IEEE P802.11
Wireless LANs

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| [LCI comments resolution] |
| Date: 2014-03-19 |
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Abstract

This document provides resolutions for CIDs 2402, 2492, 2491 and 2493. Baseline is 11mc v2.2.

Changes indicated by a mixture of Word track-changes and instructions.

Text in black means existing text from TGmc draft.

Text in Blue is added text, while crossed out text means text deleted from the draft.

… indicates text not replicated fromTGmc draft, not intended to be modified.

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 2402 | 14.64 | 64 | 3.1 |  |  | Reference to RFC3825 was replaced by reference to RFC6225, but the LCI format and the example below it still use the RFC3825 format. Changes in many other sections of the document are needed to fully align with RFC6225. | change 'resolution' to 'uncertainty', RFC6225 does not use resolution any more, but uncertainty.submission will be provided with proposed changes to LCI format, example and MIB variables. | Revised: See changes in 14//32r<motionedRev> that substantially implement the commenter’s proposed change. |

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| 2491 | 769.44 | 44 | 8.4.2.51 |  |  | RFC-6225 redefined b126 and b127 field to be Version. | Change Figure 8-285 b126 and b127 field to say "Version". After Dependent STA bit field description add new paragraph "The Version field is a 2-bit field defined in IETF RFC 6225, and the use is described in IETF RFC 6225." | Revised: See changes in 14//32r<motionedRev> that substantially implement the commenter’s proposed change. |

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| 2492 | 693.25 | 25 | 8.4.2.21.10 |  |  | RFC-6225 redefined b142 and b143 field to be Version. | Change Figure 8-187 b142 and b143 field to say "Version". After Dependent STA bit field description add new paragraph "The Version field is a 2-bit field defined in IETF RFC 6225, and the use is described in IETF RFC 6225." | Revised: See changes in 14//32r<motionedRev> that substantially implement the commenter’s proposed change. |

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| 2493 | 983.27 | 27 | 8.6.8.9 |  |  | RFC-6225 redefined b174 and b175 field to be Version. | Change Figure 8-574 b174 and b175 field to say "Version". After Dependent STA bit field description add new paragraph "The Version field is a 2-bit field defined in IETF RFC 6225, and the use is described in IETF RFC 6225." | Revised: See changes in 14//32r<motionedRev> that substantially implement the commenter’s proposed change. |

***Discussion***

***The requested resolution fields are mostly redundant. The only use case is for coarse/fine location of the client, to reduce network processing overhead. But for this use case, the client can simply obtain coarse location by requesting the AP’s location instead.***

***Change***

***TGmc editor: Modify the text as indicated with Track Changes:***

**3. Definitions, acronyms, and abbreviations**

**3.1 Definitions**

…

**location configuration information (LCI):** As defined in IETF RFC 6225: includes latitude,

longitude, and altitude, with uncertainty indicators for each.

**4.3.9.8 Location**

The Location request/report pair returns a requested location in terms of latitude, longitude, and altitude. It includes types of altitude such as floors. The requested location may be the location of the requestor (e.g., “Where am I?”) or the location of the reporting STA (e.g., “Where are you?”)

**8.4.2.20.10 Location Configuration Request**

The Measurement Request field corresponding to an LCI request is shown in Figure 8-143 (Measurement

Request field format for LCI request).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Location Subject |  |  |  | OptionalSubelements |

Octets: 1 variable

**Figure 8-143—Measurement Request field format for LCI request**

The Location Subject field of an LCI request is a single octet. See Table 8-78 (Location subject definition).

…

The Optional Subelements field format contains zero or more subelements, each consisting of a 1-octet Subelement ID field, a 1-octet Length field, and a variable-length Data field, as shown in Figure 8-516 (Subelement format). Any optional subelements are ordered by nondecreasing subelement ID. The Subelement ID field values for the defined optional subelements are shown in Table 8-79 (Optional subelement IDs for LCI request (#1294)(#1429)). A Yes in the Extensible column of a subelement listed in Table 8-79 (Optional subelement IDs for LCI request (#1294)(#1429)) indicates that the (#1429)subelement might be extended in future revisions or amendments of this standard. When the Extensible column of an element is equal to Subelements, then the subelement might be extended in future revisions or amendments of this standard by defining additional subelements within the subelement. See 9.25.9 (Extensible subelement parsing).

**8.4.2.21.10 Location Configuration Information report**

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NOTE—This example shows how to encode the ccordinates of the Sydney Opera House using the encoding defined in RFC6225. The building is a polygon with the following ccordinates:

 33.856625 S, 151.215906 E

 33.856299 S, 151.215343 E

 33.856326 S, 151.214731 E

 33.857533 S, 151.214495 E

 33.857720 S, 151.214613 E

 33.857369 S, 151.215375 E

Latitude ranges from -33.857720 to -33.856299; longitude ranges from 151.214495 to 151.215906.

For this example, the point that is encoded is chosen by finding the middle of each range, that is (-33.8570095, 151.2152005), which is encoded as (1110111100010010010011011000001101,

 0100101110011011100010111011000011) or (3BC49360D, 12E6E2EC3) in hexadecimal notation, using big endian; or (0D3649BC03, C32E6E2E01) using little endian.

The latitude uncertainty (LatUnc) is given by inserting the difference between the center value and the outer value into the formula from Section 2.3.2 of RFC6225. This gives:

 x = 8 - ceil( log2( -33.8570095 - -33.857720 ) ). The result of this equation is 18, which is encoded as 010010.

Similarly, longitude uncertainty (LongUnc) is given by the formula:

 x = 8 - ceil( log2( 151.2152005 - 151.214495 ) ). The result of this equation is also 18, which is encoded as 010010.

The top of the building is 67.4 meters above sea level, and a starting altitude of 0 meters above the WGS84 geoid is assumed, the middle of the range is 33.7m.

Altitude uncertainty (AltUnc) uses the formula from Section 2.4.5 from RFC6225:

 x = 21 - ceil( log2( 33.7 - 0 ) ), the result of this equation is 15, which is encoded as 001111.

The RegLoc Agreement field is set to 1 to report that the STA is operating within a national policy area or an international agreement area near a national border (see 10.12.3 (Registered STA operation)); otherwise, it is 0.

***TGmc Editor: update figure 8-187:***

Latitude Resolution -🡪 Latitude Uncertainty

Latitude Fraction+Latitude Integer (bits 22 through 55) 🡪 Latitude

Longitude Resolution 🡪 Longitude Uncertainty

Longitude Fraction + Longitude Interger (bits 62 through 95) 🡪 Longitude

Altitude Resolution 🡪 Altitude Uncertainty

Altitude Fraction + Altitude Integer (bits 106 through 135) 🡪 Altitude

Change bits b142 and b143 from Reserved field to say "Version".

The RegLoc DSE field is set to 1 to report that the enabling STA is enabling the operation of STAs with DSE; otherwise, it is 0.(#1692)

The Dependent STA field is set to 1 to report that the STA is operating with the enablement of the enabling STA whose LCI is being reported; otherwise, it is 0.(#1692)

The Version field is a 2-bit field defined in IETF RFC 6225, and the use is described in IETF RFC 6225.

The Optional Subelements field format contains zero or more subelements, each consisting of a 1-octet Subelement ID field, a 1-octet Length field, and a variable-length Data field, as shown in Figure 8-516 (Subelement format). Any optional subelements are ordered by nondecreasing subelement ID.

…

**8.4.2.51 DSE Registered Location element**

***TGmc Editor: update figure 8-285:***

Rename fields as follows:

Latitude Resolution -🡪 Latitude Uncertainty

Latitude Fraction+Latitude Integer (bits 6 through 39) 🡪 Latitude

Longitude Resolution 🡪 Longitude Uncertainty

Longitude Fraction + Longitude Interger (bits 46 through 79) 🡪 Longitude

Altitude Resolution 🡪 Altitude Uncertainty

Altitude Fraction + Altitude Integer (bits 90 through 119) 🡪 Altitude

Change bits b126 and b127 from Reserved field to say "Version".

***TGmc Editor: After Dependent STA bit field description add new paragraph***

"The Version field is a 2-bit field defined in IETF RFC 6225, and the use is described in IETF RFC 6225.

**8.6.8.9 DSE Measurement Report frame format**

***TGmc Editor: update figure 8-574:***

Rename fields as follows:

Latitude Resolution -🡪 Latitude Uncertainty

Latitude Fraction+Latitude Integer (bits 54 through 87) 🡪 Latitude

Longitude Resolution 🡪 Longitude Uncertainty

Longitude Fraction + Longitude Interger (bits 94 through 127) 🡪 Longitude

Altitude Resolution 🡪 Altitude Uncertainty

Altitude Fraction + Altitude Integer (bits 138 through 167) 🡪 Altitude

Change bits b174 and b175 from Reserved field to say "Version".

***TGmc Editor: After Dependent STA bit field description add new paragraph***

The Version field is a 2-bit field defined in IETF RFC 6225, and the use is described in IETF RFC 6225.

**10.11.9.6 Location Configuration Information Report**

NOTE 1(#1101)— The physical location and azimuth MIB information of the STA might be set by administrative means.

The Datum value shall be 1 (World Geodetic System 1984), unless another datum is required for operation

in the regulatory domain.

If the Altitude Type is 2 (Floors of Altitude), the value reported shall be as required for operation in the

regulatory domain.

An LCI request shall indicate a location request for the requesting STA, the reporting STA, or a third STA

with the MAC address specified in the Target MAC Address subelement, by setting the LCI request

Location Subject field to indicate a Local, a Remote, or a third-party request, respectively. Local LCI

(#1294)request is used by the requesting STA to obtain its own location by asking “Where am I?” Remote

LCI (#1294)request is used by requesting STA to obtain location of reporting STA by asking “Where are

you?” Third-party Location request is used by requesting STA to obtain location of a STA with the MAC

address specified in the Target MAC Address subelement.

The Latitude, Longitude, and Altitude fields of the Location Configuration Information report shall be reported at their best known resolutions.

NOTE 2(#1101)—. A STA that requested

an LCI including an Azimuth Request, and received an LCI (#1294)report in which the Incapable bit is 1 might

alternatively request the LCI with no Azimuth requested.

If dot11RM3rdPartyMeasurementActivated is false, a STA shall reject any LCI (#1294)request that includes

an(#1294) LCI (#1294)request with the Location Subject field equal to 2 and shall respond with a Radio

Measurement Report frame including an Radio Measurement Report element with the incapable bit set to 1.

It is optional for a STA to support an LCI (#1294)request and an LCI (#1294)report with the Location

Subject field equal to 2. If dot11RM3rdPartyMeasurementActivated is true and a STA supports LCI

(#1294)request and LCI (#1294)report, the following procedure shall be followed:

— When a non-AP STA requests the geospatial location of a STA with the MAC address specified in

the Target MAC address field, it shall also include its own MAC address in the Originator

Requesting STA MAC address field. When an AP receives an LCI (#1294)request with the Location

Subject field value equal to 2, the AP shall generate an LCI (#1294)request to the STA with the

MAC address specified in the Target MAC address field. If the AP does not have an association with

the STA with the MAC address specified in the Target MAC address field, the AP shall reject the

received LCI (#1294)request and shall respond with an(#1294) LCI (#1294)report where the

Incapable bit is set in the MeasurementReport Mode field. The AP shall copy the Originator

Requesting STA MAC address and Target MAC address fields into the request from the received

LCI request.

— When a STA receives an LCI (#1294)request with the Location Subject field value equal to 2, the

STA shall only generate an LCI (#1294)report if the MAC address in the Target MAC address field

is its own MAC address. When an LCI (#1294)report is generated, the reporting STA shall include

its MAC address into the Target MAC address field and the MAC address present in the Originator

Requesting STA MAC address field of the corresponding LCI (#1294)request into the Originator

Requesting STA MAC address field. When an AP receives an LCI (#1294)report with an Originator

Requesting STA MAC address field present, the AP shall generate an LCI (#1294)report to the

associated STA with the MAC address specified in the Originator Requesting MAC address field.

The AP shall copy the Originator Requesting STA MAC address and Target MAC address fields

into the LCI report being transmitted to the originating requesting STA.

If dot11RMLCIMeasurementActivated is false, a station shall reject the received LCI (#1294)request and

shall respond with an(#1294) LCI (#1294)report with the Incapable bit in the Measurement Report Mode

field set to 1.

If dot11RMLCIMeasurementActivated is true and a STA has its own location configured in LCI format, it

shall set the Geospatial Location field to 1 in the Extended Capabilities element (see 8.4.2.26 (Extended

Capabilities element)).

NOTE 3(#1101)—It is recommended that User Applications not send location information to other stations without the

express permission of the user. User agents acquire permission through a user interface, unless they have prearranged

trust relationships with users. Those permissions that are acquired through the user interface and that are preserved

beyond the current browsing session (i.e., beyond the time when the BSS connection is terminated) are revocable and

receiving stations should respect revoked permissions. Some user applications might have prearranged trust

relationships that do not require such user interfaces. For example, while a social networking application might present a

user interface when a friend performs a location request, a VOIP telephone might not present any user interface when

using location information to perform an E911 function.

**10.12.3 Registered STA operation**

A registered STA(#1289) shall have dot11DSERequired set to false. They shall transmit the DSE Registered

Location element in every Beacon frame and shall set the Dependent STA bit in the DSE Registered

Location element to 0. If the registered STA is located within a national policy area, such as a Fixed Satellite

Service exclusion zone, or within an international agreement area near a national border, the RegLoc

Agreement bit in the DSE Registered Location element shall be set to 1, signifying to other STAs that

additional restrictions on STAs with directional antennas may apply; otherwise, it shall be set to 0.

The Latitude, Longitude, and Altitude fields of the DSE Registered Location element shall be reported at

their best known resolutions, which may exceed the resolutions required by regulatory authorities.

The

Altitude Type field value shall be 3 (i.e., height above ground is in meters or, in other words, the altitude is

in meters above adjacent terrain), unless another altitude type is required for operation in the regulatory

domain. The Datum field value shall be 1 (World Geodetic System 1984), unless another datum is required

for operation in the regulatory domain.

An enabling STA is a registered STA that broadcasts its registered location, and regulatory authorities

permit it to enable operation of unregistered STAs (see 10.12.4 (Enabling STA operation with DSE)). A

dependent STA is an unregistered STA that operates under the control of an enabling STA (see 10.12.5

(Dependent STA operation with DSE)).

***TGmc Editor: Remove lines RM9.1.2, RM9.1.3, RM9.1.4 from the Table in B.4.15 Radio Management extensions***

***TGmc Editor: Modify the MIB variables in Annex C.3 as follows:***

Dot11LCIDSEEntry ::=

SEQUENCE {

dot11LCIDSEIndex Unsigned32,

dot11LCIDSEIfIndex InterfaceIndex,

dot11LCIDSECurrentOperatingClass Unsigned32,

dot11LCIDSELatitudeUncertainty Unsigned32,

dot11LCIDSELatitudeInteger Integer32,

dot11LCIDSELatitudeFraction Integer32,

dot11LCIDSELongitudeUncertainty Unsigned32,

dot11LCIDSELongitudeInteger Integer32,

dot11LCIDSELongitudeFraction Integer32,

dot11LCIDSEAltitudeType INTEGER,

dot11LCIDSEAltitudeUncertainty Unsigned32,

dot11LCIDSEAltitude Integer32,

dot11LCIDSEDatum Unsigned32,

dot11RegLocAgreement TruthValue,

dot11RegLocDSE TruthValue,

dot11DependentSTA TruthValue,

dot11DependentEnablementIdentifier Unsigned32,

dot11DSEEnablementTimeLimit Unsigned32,

dot11DSEEnablementFailHoldTime Unsigned32,

dot11DSERenewalTime Unsigned32,

dot11DSETransmitDivisor Unsigned32 }

dot11LCIDSELatitudeUncertainty OBJECT-TYPE

SYNTAX Unsigned32 (0..63)

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This is a control variable.

It is written by the SME when the device is initialized.

Latitude uncertainty is 6 bits as defined in RFC6225"

::= { dot11LCIDSEEntry 4 }

dot11LCIDSELongitudeUncertainty OBJECT-TYPE

SYNTAX Unsigned32 (0..63)

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This is a control variable.

It is written by the SME when the device is initialized.

Longitude uncertainty is defined in RFC6225"

::= { dot11LCIDSEEntry 7 }

dot11LCIDSEAltitudeType OBJECT-TYPE

SYNTAX INTEGER { meters(1), floors(2), hagm(3) }

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This is a control variable.

It is written by the SME when the device is initialized.

Altitude Type is 4 bits encoding the type of altitude.

Codes defined are:

meters : in (#273)2s complement(#273) fixed-point 22-bit integer part with

8-bit fraction

floors : in (#273)2s complement(#273) fixed-point 22-bit integer part with

8-bit fraction

hagm : Height Above Ground in meters, in (#273)2s complement(#273) fixedpoint

22-bit integer part with 8-bit fraction. "

DEFVAL { 3 }

::= { dot11LCIDSEEntry 10 }

dot11LCIDSEAltitudeUncertainty OBJECT-TYPE

SYNTAX Unsigned32 (0..63)

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This is a control variable.

It is written by the SME when the device is initialized.

Altitude uncertainty is defined in RFC6225(#1692)"

::= { dot11LCIDSEEntry 11 }

dot11LCIDSEAltitude OBJECT-TYPE

SYNTAX Integer32 (-2097151..2097151)

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This is a control variable.

It is written by the SME when the device is initialized.

This field is defined in RFC6225."

::= { dot11LCIDSEEntry 12 }

***TGmc Editor: Rename:***

dot11RMRqstLCILatitudeResolution to dot11RMRqstLCILatitudeUncertainty

dot11RMRqstLCILongitudeResolution to dot11RMRqstLCILongitudeUncertainty

dot11RMRqstLCIAltitudeResolution to dot11RMRqstLCIAltitudeUncertainty

***TGmc Editor: Modify the MIB variables in Annex C.3 as follows:***

Dot11LCIReportEntry ::=

SEQUENCE {

dot11LCIReportIndex Unsigned32,

dot11LCIReportToken OCTET STRING,

dot11LCIIfIndex InterfaceIndex,

dot11LCISTAAddress MacAddress,

dot11LCILatitudeUncertaintyn Unsigned32,

dot11LCILatitudeInteger Integer32,

dot11LCILatitudeFraction Integer32,

dot11LCILongitudeUncertainty Unsigned32,

dot11LCILongitudeInteger Integer32,

dot11LCILongitudeFraction Integer32,

dot11LCIAltitudeType INTEGER,

dot11LCIAltitudeUncertainty Unsigned32,

dot11LCIAltitude Integer32,

dot11LCIDatum Unsigned32,

dot11LCIAzimuthType INTEGER,

dot11LCIAzimuthResolution Unsigned32,

dot11LCIAzimuth Integer32,

dot11LCIVendorSpecific OCTET STRING,

dot11LCIRprtMeasurementMode INTEGER}

**References:**