ESP-NOW

User Manual

Version 1.0

Espressif IoT Team

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1. Vendor-specific Element

Vendor-specific information element is a set of information elements defined using a unique format and interpreted in a certain way, not described in the IEEE 802.11 standard.

1.1. Format of Vendor-specific Element

The format of Vendor-Specific element is shown in table 1-1 below.

Table 1-1. Format of Vendor-specific Element

	Element ID	Length	OUI	Vendor-specific Content
Length (byte)	1	1	j	n - j

Element ID	Element ID of vendor-specific information, the length of which is 1 byte, and the value is 221 (0xdd).
Length	Length of "vendor-specific" information elements, the length of which is 1 byte, and the value is n (j ≤n ≤ 255), n is the total length of OUI and VSC.
* OUI	Organization Unique Identifier is a 24-bit number that uniquely identifies a vendor, the length of which is j ≥3 byte.
Vendor-Specific Content	Content of "vendor-specific" information element, the length of the content is n - j ≤ 252 byte.

Remark:

* Espressif has reserved the first three octets of MAC address as its OUI, the value is 0x18fe34.

1.2. Content of Vendor-specific Information Element

Content of vendor-specific information element is shown in table 1-2 below.

Table 1-2. Format of the content of vendor-specific information element

	Type	Version	Body
Length (byte)	1	1	n-5

***Type**	Type of vendor-specific information element, the length is 1 byte.
Version	Version information of vendor-specific information element, the length is 1 byte.
Body	Content of vendor-specific information element, the length is n-5 (5 ≤ n ≤ 255), the value varies with the changing of type of IE.

2. ESP-NOW

ESP-NOW is a wireless communication technology built on Action frame that enables encrypted data transmission between devices while no WiFi connection is not required. ESP-NOW technology can be applied to low power consumption devices including various lights, sensors, and so on. The definition of vendor specific body is shown in Figure 2-1 below.

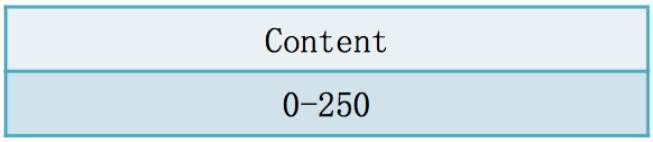

Figure 2-1 ESP-NOW Information Format

Information of ESP-NOW is completely defined by application layer. Information of each frame is entirely transparent to application layer, therefore, only information included in the Content part will be transmitted and received. In this way, the application layer can establish protocols directly so as to control different devices.

Demo code:

```
void ICACHE_FLASH_ATTR simple_cb(u8 *macaddr, u8 *data, u8 len)
{
   int i;
   u8 ack_buf[16];
   u8 recv_buf[17];

   os_printf("now from[");
   for (i = 0; i < 6; i++)
         os_printf("%02X, ", macaddr[i]);
   os_printf(" len: %d]:", len);

   os_bzero(recv_buf, 17);
   os_memcpy(recv_buf, data, len<17?len:16);

   if (os_strncmp(data, "ACK", 3) == 0)
```

```
        return;

    os_sprintf(ack_buf, "ACK[%08x]", ack_count++);
    esp_now_send(macaddr, ack_buf, os_strlen(ack_buf));
}

void user_init(void)
{
    u8 key[16]= {0x33, 0x44, 0x33, 0x44, 0x33, 0x44, 0x33, 0x44, 0x33, 0x44,
0x33, 0x44, 0x33, 0x44, 0x33, 0x44};
    u8 da1[6] = {0x18, 0xfe, 0x34, 0x97, 0xd5, 0xb1};
    u8 da2[6] = {0x1a, 0xfe, 0x34, 0x97, 0xd5, 0xb1};

    if (esp_now_init()==0) {
        os_printf("esp_now init ok\n");

        esp_now_register_recv_cb(simple_cb);
        esp_now_set_self_role(1);
        esp_now_add_peer(da1, 1, key, 16);
        esp_now_add_peer(da2, 2, key, 16)

    } else {
        os_printf("esp_now init failed\n");
    }
}

void ICACHE_FLASH_ATTR demo_send(u8 *mac_addr, u8 *data, u8 len)
{
    esp_now_send(NULL, data, len);/* the demo will send to two devices which
added by esp_now_add_peer() */
    //esp_now_send(mac_addr, data, len); /* send to the specified mac_addr */
}
```