

NRC7292 Application Note

(Dynamic Vendor IE in Beacon)

Ultra-low power & Long-range Wi-Fi

Ver 1.5
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NEWRACOM, Inc.

NRC7292 Application Note (Dynamic Vendor IE in Beacon) Ultra-low power & Long-range Wi-Fi Module

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1 Overview

This document describes the Dynamic Vendor IE feature. This feature is to broadcast vendor specific information in a Beacon frame. As shown in Figure 1.1, a 11ah AP can deliver up to 5 vendor specific information in one Beacon frame. Furthermore, the number of vendor specific information and its contents can be changed dynamically with *iw* command. The Dynamic Vendor IE feature is supported only through the host mode.

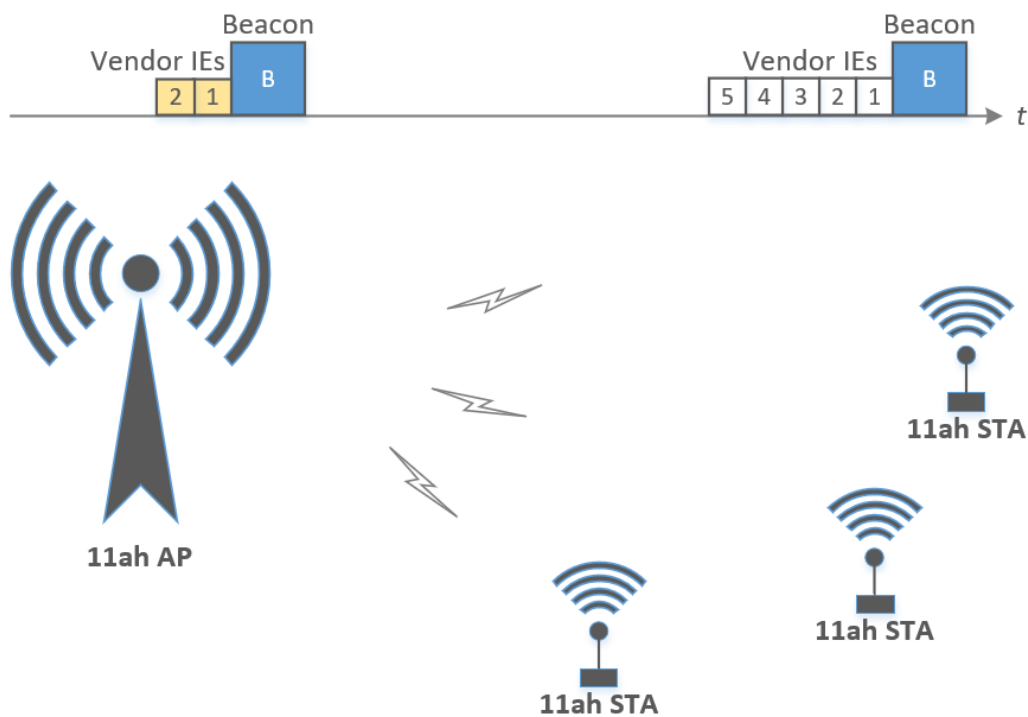


Figure 1.1 Concept of the Dynamic Vendor IE

2 How to use the Dynamic Vendor IE

2.1 Deliver vendor specific information

User can use *iw* command for vendor information delivery on the host terminal. Once the user executes the command, the vendor information is sent at the next Beacon frame. User can run this command during 11ah AP operation.

2.1.1 Usage

```
$iw dev <interface> vendor recv <OUI> <Subcmd> <HEX data>  
$iw dev <interface> vendor send <OUI> <Subcmd> <HEX data>
```

- Interface : 11ah interface (e.g. wlan0)
- OUI : Organization Unique Identifier (0xFCFFAA for IEEE Registration Authority)
- Subcmd : sub-command ID for adding/removing hex data
 - 0x0 ~ 0x5 for vendor recv (vendor IE add command)
Add a vendor specific IE in a beacon frame. If a vendor specific IE exists with the same sub-command, it will be updated with a new one.
 - 0xDE 0x0~0x5 for vendor send (vendor IE remove command)
Remove a vendor specific IE which has corresponding sub-command ID. 'HEX data' should be used to designate the sub-command ID to be removed.
For example, 0xDE 0x3 will remove a vendor specific IE which has the sub-command ID 0x3.
- HEX data : vendor specific information data in hex (up to 255 bytes)

2.1.2 Example

1. Deliver three vendor specific information in beacon frame

```
$sudo iw dev wlan0 vendor recv 0xFCFFAA 0x0 0x01 0x02 0x03 0x04  
$sudo iw dev wlan0 vendor recv 0xFCFFAA 0x1 0x05 0x06 0x07 0x08  
$sudo iw dev wlan0 vendor recv 0xFCFFAA 0x2 0x09 0x0A 0x0B 0x0C
```
2. Remove two vendor specific information in beacon frame

```
$sudo iw dev wlan0 vendor send 0xFCFFAA 0xDE 0x0  
$sudo iw dev wlan0 vendor send 0xFCFFAA 0xDE 0x1
```

2.2 Retrieve vendor specific information

User can retrieve the vendor specific information by using *iw* command. When the user executes this command, the retrieved vendor information printed out on the terminal. User only can use this command at the 11ah STA.

2.2.1 Usage

```
$iw event -f
```

2.2.2 Example

1. When 11ah AP broadcasts two vendor specific IEs, "0x01020304" and "0x05060708"
\$sudo iw event -f

```
phy #28: vendor event fcffaa:0
vendor event: 08 00 00 00 01 02 03 04

phy #28: vendor event fcffaa:0
vendor event: 08 00 00 00 01 02 03 04

phy #28: vendor event fcffaa:0
vendor event: 08 00 00 00 01 02 03 04

phy #28: vendor event fcffaa:0
vendor event: 08 00 00 00 01 02 03 04

phy #28: vendor event fcffaa:0
vendor event: 08 00 00 00 01 02 03 04
```

3 Revision History

Revision No	Date	Comments
Ver 1.0	7/5/2019	Initial version for customer release created
Ver 1.1	5/20/2022	Add description about removing sub-command
Ver 1.2	7/5/2022	Update description about deliver vendor specific information
Ver 1.3	7/8/2022	Update 2.1
Ver 1.4	7/14/2022	Fix typos of 2.1
Ver 1.5	6/12/2023	Update for v1.4 SW package