IEEE P802.11  
Wireless LANs

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| Proposed Comment Resolutions for LB252 (11bc D1.0) | | | | |
| Date: 2021-03-12 | | | | |
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Abstract

This document proposes comment resolutions for 11bc D1.0.

Note: The changes shown are based on 11bc D1.01

# 1. Overview (#1101)

#### 1.3 Supplementary Information on Purpose

1. ***Insert the following to the end of the list:***
2. Specifically, in the context of IEEE 802.11™-compliant devices, this standard

14 ....

1. —— Defines a (#1244) mechanism to enable IEEE 802.11 stations to transmit and receive broadcast data in an infrastructure BSS, both in cases where the transmitter(s) and the receiver(s) are associated and when they are not; and a mechanism to enable uplink data to be relayed to a specified destination in an external network. (#1242, #1243, #1537).
2. **2. Normative references**
3. The following referenced documents are indispensable for the application of this document (i.e., they must
4. be understood and used, so each referenced document is cited in text and its relationship to this document is
5. explained). For dated references, only the edition cited applies. For undated references, the latest edition of
6. the referenced document (including any amendments or corrigenda) applies.
7. ***Insert the following references at the end of the existing normative references:*** (#1172)
8. IETF RFC 4082, Timed Efficient Stream Loss-Tolerant Authentication (TESLA): Multicast Source
9. Authentication Transform Introduction
10. FIPS PUB 202, SHA-3 Standard: Permutation-Based Hash and Extendable-Output Functions
11. FIPS PUB 186-5 (Draft), Digital Signature Standard (DSS), October 2019
12. NIST Special Publication 800-185, SHA-3 Derived Functions: cSHAKE, KMAC, TupleHash and
13. ParallelHash
14. Draft NIST Special Publication 800-186, Recommendations for Discrete Logarithm-Based Cryptography:
15. Elliptic Curve Domain Parameters, October 2019
16. **3. Definitions, acronyms and abbreviations**

#### 3.1 Definitions

1. For the purposes of this document, the following terms and definitions apply. The *IEEE Standards*
2. *Dictionary Online* should be consulted for terms not defined in this clause. 1

#### 3.2 Definitions specific to IEEE 802.11

1. ***Insert the following definitions maintaining alphabetical order:***

**enhanced broadcast service (EBCS)**: A service that enables the relaying of uplink broadcast traffic to a specified destination and enhances downlink broadcast traffic (#1054, #1241). It additionally provides means for protecting broadcast traffic, protecting the privacy of the stations receiving that traffic, and verifying the authenticity of the origin of the traffic (#1240).

1. (#1239, #1399, #1434, #1540).

#### 3.3 Definitions specific to IEEE 802.11 operation in some regulatory domains

1. **3.4 Abbreviations and acronyms**
2. ***Insert the following acronym definitions (maintaining alphabetical order):***

20

1. EBCS enhanced broadcast service
2. HCFA hash chain frame authentication (#1569)
3. HLSA higher layer source authentication (#1568)
4. PKFA public key frame authentication (#1569)
5. **9.4.5.100 Enhanced Broadcast Services ANQP-element**
6. The Enhanced Broadcast Services ANQP-element provides a list of one or more enhanced broadcast
7. services that are available from the STA transmitting this element. The format of the Enhanced Broadcast
8. Services ANQP-element is defined in Figure 9-bc12.

### 12

|  |  |  |  |
| --- | --- | --- | --- |
| Info ID | Length | Broadcast Control | Enhanced Broadcast Services Tuples |

Octets: 2 2 1 variable

**Figure 9-bc12 - EBCS Response Info Control subfield format**

### 13

1. The Info ID and Length fields are defined in 9.4.5.1 (General).
2. The Broadcast Control field is defined in Figure 9-bc13:

B0 B1 B2 B3 B7

|  |  |  |  |
| --- | --- | --- | --- |
| Transmit Capability | Receive Capability | Service Advertisement | Reserved |

Bits: 1 1 1 5

**Figure 9-bc13 Enhanced Broadcast field format**

### 16

1. The Transmit Capability subfield is set to 1 by a STA to indicate that it supports the transmission of EBCS.
2. This subfield is set to 0 to indicate that there is no support for the transmission of EBCS.
3. The Receive Capability subfield is set to 1 by a STA to indicate that it supports the reception of EBCS.
4. This subfield is set to 0 to indicate that there is no support for the reception of EBCS. When the Enhanced
5. Broadcast Services ANQP-element is transmitted by a non-AP STA, this bit set to 1 indicates that the
6. information in the Enhanced Broadcast Services Tuples refers to EBCS being received by the non-AP STA.
7. The Service Advertisement subfield is set to 1 by a STA to indicate that the Enhanced Broadcast Services
8. Tuples subfield contains information about the EBCS(s) transmitted by the STA. This subfield is set to 0 to
9. indicate that there are no Enhanced Broadcast Services Tuples subfields at the time of transmission from
10. the STA.
11. The Enhanced Broadcast Services Tuples field contains one or more Enhanced Broadcast Services Tuple
12. fields as shown in Figure 9-bc14.

### 13

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Control | Content ID | Request Method | Broadcast MAC  Address (Optional) | Next Schedule (Optional) | Time to Termination (Optional) |

Octets: 1 1 1 0 or 6 0 or 8 0 or 2

### 14

|  |  |  |  |
| --- | --- | --- | --- |
| Content Destination Address Type (Optional) | Content Destination Address (Optional) | Title Length (Optional | Title (Optional) |

Octets: 0 or 1 variable 0 or 1 variable

### 15

1. **Figure 9-bc14 - Enhanced Broadcast Services Tuple field format**

### 17

1. The Control field defines which of the optional fields are present in the Enhanced Broadcast Services Tuple
2. field and is defined in Figure 9-bc15a:

### 20

B0 B1 B2 B3 B4 B5 B6 B7

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Broadcaster MAC  Address  Present | Next Schedule Present | Time to Termination Present | Content Destination Address  Present | Title Present | Association Required | Reserved |

Bits 1 1 1 1 1 1 2

**Figure 9-bc15 Control field format**

1. The Broadcaster MAC Address Present subfield is set to 1 by a STA to indicate that the Enhanced
2. Broadcast Services Tuple field contains a Broadcaster MAC Address field. This subfield is set to 0 to
3. indicate that there is no Broadcaster MAC Address field.
4. The Next Schedule subfield is set to 1 by a STA to indicate that the Enhanced Broadcast Services Tuple
5. field contains a Next Schedule field. This subfield is set to 0 to indicate that there is no Next Schedule
6. field.
7. The Time to Termination subfield is set to 1 by a STA to indicate that the Enhanced Broadcast Services
8. Tuple field contains a Time to Termination field. This subfield is set to 0 to indicate that there is no Time
9. to Termination field.
10. The Content Destination Address Present subfield is set to 1 by a STA to indicate that the Enhanced
11. Broadcast Services Tuple field contains Content Destination Address Type and Content Destination
12. Address fields. This subfield is set to 0 to indicate that there are no Content Destination Address Type and
13. Content Destination Address fields.
14. The Title Present subfield is set to 1 by a STA to indicate that the Enhanced Broadcast Services Tuple field
15. contains a Title Length field and a Title field. This subfield is set to 0 to indicate that there are no Title
16. Length and Title fields.
17. The Content ID subfield indicates the identifier of the content.

The Request Method subfield is a bit mask that (#1091) indicates the request method to solicit the transmission

of an EBCS identified by the content ID contained in the Content ID subfield. The encoding of the Request Method subfield is defined in Table 9-bc3 (Request Method subfield encoding). When no bits are set within the Negotiation Method subfield there is no negotiation (#1091).

1. **Table 9-bc3—Request Method subfield encoding**

|  |  |  |
| --- | --- | --- |
| **Negotiation Method subfield bit** (#1091) | **Meaning** | **Notes** |
| 0 | Request using EBCS Request frames | EBCS request by STAs that are associated with the broadcaster |
| 1 | Request using EBCS Request ANQP-elements | EBCS request by STAs that are not associated with the broadcaster |
| 2 | Request using IP request | Out of band IP request |
| 3-7 | Reserved |  |

### 22

1. The Broadcaster MAC Address field indicates the MAC Address of the AP broadcasting this channel, in
2. the case of a setup with multiple APs. (#1013)
3. The Time Of Termination subfield indicates the number of TBTTs until the content identified by the
4. content ID contained in the Content ID subfield is terminated. A value of 0 indicates that the content
5. identified by the content ID in the Content ID subfield will be terminated at the following TBTT. A value
6. of 65535 indicates that the content identified by the content ID in the Content ID subfield has no specific
7. termination time.
8. The Next Schedule subfield indicates the number of TBTTs until the content identified by the content ID
9. contained in the Content ID subfield is transmitted again. A value of 0 indicates that the content identified
10. by the content ID in the Content ID subfield will start to transmit at the next TBTT. A value of 65535
11. indicates that the content identified by the content ID in the Content ID subfield has no specific
12. transmission starting time.
13. The Content Destination (#1014) Address Type subfield is defined in Table 9-bc4 (Content Destination Address

Type subfield). (#1015, 1510).

1. **Table 9-bc4 Content Destination Address Type subfield**

|  |  |
| --- | --- |
| **Value** | **Higher Layer Protocol** |
| 0 | UDP/IPv4 |
| 1 | UDP/IPv6 |
| 2 | UDP/hostname (#1015) |
| 3 | MAC Address |
| 4-7 | Reserved |

### 15

1. The Content Destination Address subfield is the destination address and port of the content, encoded as
2. follows.
3. If the Content Destination Address Type subfield is UDP/IPv4, the format of the Content Destination
4. Address subfield is shown in Figure 9-bc16 (Content Destination Address subfield format for UDP/IPv4).

Destination Port

Destination IPv4 Address

Octets 4 2

1. **Figure 9-bc16 Content Destination Address subfield format for UDP/IPv4**

### 21

1. If the Content Destination Address Type subfield is UDP/IPv6, the format of the Content Destination
2. Address subfield is shown in Figure 9-bc17 (Content Destination Address subfield format for UDP/IPv6).

Destination Port

Destination IPv6 Address

Octets 16 2

1. **Figure 9-bc17 Content Destination Address subfield format for UDP/IPv6**

### 25

* 1. If the Content Destination Address Type subfield is UDP/hostname, the format of the Content Destination
  2. Address subfield is shown in Figure 9-bc18 (Content Destination Address subfield format for
  3. UDP/hostname). The Hostname Length subfield indicates the length of the Hostname subfield. The
  4. Hostname subfield is the hostname as a UTF-8 string.

|  |  |  |
| --- | --- | --- |
| Hostname Length | Hostname | Destination UDP Port |

Octets 1 variable 2

* 1. **Figure 9-bc18 Content Destination Address subfield format for UDP/hostname (CID 53)**

### 6

1. If the Content Destination Address Type subfield is MAC Address, the format of the Content Destination
2. Address subfield is shown in the Figure 9-bc19 (Content Destination Address subfield format for MAC
3. Address). The MAC Address field is the destination MAC Address of the content.

MAC Address

Octets 6

1. **Figure 9-bc19 Content Destination Address subfield format for MAC Address**

### 11

1. The Title Length field indicates the length of the following Title field in octets.
2. The Title field is a human readable title of the content as a UTF-8 string.
3. **9.4.5.101 Enhanced Broadcast Request ANQP-element**
4. The Enhanced Broadcast Request ANQP-element transmits a register (or de-register) request from a STA
5. to a peer STA to receive (or stop receiving) enhanced broadcast services that are available from the peer
6. STA. The format of the Enhanced Broadcast Request ANQP-element is defined in Figure 9-bc20
7. (Enhanced Broadcast Request ANQP-element format).

### 19

|  |  |  |
| --- | --- | --- |
| Info ID | Length | Enhanced Broadcast Services Request Tuples |

Octets: 2 2 variable

**Figure 9-bc20 – Enhanced Broadcast Request ANQP-element format**

1. The Info ID and Length fields are defined in 9.4.5.1 (General).
2. The Enhanced Broadcast Services Request Tuples field contains one or more Enhanced Broadcast Services Request Tuple fields as shown in Figure 9-bc21 (#1563). (Enhanced Broadcast Services Request Tuples).

### 23

Content ID

Broadcast Action

Octets: 1 1

1 **Figure 9-bc21 – Enhanced Broadcast Services Request Tuple field format (#1563)**

### 2

1. The Broadcast Action field values are defined in Table 9-bc5:
2. **Table 9-bc5 – Broadcast Action field values**

|  |  |
| --- | --- |
| **Value** | **Description** |
| 0-1 | Reserved |
| 2 | Register to receive broadcast identified by  Content ID (#1017) |
| 3 | Unregister from receiving broadcast identified by  Content ID (#1017) |
| 4-255 (#1017) | (#1017) Reserved |

### 5

1. The Content ID subfield indicates the identifier of the content.
2. **9.4.5.102 Enhanced Broadcast Response ANQP-element**
3. The Enhanced Broadcast Response ANQP-element provides a list of zero or more enhanced broadcast
4. services that are available from a peer STA. The format of the Enhanced Broadcast Response ANQP-
5. element is defined in Figure 9-bc22 (Enhanced Broadcast Response ANQP-element format.

### 11

|  |  |  |
| --- | --- | --- |
| Info ID | Length | Enhanced Broadcast Services Response Tuples  (Optional) |

2 2 variable

12 **Figure 9-bc22 – Enhanced Broadcast Response ANQP-element format**

### 13

1. The Info ID and Length fields are defined in 9.4.5.1 (General). The Enhanced Broadcast Services Response
2. Tuples field contains one or more Enhanced Broadcast Services Response Tuple fields. The Enhanced
3. Broadcast Services Response Tuple field is defined as shown in Figure 9-bc23.

### 4

Broadcast Service Transmitting

Content ID

Octets: 1 1

5 **Figure 9-bc23 - Enhanced Broadcast Services Response Tuple format**

### 6

1. The Broadcast Service Transmitting field indicates whether the Enhanced Broadcast Service referenced by
2. the Content ID field is being transmitted. A value of 1 indicates that the Broadcast Service is being
3. transmitted and a value of 0 indicates that the Broadcast Service is not being transmitted.

**Table 9-bc23a – Broadcast Service Transmitting field values (#1566)**

|  |  |
| --- | --- |
| **Value** | **Description** |
| 0 | A broadcast service is not being transmitted |
| 1 | A broadcast service is being transmitted |
| 2-255 | Reserved |

16 **11. MLME**

17 **11.22**

18 **11.22.3**

1. **11.22.3.3 ANQP procedures**
2. **11.22.3.3.1 General**
3. ***Add the following three new entries at the base of Table 11-14***

**Table 11-14—ANQP usage** (#1202)

### 6

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **ANQP-element name** | **ANQP-element (sub-clause)** | **ANQP-element type** | **BSS** | | **IBSS** |
| **AP** | **No**  **n-AP**  **and non-**  **PCP**  **STA** | **STA** |
| Enhanced Broadcast Services | 9.4.5.100 | S | T, R, G | T, R, G | - |
| Enhanced Broadcast Request | 9.4.5.101 | Q | T, R, G | T, R, G | - |
| Enhanced Broadcast Response | 9.4.5.102 | S | T, R, G | T, R, G | - |

1. **11.22.3.3.100 Enhanced Broadcast Service procedures**

### 21

1. Enhanced Broadcast Services may be advertised using the Enhanced Broadcast Services ANQP-element
2. (see 9.4.5.100). The element provides a list of zero or more enhanced broadcast services that are available from a STA (#1283). Each broadcast service advertisement may contain the time and duration of transmission,
3. together with an identifier of the broadcast content (#1147), a content ID, and other information relevant to the
4. broadcast service.
5. A STA may use the Enhanced Broadcast Request ANQP-element to request registration (or unregistration) from a peer STA transmitting an enhanced broadcast service (#1282, #1529).

### 29