### **IEEE P802.11 Wireless LANs**

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| Location Comment Resolutions | | | | |
| Date: 2023-05-25 | | | | |
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**Abstract**

CIDs 4198, 4312

**Revisions:**

* Rev 0: Initial version of the document.

***TGme editor: Please note Baseline is 11me D3.0. Edits are expressed via Word track changes:***

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| 4312 | Location Reference subelement was deleted under CID 3225, but there are still some references to it | 2605 | 9.4.2. 20.13 | 63 | Delete from 4.3.21.10 Location services, 947.61, p. 948 (6x), 953.2, 2519.49 [needs discussion | Revised. See changes under CID4198 in 23/0929<motionedRevision> that actually fix various location-related issues  TGme Editor: no further changes beyond those defined for CID4198 |
| 4198 | Multiple issues with civic location: \* 4.3.21.10 Location services's claim that "The location reference is a URL that defines from where the location value is retrieved." \* Which field is being referred to in "The Civic Location Type field contains the format of location information in the Civic Location field" in 9.4.2.21.13 Location Civic report \* Which field is being referred to in "The Civic Location field follows the little-endian octet ordering" in 9.4.2.21.13 Location Civic report \* Which field is being referred to in "If the Location Civic report contains the Location Reference and Location Shape subelements, the receiving STA may use the information specified in those subelements in combination with the Civic Location field value for additional granularity on the position reported in the Civic Location field." in 11.10.9.9 Location Civic report \* "When the Civic Location Type field is IETF RFC 4776, the list of optional subelements optionally includes the Location Reference, Location Shape, Map Image, and Vendor Specific subelements as defined in Table 9-175 (Subelement IDs for Location Civic report)." in 9.4.2.21.13 Location Civic report is not clear: is it trying to say that no other optional subelements are allowed? \* Dependencies between subelements, e.g.: o Location Shape depends on the presence of Location Reference, which in turn depends on this being Civic Location. o Map Image depends on this being Civic Location. \* ... or maybe: o Location Shape depends on the presence of non-empty Location Reference, which in turn depends on this being Civic Location. o Location Reference if absent/empty, depends on the presence of Map Image which in turn depends on this being Civic Location. \* ... or even: o Location Shape depends on the presence of Location Reference which in turn depends on the presence of a Map Image which in turn depends on this being Civic Location (seems to be implicit in "of the floor plan on which the Location Shape is defined") \* Whether if you don't have a non-empty Location Reference it should be "... indicates that the position of the Location Shape is the south west corner (i.e., 0,0) of the lowest (or only) floor in the floor plan on which the Location Shape is defined." \* The axes of the coordinate system are undefined. We probably should require that a map is a prereq for locshape |  | 9.4.2. 21.13 |  | As it says in the comment [big item; needs discussion] | Revised. See changes under CID4198 in 23/0929<motionedRevision> that actually fix various location-related issues |

***Discussion and Intermingled text changes***

**Location Reference subelement was deleted under CID 3225, but there are still some references to it**

*Looking back at 3225, the string reference doesn’t have to be computable. Putting a blue dot/ellipse/etc on a map via them belonging to the same coordinate system suffices. Here, the string reference*

* *could be used for debugging.*
* *could be displayed on the map as a location marker (“bottom left of building”) akin to how Google maps shows (a few) markers on the map for (paying) venues.*

*Then revert 3225:*

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| Table 9-175—Subelement IDs for Location Civic report   |  |  |  | | --- | --- | --- | | Subelement ID | Name | Extensible | | 3 | Location Reference | No |   The Target MAC Address subelement contains the MAC address of the STA whose Location Information was requested and it is present whenever the Location Subject field in the corresponding Location Civic request was set to 2. The format of the Target MAC Address subelement is shown in Figure 9-250 (Target MAC Address subelement format).  The format of the Location Reference subelement is shown in Figure 9-316 (Location Reference subelement format).  A screenshot of a computer  Description automatically generated  The Location Reference field is an ASCII string that defines a position on a floor from which the relative location contained in the Location Shape subelement is offset. A Location Reference subelement set to 0 indicates that the position of the Location Shape is top north west corner (i.e., 0,0) of the floor plan on which the Location Shape is defined. |

**\* 4.3.21.10 Location services's claim that "The location reference is a URL that defines from where the location value is retrieved."**

*Rather, “Location Reference” in clause 4.3.21.10 was intended to point to Location Identifier (9.4.2.20.14 (Location Identifier report)), so rewrite the text to clarify this intent.*

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| 4.3.21.10 Location services  Location Configuration Request and Response frames enable STAs to configure a collection of location related parameters for Location Track Notification frames. The AP can indicate that it can provide location data to support applications such as emergency services. Location services also provide the ability for STAs to exchange location information using Radio Measurement Request and Radio Measurement Report frames. The protocol supports exchange-by-value and exchange-by-reference mechanisms. Exchange-by-value can be performed in geospatial (LCI) and civic formats. Exchange-by-reference can be performed using a URL that defines from where the location value is retrieved (Location Identifier). |

**\* Which field is being referred to in "The Civic Location Type field contains the format of location information in the Civic Location field" in 9.4.2.21.13 Location Civic report**

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| 9.4.2.20.13 Location Civic report    The Civic Location Type field contains the format of location information in the Location Civic Subelement field, as indicated in Table 9-152 (Civic Location Type field values). |

**\* Which field is being referred to in "The Civic Location field follows the little-endian octet ordering" in 9.4.2.21.13 Location Civic report**

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| 9.4.2.20.13 Location Civic report    The Location Civic field contains the location information in the format as indicated in the Civic Location Type field. When the Civic Location Type field is IETF RFC 4776:   * The Location Civic field is formatted according to IETF RFC 4776 starting at the country code field (i.e., excluding the GEOCONF\_CIVIC/ OPTION\_GEOCONF\_CIVIC, N/option-len and what fields) * An unknown civic location is indicated by(#3216)a zero-length Location Civic field * The Location Civic field follows the little-endian octet ordering |

**\* Which field is being referred to in "If the Location Civic report contains the Location Reference and Location Shape subelements, the receiving STA may use the information specified in those subelements in combination with the Civic Location field value for additional granularity on the position reported in the Civic Location field." in 11.10.9.9 Location Civic report**

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| 11.10.9.9 Location Civic report  If the Location Civic report contains the Location Reference and Location Shape subelements, the receiving STA may use the information specified in those subelements in combination with the Location Civic field value for additional granularity on the position reported in the Location Civic field. |

**\* "When the Civic Location Type field is IETF RFC 4776, the list of optional subelements optionally includes the Location Reference, Location Shape, Map Image, and Vendor Specific subelements as defined in Table 9-175 (Subelement IDs for Location Civic report)." in 9.4.2.21.13 Location Civic report is not clear: is it trying to say that no other optional subelements are allowed?**

From context, these subelements are specifically relevant to IETF RFC 4776 (and might not be relevant to other Civic types; though only IETF RFC 4776 and VS is defined). Given that we really only have IETF RFC 4776, the other subelements (Originator Requesting STA MAC Address, Target MAC Address, Colocated BSSID List) are surely allowed (and do seem reasonable).

As well, for VS, all of these subelements seem allowable and don’t need to be excluded.

Then really we just have some optional subelements that are optional. Therefore omit this text. (And promote the introduction of the optional subelements) (see below).

**\* Dependencies between subelements, e.g.:**

**o Location Shape depends on the presence of Location Reference, which in turn depends on this being Civic Location.**

**o Map Image depends on this being Civic Location.**

**\* ... or maybe:**

**o Location Shape depends on the presence of non-empty Location Reference, which in turn depends on this being Civic Location.**

**o Location Reference if absent/empty, depends on the presence of Map Image which in turn depends on this being Civic Location.**

**\* ... or even:**

**o Location Shape depends on the presence of Location Reference which in turn depends on the presence of a Map Image which in turn depends on this being Civic Location (seems to be implicit in "of the floor plan on which the Location Shape is defined")**

*Dependencies should be explicitly expressed:*

* *Location Shape is defined in terms of Location Reference:*

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| The Location Shape subelement defines the position in meters, including uncertainty, of the entity being located. A Shape is specified with respect to either a 2-Dimensional or 3-Dimensional Coordinate Reference System where each point in the shape defines the direction from the Location Reference value’s starting point. |

* *Map Image is defined in terms of Location Reference and Location Shape subelements*

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| The Map Image subelement contains a map reference that is used in combination with the Location Reference and Location Shape subelements. |

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| 9.4.2.20.13 Location Civic report    The Optional Subelements field contains zero or more subelements with subelement ID greater than or equal to 1 as listed in Table 9-175 (Subelement IDs for Location Civic report). The subelement format and ordering of subelements are defined in 9.4.3 (Subelements).  If the Civic Location Type field is IETF RFC 4776, and the Optional Subelements field includes the Location Shape subelement then the Optional Subelements field also includes the Location Reference subelement. If the Civic Location Type field is IETF RFC 4776, and the Optional Subelements field includes the Map Image subelement then the Optional Subelements field also includes both the Location Shape and Location Reference subelements.  When the Civic Location Type field value is Vendor Specific, the Optional Subelements field includes a Vendor Specific subelement that identifies the Organization Identifier corresponding to the Civic Location Type field. |

**\* The axes of the coordinate system are undefined. We probably should require that a map is a prereq for locshape**

*It turns out that a coordinate system is always defined, such that a map is not a prereq; see:*

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| 9.4.2.20.13 Location Civic report  The Location Shape subelement defines the position in meters, including uncertainty, of the entity being  located. A Shape is specified with respect to either a 2-Dimensional or 3-Dimensional Coordinate Reference System where each point in the shape defines the direction from the Location Reference value’s starting point. **A positive X-axis value corresponds to an easterly direction relative to the Location Reference value’s starting point; a negative X-axis value corresponds to a westerly direction relative to the Location Reference value’s starting point; a positive Y-axis value corresponds to a northerly direction relative to the Location Reference value’s starting point; a negative Y-axis value corresponds to a southerly direction relative to the Location Reference value’s starting point and the Z-axis value corresponds to the altitude above the horizontal plane at the Location Reference value’s starting point.** |

**\* Whether if you don’t have a non-empty Location Reference it should be “... indicates that the position of the Location Shape is the south west corner (i.e., 0,0) of the lowest (or only) floor in the floor plan on which the Location Shape is defined.”**

*Given, from above, we have a traditional right hand coordinate system then we should similarly use bottom left for (0,0).*

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| ***TGme editor: For the change text below, the reversion of CID3225 defined above is treated as baseline text. The changes herein are changes upon those earlier changes.***  The Location Reference field is an ASCII string that defines a position on a floor from which the relative location contained in the Location Shape subelement is offset. A Location Reference subelement with Length field set to 0 indicates that the position of the Location Shape is with respect to the south west corner (i.e., 0,0) of the lowest (or only) floor in the floor plan on which the Location Shape is defined. |

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| *As well, a worked example is probably worthwhile:****TGme editor: At the end of 11.10.9.9 Location Civic report, insert:***  For example, if the response to a Location Civic request with Location Subject field equal to Location Subject Local, is a Location Civic response containing a Location Reference field equal to “Lobby Entrance”, a Location Shape ID field equal to 2-Dimensional Point, a Location Shape Value field equal (0, 2), a Map Type field equal to png and a Map URL field equal to “http://www.example.com/maps/exampleBuilding/lobbyLevel.png?bottom=0&left=-50&right=200&top=100” then a process related to the user interface might retrieve the map image and display it from (-50,0) to (200,100), place a pin at (0,0) labelled “Lobby Entrance” and place a second pin at (0, 2) labelled “You Are Here”. |