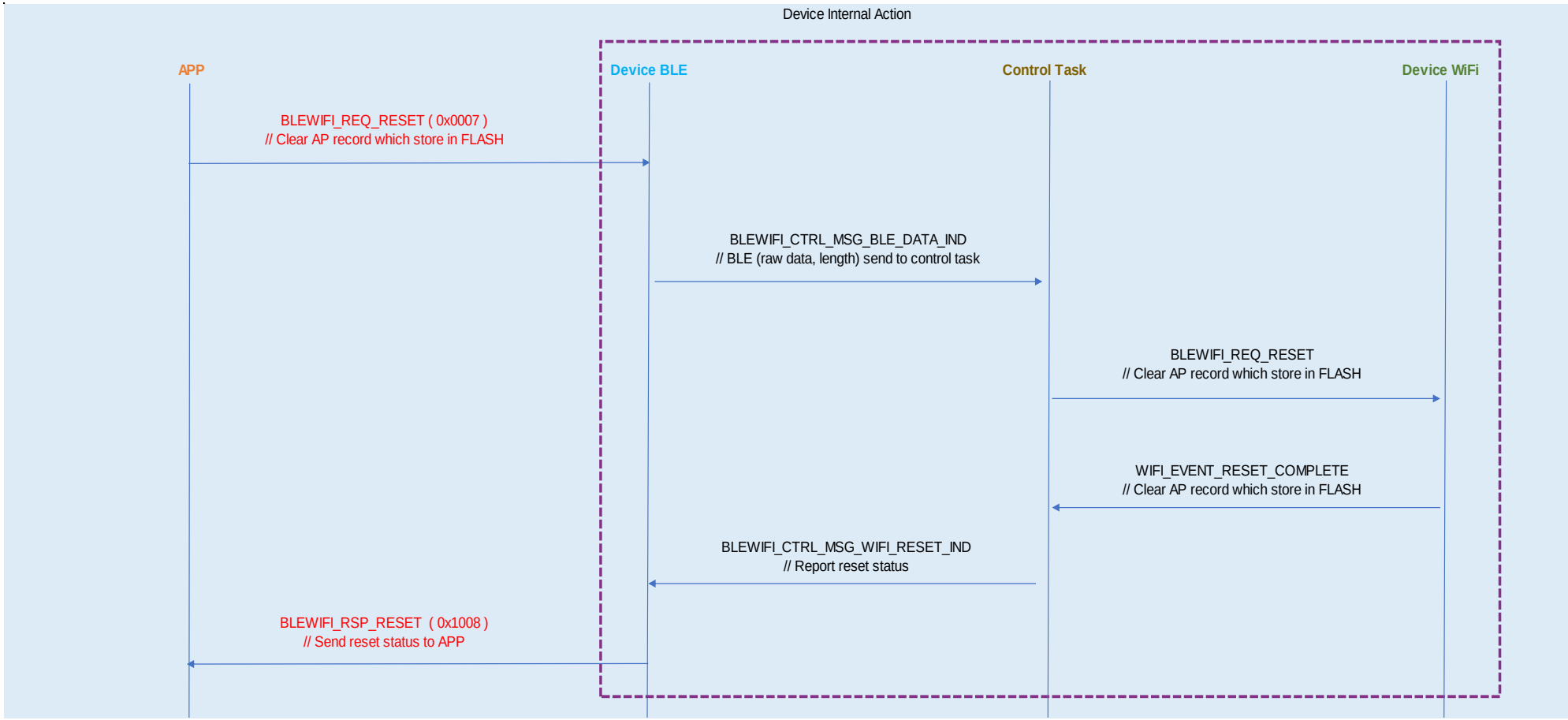
4.9. Wi-Fi Disconnect



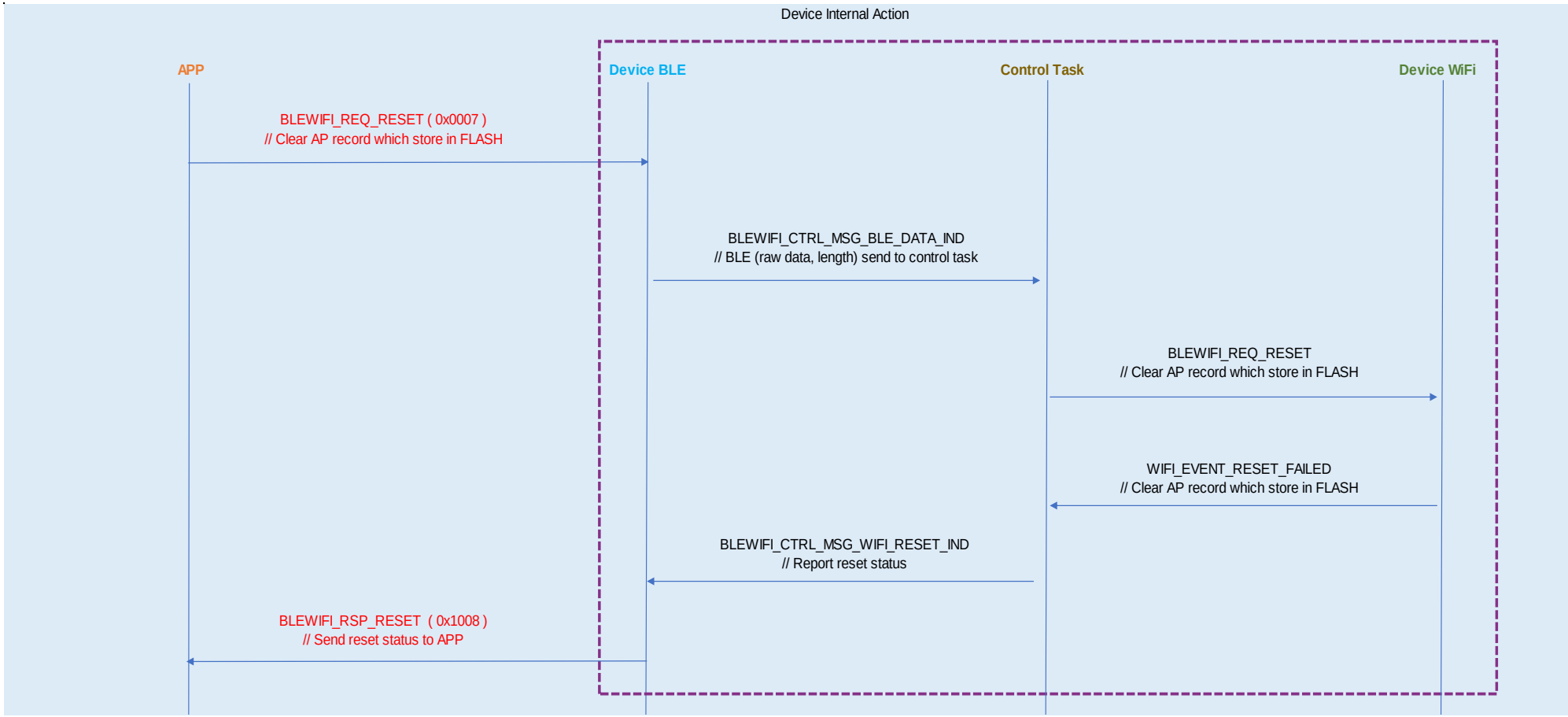
4.10. Wi-Fi Disconnect (TimeOut)



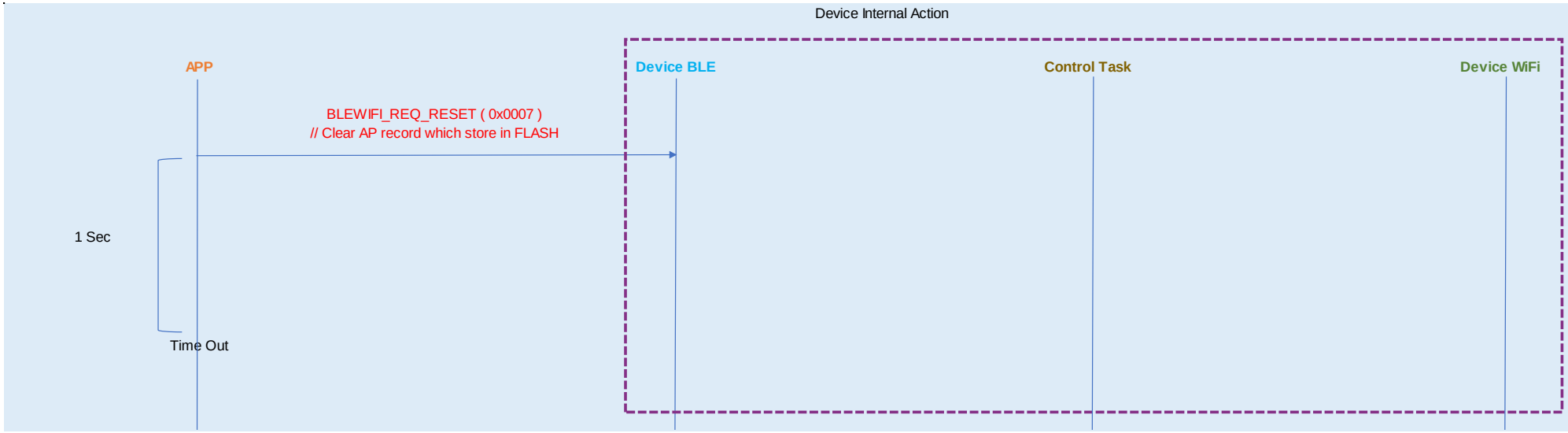
4.11. Wi-Fi Reset



4.12. Wi-Fi Reset (Failure)



4.13. Wi-Fi Reset (TimeOut)



CONTACT

sales@Opulinks.com