**IEEE P802.15**

**Wireless Personal Area Networks**

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| Project | IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs) |
| Title | **LB207/D01 comment resolution -- Message Control -- CIDs 289, 313, 1032, 1033, 1217, and 1218** |
| Date Submitted | December 19, 2024 |
| Sources | Alex Krebs (Apple), Hongwon Lee(LG Electronics)krebs @ apple.com, hongwon.lee@lge.com |
| Re: |  |
| Abstract |  |
| Purpose | To propose resolution for MMS related comments for “P802.15.4ab™/D (pre-ballot) C Draft Standard for Low-Rate Wireless Networks”. |
| Notice | This document does not represent the agreed views of the IEEE 802.15 Working Group or IEEE 802.15.4ab Task Group. It represents only the views of the participants listed in the “Sources” field above.It is offered as a basis for discussion and is not binding on the contributing individuals. The material in this document is subject to change in form and content after further study. The contributors reserve the right to add, amend or withdraw material contained herein. |

**Table of contents**

[CID 289 (Accepted) 3](#_Toc187325873)

[CID 1032 and 1033 (Revised) 4](#_Toc187325874)

[CID 313 (Revised) 5](#_Toc187325875)

# CID 289 (Accepted)

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| --- | --- | --- | --- | --- | --- | --- |
| **Name** | **Index #** | **Page** | **Sub-clause** | **Line #** | **Comment** | **Proposed Change** |
| Tero Kivinen | 289 | 17 | 7.3.7 | 1 | Is this new compact frame format really meant to be implemented by every single 802.15.4 device? It is now in part of clause 7 which is mandatory to implement parts.  | Move to 10.xx and clearly mark that this is optional. In that case add similar footnote to table 7-1 than what there already exists for Fragment and frag frame types describing where the format can be found. |

Discussion:

Proposed resolution: Accepted

Disposition detail:

# CID 1032 and 1033 (Revised)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Name** | **Index #** | **Page** | **Sub-clause** | **Line #** | **Comment** | **Proposed Change** |
| Billy Verso | 1032 | 23 | 8.3.4 | 17 | "For Compact frames, if the SrcAddrMode and DstAddrMode is COMPACT…." is in a paragraph only for compact frames, (where SendFrameType == COMPACT\_FRAME"). I think here the addressing mode can only be NONE or COMPACT | Specify that NONE/COMPACT are only valid values for compact frames. |
| Billy Verso | 1033 | 23 | 8.3.4 | 18 | "SrcAddr or DstAddr contain the Compact frame address information"… needs more detail. | Specify how SrcAddr and DstAddr parameters of this primitive map into the RPA Hash and RPA Prand fields of the transmitted compact frame, (assuming that is what is meant by this line, or otherwise clarify what is meant). Use separate sentences, i.e., "When SrcAddrMode is COMPACT, the SrcAddr parameter ...." and "When DstAddrMode is COMPACT, the DstAddr parameter ..."  |

Discussion: Agree with comment.

Proposed resolution: Revised

Disposition detail: Revise sentence to

For Compact frames SrcAddrMode and DstAddrMode is either NONE, or COMPACT. If the SrcAddrMode and DstAddrMode are COMPACT, then the SrcAddr and DstAddr contain the IRK of the transmitting device and the receiving device. The Compact Frame ID conveyed in the CompactFrameDescriptor determines if the Compact frame RPA Hash field is generated with either the transmitter IRK or the receiver IRK.

# CID 313, 1217, 1218 (Revised)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Name** | **Index #** | **Page** | **Sub-clause** | **Line #** | **Comment** | **Proposed Change** |
| Tero Kivinen | 313 | 24 | 8.3.4 | 11 | There is only very few valid values for CompactMessageControl so there is no point of sending it as 8-bit integer. It is possible to combine CompactFrameId and CompactMessageControl to 6-bit value while allowing all currently possible CompactFrameId and CompactMessageControl combinations. Combining those two to one value would also allow using of the existing frame formats with one extra octet but include support for extensibility, security, privacy etc which are not provided by the compact frame format (for example use MAC Command Frame format with 2 octet MHR (no addressing in header) and allocate those bit less than 60 different CompactFrameID and CompactMessageControl combinations as separate MAC Commands.  | Combine CompactFrameID and CompactMessageControl to one integer, and transmit that one byte instead of current Message Control field.  |
| Billy Verso | 1217 | 92 | 10.38.9.4 | 6 | The numbering space of the Message Control field is sparce, and seems to be mostly increasing in units of 16, but not always. After 4ab this numbering space will have to be managed by the 802.15 assigned numbers authority (ANA) and this will be easier to do via a simple sequential list. | In preparation for ANA management of the numbering space, renumber all Message Control field values in ALL compact frames to be simple sequential values. |
| Billy Verso | 1218 | 92 | 10.38.9.4 | 7 | In general the message formats being totally dependant on Message Control field value while very flexible makes decoding the frames into a huge "if … then…" type structure where each value needs separate decoding routine which from a software point of view seems a bit clunky, and has given rise to multiple separate messages when different fields are needed. | Please consider is this the best way to do it. Pros/Cons… it’s not too late to improve the design choices here. |

Discussion: Disagree with the comment #313, but agree with comment #1217 which suggests that the use of the MessageControl field needs to be clarified. To that end I propose to split up the MessageControl 8 bit field into two 4 bit fields named MessageControl and MessageVersion as previously described on page 7 in 15-23/258r2.

As for #1218 it is not clear what is the commenter wants to suggest otherwise. The MessageControl field offers the ability to have flexible and extendable functionality for sequences of compact frames. E.g. the Poll compact frame can also be used for updating short-term ranging configuration parameters. If we followed the idea of #313 and merged the MessageControl into a larger set of Compact Frame IDs, there would still be a long "if then else" structure for Frame IDs instead. If the commenter has a better idea, he should make a proposal for the group to consider.

Proposed resolution: Revised

Disposition detail: On page 24, line 11, in Table 2 change:

|  |  |  |  |
| --- | --- | --- | --- |
| ... |  |  |  |
| CompactMessageControl | Unsigned Integer | 0-15 | This provides the Message Control field value, which identifies the content of the Message Content field |
| CompactMessageVersion | Unsigned Integer | 0-15 | This provides the Message Version field value, which identifies the version of the Message Content field |
| ... |  |  |  |

The CompactMessageControl parameter defines the content of the Compact frame’s Message Content field, except for any data for the Passthrough field which is supplied by the Msdu parameter. The CompactMessageVersion indicates which revision of the Message Content field format is used in the Compact Frame.

One page 28, line 5 change:

|  |  |  |
| --- | --- | --- |
| **Compact frame type** | **Private Payload field** | **Open Payload field** |
| One-to-one Initiator Secure Report | Round-trip Time field | The Message Control field, the Message Version field, and all other fields in the Message Content field except the Round-trip Time field. |
| One-to-one Responder Secure Report | Reply Time field | The Message Control field, the Message Version field, and all other fields in the Message Content field except the Reply Time field. |
| One-to-many Initiator Secure Report, with Message Control field = 0 | Round-trip Time field | The Message Control field, the Message Version field, and all other fields in the Message Content field except the Round-trip Time field. |
| One-to-many Initiator Secure Report, with Message Control field = 1 | Round-trip Time One and Round-trip Time Two fields | The Message Control field, the Message Version field, and all other fields in the Message Content field except the Round-trip Time One and Round-trip Time Two fields. |
| One-to-many Responder Secure Report | Reply Time field | The Message Control field, the Message Version field, and all other fields in the Message Content field except the Reply Time field. |

On page 57, line 20 change:

If the initiator intends to proceed to the control phase, the Message Control field of the Start of Ranging

Compact frame shall be set to 0 or 1 (with value of the status field set as SUCCESS). If a responder

receives a Start of Ranging Compact frame with the Message Control field equal to 1 and the value of

the status field is set as SUCCESS and if any of the NB Channel Map, Management PHY Configuration

field, Management MAC Configuration field, Ranging PHY Configuration field and Ranging MAC

Configuration field is not present, the value of the field of the same name from the Advertising Response

Compact frame shall be used for starting the ranging session, or if no value was given in the Advertising

Response Compact frame, if applicable the value communicated via OOB methods, or otherwise the default

value of the field shall be used for the ranging session.

Otherwise, if the initiator does not intend to proceed to the control phase, the Message Control field of the

Start of Ranging Compact frame shall be set to 1, and the value of the Status field set as one of the non-

reserved entries in Table 16 other than SUCCESS. If a responder receives a Start of Ranging Compact

frame with the Message Control field equal to 1 and the value of the Status field is one of the non-

reserved entries in Table 16 other than SUCCESS, the responder’s action is as follows:

On page 58, line 4 change:

After transmitting the Start of Ranging Compact frame with the Message Control field equal to 0 or a

Pubic Start of Ranging Compact frame with the Message Control field equal to 0, the initiator shall

enter the control phase, at the time it has indicated in the start of ranging message. After the initiator has

confirmed receipt of the expected response from the responder during control phase, and unless

initialization of further devices is required, the initiator shall discontinue ranging initialization and cease

transmission of Advertising Poll Compact frames.

On page 58, line 23 change:

If the initiator intends to proceed to the control phase, the Message Control field of the Start of Ranging

Compact frame shall be set to 0 or 1 (with value of the status field set as SUCCESS). If a responder

receives a Start of Ranging Compact frame with the Message Control field equal to 1 and the value of

the status field is set as SUCCESS and if any of the NB Channel Map, Management PHY Configuration

field, Management MAC Configuration field, Ranging PHY Configuration field and Ranging MAC

Configuration field is not present, the value of the field of the same name from the Advertising Response

Compact frame shall be used for starting the ranging session, or if no value was given in the Advertising

Response Compact frame, if applicable the value communicated via OOB methods, or otherwise the default

value of the field shall be used for the ranging session.

Otherwise, if the initiator does not intend to proceed to the control phase, the Message Control field of the

Start of Ranging Compact frame shall be set to 1, and the Status field value set to one of the non-

reserved entries in Table 16 other than SUCCESS. If a responder receives a Start of Ranging Compact

frame with a Message Control field value of 1, and the value of the Status field is one of the non-

reserved entries in Table 16 other than SUCCESS, the responder’s action is as follows:

On page 63, line 6 change:

After transmitting the Start of Ranging Compact frame, the initiator shall enter the control phase. If the

initiator had accepted the responder’s request for a specific one-to-many ranging mode during the

initialization and setup phase, as explained in 10.38.3.4, the initiator shall transmit the One-to-many Poll

Compact frame with the Message Control field value that matches the requested one-to-many ranging mode.

After receiving the Start of Ranging Compact frame, the responder shall enter the control phase. After the

initiator has confirmed receipt of the response Compact frame(s) from the responder(s) during the control

phase, and unless initialization of further devices is required, the initiator shall discontinue ranging

initialization and cease the transmission of Advertising Poll Compact frame.

On page 65, line 16 change :

In a one-to-many session, a One-to-many Poll Compact frame in the first sub-round shall be transmitted as

described in 10.38.8. To address multiple responders simultaneously, the IRK for the one-to-many POLL

compact frame with the Message Control field not set to 0 should be generated using a Group ID, which

represents a group of multiple devices in a one-to-many ranging session. By transmitting a Public

Advertising Poll Compact frame on the initialization channel, a

Group ID may be shared with responders. The GroupID shall be used to generate the IRK for the RPA\_hash used

in One-to-many Poll Compact frame in the one-to-many ranging session, as described in 10.38.8, in case

Group ID is shared with responders.

If a Group ID is not shared, the value, 0xFFFFFF shall be used to generate

the IRK for the RPA\_hash used in the One-to-many Poll Compact frame with the Message Control field

not set to 0.

On page 65, line 35 change :

i.e., for One-to-many Poll Compact frame where the Message Control field value is not 0.

On page 66, line 4 change :

i.e., for One-to-many Poll Compact frame where the Message Control field value is not 0.

On page 66, line 26 change :

**10.38.3.8 Supported message control list indication**

The initiator (controller) may indicate the supported message control commands for each Compact frame

by referencing the supported Compact Frame ID values and their Message Control and Message Version values using the

SMC TLVs field. A Message Version value greater than 0 signals support of versions less or equal to the Message Version of the corresponding Message Control. Subclause 10.38.9 details the message encodings.

The responder (controlee) may request ranging session configuration in the Advertising Response Compact

frame and may indicate the supported message control list for each Compact frame by referencing the

supported Compact Frame ID values and their Message Control and Message Version values using the SMC TLVs field.

After the supported message control lists have been exchanged, devices shall use values for Compact

Frame ID and Message Control indicated in the peer's SMC\_TLVs field when transmitting Compact frames

to the peer.

On page 73, line 25 change :

For contention-based one-to-many ranging, if the ranging initiation uses the One-to-many Poll Compact

frame with a Message Control field value of 5, which specifies the number of ranging sub-rounds and

their size, then, in the ranging sub-rounds, the responders send their responses after receiving the poll

messages.

If the ranging initiation uses the One-to-many Poll Compact frame with a Message Control field value of

6, then, after the first ranging sub-round in the ranging round, i.e., for second and subsequent ranging

On page 74, line 13 change :

As a ranging initialization message, the One-to-many Poll Compact frame with the Message Control field

set to 9 or 10 serves to enable the time efficient one-to-many SS-TWR from an initiator to multiple

responders in the first ranging sub-round. Each ranging sub-round, except the last ranging sub-round, has

two responders. The last ranging sub-round has either one or two responders. Where there are two

responders scheduled in a ranging sub-round, the corresponding Start Slot Index fields shall be set to the

same value; and the corresponding Time Shift Indication fields shall set to zero and one, respectively.

Where there is only one responder scheduled in a ranging sub-round, the Start Slot Index field is used to

indicate the slot index of the corresponding One-to-many Poll Compact frame, and the corresponding Time

Shift Indication field shall set to zero. In the subsequent ranging sub-round, the One-to-many Poll Compact

frame with the Message Control field set to 0 shall be used.

On page 75, line 17 change :

When there are two responders involved in ranging in the same ranging sub-round, the report phase

consists of one, two, or three periods for transmission of a report packet. The durations of the three

reporting periods are specified by the *macMms1stReportNSlots*, *macMms2ndReportNSlots*, and

*macMms3rdReportNSlots* attributes. If the report phase has only a single transmission, the initiator shall

transmit the One-to-many Initiator Report Compact frame with the Message Control field set to 1 or the

One-to-many Initiator Secure Report Compact frame with the Message Control field set to 1 to the two

responders in the first reporting period. This message indicates the round-trip time with respect to each of

the two responders in the Round-trip Time One and the Round-trip Time Two fields, respectively. If the

report phase has two transmissions, the responder with Time Shift Indication field set to zero shall transmit

the One-to-many Responder Report Compact frame or the One-to-many Responder Secure Report Compact

frame in the first reporting period, and the responder with Time Shift Indication field set to one shall

transmit the One-to-many Responder Report Compact frame or the One-to-many Responder Secure Report

Compact frame in the second reporting period. If the report phase has three transmissions, the responder

with Time Shift Indication field set to zero shall transmit the One-to-many Responder Report Compact

frame or the One-to-many Responder Secure Report Compact frame in the first reporting period, the

responder with Time Shift Indication field set to one shall transmit the One-to-many Responder Report

Compact frame or the One-to-many Responder Secure Report Compact frame in the second reporting

period, and the initiator shall transmit the One-to-many Initiator Report Compact frame or the One-to-many

Initiator Secure Report Compact frame with the Message Control field set to 1 in the third reporting

period. Figure 43 shows the possible report packet positions in the report phase.

On page 80, line 21 change :

**10.38.9.3.1 The Message Control Version field**

This is a one octet field that contains the Message Control field in bits 7 to 4, and the Message Version field in bits 3 to 0.

**10.38.9.3.2 The Message Control field**

This is a 4-bit field that dictates the interpretation the Message Content field. The meaning of the

Message Control field values is also dependent on the Compact Frame ID field value.

**10.38.9.3.3 The Message Version field**

This is a 4-bit field that in combination with the Message Control field dictates the interpretation of the Message Content field. The meaning of the Message Control field values is also dependent on the Compact Frame ID field value. Unless otherwise stated the value of this field is set to zero.

On page 81, line 4 change :

The SMC Values field is a list of valid Message Control field (10.38.9.3.2) and Message Version field (10.38.9.3.3) values for the associated

Compact frame (as specified by the SMC Tag field) that are supported by the sender. The upper 4 bit of each value of this list shall be the Message Control field value and the lower 4 bits of this field shall be the Message Version value.

On page 92, line 1 change :



Message

Control

Version

**Figure 61—Advertising Poll Compact Frame Content field format**

The Initiator RPA Hash field shall be calculated as specified in 10.38.9.2.1 using the initiator's IRK.

The RPA Prand field shall be set as specified in 10.38.9.2.1. During initialization phase, the value of

RPA Prand as conveyed in this Compact frame shall be used to compute the RPA Hash used in subsequent

Compact frames, until the initiator transmits another Advertising Poll Compact frame.

The Message Control field value (contained in the Message Control Version field) shall be either 0, 1. This value determines the

formatting of the Message Content field.

When the Message Control field value is 0 the Message Content field is empty, i.e., has zero length.

A Message Control field value of 0 signals support by the initiator for MMS messages with Compact

Frame ID field values of 1 to 6 with a Message Control field value of 0.

When the Message Control field value is 1 the Message Content field shall be formatted as shown in

Figure 62.

**Octets: 1 variable**

Initialization Slot

Duration SMC TLVs

**Figure 62—Format of the Message Content field in the Advertising Poll Compact frame**

**when the Message Control field value is 1**

When the Message Control field value (contained in the Message Control Version field) is 2 the Message Content field shall be formatted as shown in

Figure 63.

**Octets: 1 1**

Cap Duration

Initialization Slot

Duration

**Figure 63—Format of the Message Content field in the Advertising Poll Compact frame**

**when the Message Control field value is 2**

When the Message Control field value (contained in the Message Control Version field) is 3 the Message Content field shall be formatted as shown in

Figure 64.

**Octets: 1 1 variable**

Cap Duration

Initialization Slot

Duration SMC TLVs

**Figure 64—Format of the Message Content field in the Advertising Poll Compact frame**

**when the Message Control field value is 3**

On page 93, line 13 change :



Message

Control

Version

**Figure 65—Advertising Response Compact Frame Content field format**

The Responder RPA Hash field shall be set as specified in 10.38.9.2.1 using the responder's IRK.

The Message Control field value (contained in the Message Control Version field) shall be one of 0, 1. This value determines the

formatting of the Message Content field.

For the Message Control field value of 0, the Message Content field shall be formatted as shown in

Figure 66.

**Octets: 6** NB Channel

Map

**1 8 4 1**

Management

PHY

Configuration

Management

MAC

Configuration

Ranging PHY

Configuration

Ranging MAC

Configuration

**Figure 66—Format of the Message Content field in the Advertising Response Compact**

**frame when the Message Control field value is 0**

The NB Channel Map field shall be set as per 10.38.9.3.7.

The Management PHY Configuration field shall be set as per 10.38.9.3.17.

The Management MAC Configuration field shall be set as per 10.38.9.3.12.

The Ranging PHY Configuration shall be as per 10.38.9.3.10.

The Ranging MAC Configuration field shall be set as per 10.38.9.3.11.

When the Message Control field value is 1 the Message Content field shall be formatted as shown in

Figure 67.

On page 94, line 2 change : **frame when the Message Control field value is 1**

On page 94, line 20 change :



Message

Control

Version

**Figure 68—Start of Ranging Compact Frame Content field format**

When the Start of Ranging Compact frame is transmitted to a single responder selected during contention-

based initialization and setup (as described in 10.38.3.5), the RPA Hash field shall be calculated as

specified in 10.38.9.2.1 using the responder's IRK. Otherwise, the RPA Hash field shall be calculated as

specified in 10.38.9.2.1 using the initiator's IRK.

The Message Control field value (contained in the Message Control Version field) shall be one of the values: 0, 1 or 2. This value determines the

formatting of the Message Content field.

On page 95, line 1 change :

When the Message Control field value is 0 the Message Content field shall be formatted as shown in

Figure 69.

**when the Message Control field value is 1**

**Figure 70—Format of the Message Content field in the Start of Ranging Compact frame**

Status

Time Offset

NB Channel

Seed

Presence Bimap

NB Channel

Map

Management

PHY

Configuration

Management

MAC

Configuration

Ranging PHY

Configuration

Ranging MAC

Configuration

Starting Block

Index

MMS Ranging

Mode

Configuration

Message Content field shall be formatted as shown in Figure 70.

indicate the status of the initialization and setup phase. When the Message Control field value is 1 the

The Start of Ranging Compact frame with Message Control field value equal 1 is sent by the initiator to

The Ranging MAC Configuration field shall be set as per 10.38.9.3.11.

The Ranging PHY Configuration field shall be as per 10.38.9.3.10.

The Management MAC Configuration field shall be set as per 10.38.9.3.12.

The Management PHY Configuration field shall be set as per 10.38.9.3.17.

The NB Channel Map field shall be set as per 10.38.9.3.7.

The NB Channel Seed field shall be as per 10.38.9.3.16.

The Time Offset field shall be as per 10.38.9.3.14.

**when the Message Control field value is 0**

**Figure 69—Format of the Message Content field in the Start of Ranging Compact frame**

On page 96, line 3 change :

The Presence Bitmap field is present when the value of status field is SUCCESS or

REJECT\_WITH\_SUGGESTED\_CONFIG\_CHANGE, otherwise the Presence Bitmap field is not present.

The Presence Bitmap is set as specified in 10.38.9.3.24, with the fields other than NB Channel Map,

Management PHY Configuration Present field, Management MAC Configuration Present field, Ranging

PHY Configuration Present field, Ranging MAC Configuration Present field and Starting Block Index

Present field set to zero. The encoding and meaning of the Presence Bitmap field and subsequent fields in

the Message Content field is identical to that of the field of the same name in the Advertising Response

Compact frame with Message Control field value equal to 1.

The Starting Block Index field if present indicates the index of the first ranging block for a ranging session.

The MMS Ranging Mode Configuration if present indicates the requested ranging mode configuration and

shall be set as per 10.38.9.3.25.

When the Message Control field value is 2, the ranging executed in Hyper Block mode. In this case, the

responders assume that Hyper Block mode starts from the specified Time Offset and they should acquire

the configuration information from HBS IE and ARC IE. When the Message Control field value is 2

the Message Content field shall be formatted as shown in Figure 71.

**Octets: 4** Time

Offset

**Figure 71—Format of the Message Content field in the Start of Ranging Compact frame**

**when the Message Control field value is 2**

On page 97, line 21 change :



Message

Control

Version

**Figure 73—One-to-one Poll Compact Frame Content field format**

When the One-to-one Poll Compact frame is transmitted to a single responder selected during contention-

based initialization and setup (as described in 10.38.3.5), the RPA Hash field shall calculated as specified in

10.38.9.2.1 using the responder's IRK. Otherwise, the RPA Hash field shall be calculated as specified in

10.38.9.2.1 using the initiator's IRK.

The RPA Prand field shall be set as specified in 10.38.9.2.1. In the scope of a ranging round, the value of

RPA

\_prand as conveyed in this frame shall be used to compute the RPA\_hash used in all subsequent

frames, until the initiator transmits another One-to-one Poll Compact frame or a One-to-many Poll

Compact frame.

The Message Control field value (contained in the Message Control Version field) shall be either 0 or 1. This value determines the formatting of the

Message Content field.

When the Message Control field value is 0 the Message Content field shall consist of two octets with

the value of zero as shown in Figure 74.

**Octets: 2**

0x0000

**Figure 74—Format of the Message Content field in the One-to-one Poll Compact frame**

**when the Message Control field value is 0**

When the Message Control field value is 1 the Message Content field shall be formatted as shown in

Figure 75.

On page 98, line 1 change:

**Figure 75—Format of the Message Content field in the One-to-one Poll Compact frame**

**when the Message Control field value is 1**

The Request Bitmap field is formatted as per 10.38.9.3.13.

The Presence Bitmap field is set as specified in 10.38.9.3.24, except that the Extended Presence Bitmap

Present field shall be set to zero.

The NB Channel Map field if present shall be set as per 10.38.9.3.7.

The Management PHY Configuration field if present shall be set as per 10.38.9.3.17.

The Management MAC Configuration field if present shall be set as per 10.38.9.3.12.

The Ranging PHY Configuration if present shall be as per 10.38.9.3.10.

The Ranging MAC Configuration field if present shall be set as per 10.38.9.3.11.

The Block Index field if present shall be set as per 10.38.9.3.19.

The Round Index field if present shall be set as per 10.38.9.3.20.

**10.38.9.8 One-to-one Response Compact frame**

The One-to-one Response Compact frame is sent by the responder during the control phase. This serves to

enable carrier coherent transmissions from the responder to the initiator device, and may also convey short

term operating parameter request(s). The Compact Frame Content field of the One-to-one Response

Compact frame shall be formatted as shown in Figure 76.

****

Message

Control

Version

**Figure 76—One-to-one Response Compact Frame Content field format**

The Responder RPA Hash field shall be calculated as specified in 10.38.9.2.1 using the responder's IRK.

The Message Control field value (contained in the Message Control Version field) shall be either 0 or 1. This value determines the formatting of the

Message Content field.

When the Message Control field value is 0 the Message Content field shall consist of five octets with

the value of zero as shown in Figure 77.

On page 99, line 1 change:

**Figure 77—Format of the Message Content field in the One-to-one Response Compact**

**frame when the Message Control field value is 0**

When the Message Control field value is 1 the Message Content field shall be formatted as shown in

Figure 78.

**Octets: 1 0/2/5/6 0/1 0/8 0/4 0/1 0/1/2/3**

Presence

Bitmap

NB

Channel

Map

Management

PHY

Configuration

Management

MAC

Configuration

Ranging PHY

Configuration

Ranging

MAC

Configuration

Zero Padding

**Figure 78—Format of the Message Content field in the One-to-one Response Compact**

**frame when the Message Control field value is 1**

The Presence Bitmap field is set as specified in 10.38.9.3.24, except that the Block and Round Index

Present field and the Extended Presence Bitmap Present field shall both be set to zero.

The encodings and meanings of the subsequent fields in the frame content is identical to that of the

Advertising Response Compact frame with Message Control field value is 1.

The Zero Padding field shall be present when the size of the Message Content field without the Zero

Padding field is less than five octets. The Zero Padding field, when present, shall consist of one, two or

three octets with a value of zero where the number of padding octets are determined such that the Message

Content field has a size of five octets.

For the One-to-one Response Compact frame with Message Control field value of 1, at least one of the

NB Channel Map, Management PHY Configuration, Management MAC Configuration, Ranging PHY

Configuration, or Ranging MAC Configuration fields shall be present in the Message Content field.

**10.38.9.9 One-to-one Initiator Report Compact frame**

This is the report sent by the initiator during the report phase in one-to-one ranging. The Compact Frame

Content field of the One-to-one Initiator Report Compact frame shall be formatted as shown in Figure 79.



Message

Control

Version

**Figure 79—One-to-one Initiator Report Compact Frame Content field format**

The Initiator RPA Hash field shall be calculated as specified in 10.38.9.2.1 using the initiator's IRK.

The Message Control field value (contained in the Message Control Version field) shall be 0.

The Message Content field shall be formatted as shown in Figure 80.

On page 100, line 1 change:

**Figure 80—Format of the Message Content field in the One-to-one Initiator Report**

**Compact frame when the Message Control field value is 0**

The Round-trip Time field value is an unsigned integer that reports the time difference, measured at the

initiator, between the RMARKERs of the initiator’s MMS fragments and the responder’s MMS fragments.

The units of time are specified in 10.29.1.4 *(Ranging counter time unit)*.

The Passthrough field content is defined in 10.38.9.3.6. Its presence can be inferred from the frame length.

**10.38.9.10 One-to-one Responder Report Compact frame**

This is sent by the responder during the report phase in one-to-one ranging. The Compact Frame Content

field of the One-to-one Responder Report Compact frame shall be formatted as shown in Figure 81.



Message

Control

Version

**Figure 81—One-to-one Responder Report Compact Frame Content field format**

The Responder RPA Hash field shall be calculated as specified in 10.38.9.2.1 using the responder's IRK.

The Message Control field value (contained in the Message Control Version field) shall be either 0 or 1. This value determines the formatting of the

Message Content field.

When the Message Control field value is 0 the Message Content field shall be formatted as shown in

Figure 82.

**Octets: 5 0/variable**

Reply Time Passthrough

**Figure 82—Format of the Message Content field in the One-to-one Responder Report**

**Compact frame when the Message Control field value is 0**

The Passthrough field is defined in 10.38.9.3.6. Its presence can be inferred from the frame length.

When the Message Control field value is 1 the Message Content field shall be formatted as shown in

Figure 83.

On page 101, line 1 change:

**Figure 83—Format of the Message Content field in the One-to-one Responder Report**

**Compact frame when the Message Control field value is 1**

The Reply Time field value is an unsigned integer reporting the time difference, measured at the responder,

between the RMARKERs of the MMS fragments received from the initiator and the MMS fragments

transmitted by the responder. The units of time are specified in 10.29.1.4 *(Ranging counter time unit)*.

The Presence Bitmap field is set as specified in 10.38.9.3.24, except that the Block and Round Index

Present field and the Extended Presence Bitmap Present field shall both be set to zero.

The encodings and meanings of the subsequent fields in the frame content is identical to that of the

Advertising Response Compact frame with Message Control field value is 1.

For the One-to-one Responder Report Compact frame with Message Control field value of 1, at least

one of the NB Channel Map, Management PHY Configuration, Management MAC Configuration, Ranging

PHY Configuration, or Ranging MAC Configuration fields shall be present in the Message Content field.

The Passthrough field is defined in 10.38.9.3.6. In the receiver the presence of the Passthrough field can be

inferred from the received frame length.

**10.38.9.11 Advertising Confirmation Compact frame**

This is the Advertising Confirmation Compact frame used by the initiator during the initialization phase.

The Compact Frame Content field of the Advertising Confirmation Compact frame shall be formatted as

shown in Figure 84.

****

Message

Control

Version

**Figure 84—Advertising Confirmation Compact Frame Content field format**

The Initiator RPA Hash field shall be calculated as specified in 10.38.9.2.1 using the initiator's IRK. Note

that if the Message Content field contains one or more Responder Address fields, each Responder Address

in the Message Content field shall represent an eligible responder's RPA hash generated using the initiator's

RPA\_prand from the preceding Advertising Poll Compact frame along with the responder's IRK.

The Message Control field value (contained in the Message Control Version field) shall be either 0 or 1. This value determines the formatting of the

Message Content field.

When the Message Control field value is 0, the Message Content field shall be formatted as shown in

Figure 85.

On page 102, line 1 change:

**Figure 85—Format of the Message Content field in the Advertising Confirmation Compact**

**frame when the Message Control field value is 0**

When the Message Control field value is 1, the Message Content field shall be formatted as shown in

Figure 86.

**Octets: 1** Number of

Responders

**variable**

Responder SOR

Time Offset List

**Figure 86—Format of the Message Content field in the Advertising Confirmation Compact**

**frame when the Message Control field value is 1**

The Number of Responders field indicates the number of responders selected by the initiator to be involved

in the following ranging session and determines the length of the Responder SOR Time Offset List field.

The Responder SOR Time Offset List field is a list of Responder SOR Time Offset elements, each

formatted as per

**Octets: 3** Responder Address **4**

SOR Time Offset

**Figure 87—Responder SOR Time Offset element format**

The Responder Address field identifies the address of a responder selected by the initiator to be involved in

the following ranging session.

The SOR Time Offset field is as defined in 10.38.9.3.15.

**10.38.9.12 One-to-many Poll Compact frame**

The One-to-many Poll Compact frame is sent by the initiator during the control phase in one-to-many

MMS ranging, this serves to enable carrier coherent transmissions from the initiator to the responder

devices and may also convey short term operating parameters. The Compact Frame Content field of the

One-to-many Poll Compact frame shall be formatted as shown in Figure 88.

****

Message

Control

Version

**Figure 88—One-to-many Poll Compact Frame Content field format**

On page 103, line 6 change:

The Message Control field value (contained in the Message Control Version field) shall be one of the values: 0, 1, 2, 3, 4, 5, 6,

7, 8, 9 or 10. This value determines the formatting of the Message Content field.

When the Message Control field value is 0 the Message Content field shall be formatted as shown in

Figure 89. This is the One-to-many Poll Compact frame for ranging sub-rounds that are not the first one.

**Octets: 2**

0x00, 0x00

**Figure 89—Format of the Message Content field in the One-to-many Poll Compact frame**

**when the Message Control field value is 0**

When the Message Control field value is 1 the Message Content field shall be formatted as shown in

Figure 90.

**Octets: 1 1 variable**

Number of

Responders

Slots Per

Responder

Responder

Address List

**Figure 90—Format of the Message Content field in the One-to-many Poll Compact frame**

**when the Message Control field value is 1**

The Number of Responders field shall be set to the number of responders selected to participate in the

ranging phase minus one.

The Slots Per Responder field shall be set to the number of ranging slots for each ranging sub-round minus

one.

The Responder Address list field shall contain the addresses of the responders selected to participate in the

ranging phase, with three octets per address and an address for each of the selected number of responders.

When the Message Control field value is 2 the Message Content field shall be formatted as shown in

Figure 91.

**Octets: 1 variable**

Number of

Responders

Responder

Detail List

**Figure 91—Format of the Message Content field in the One-to-many Poll Compact frame**

**when the Message Control field value is 2**

On page 104, line 7 change:

**Figure 92—Responder Detail field element format (Message Control = 2)**

The Responder Address field identifies a responder participating in the current one-to-many ranging. The

Responder Address field value shall contain an eligible responder’s RPA hash generated using the

initiator’s RPA

\_prand in the one-to-many Poll Compact frame along with the responder’s IRK.

The Start Slot Index fields shall be set to the index of the first slot of the ranging sub-round.

The End Slot Index field shall be set to the index of the last slot of the ranging sub-round.

When the Message Control field value is 3 the Message Content is the same as for Message Control

field value is 1. The difference between these is informing the responders whether to expect initiator

measurement reports. When the One-to-many Poll Compact frame with Message Control field value 1 and the Message Version is 1

is used, then in the measurement report phase both initiator and responders send measurement reports;

alternatively, when the One-to-many Poll Compact frame with Message Control field value 1 is used,

then in the measurement report phase only the responders send measurement reports.

When the Message Control field value is 2 and the Message Version is 1 the Message Content is the same as for Message Control

field value is 2. The difference between these is informing the responders whether to expect initiator

measurement reports. When the One-to-many Poll Compact frame with Message Control field value 4

is used, then in the measurement report phase both initiator and responders send measurement reports;

alternatively, when the One-to-many Poll Compact frame with Message Control field value 2 is used,

then in the measurement report phase only the responders send measurement reports.

The One-to-many Poll Compact frames with the Message Control field values of 5 and 6 are used

for contention-based one-to-many ranging.

When the Message Control field value is 5 the Message Content field shall be formatted as shown in

Figure 93.

**Octets: 1 1**

Number of Sub-Rounds Size of Sub-Rounds

**Figure 93—Format of the Message Content field in the One-to-many Poll Compact frame**

**when the Message Control field value is 5**

On page 105, line 2 change:

When the Message Control field value is 6 the Message Content is the same as for Message Control

field value is 5. The difference between these is controlling the ordering of poll and response messages

in the contention based one-to-many ranging, as follows:

⎯ When the initiator uses the One-to-many Poll Compact frame with Message Control field value

5 in the first ranging sub-round, then the initiator will send first in the subsequent sub-rounds

(using the One-to-many Poll Compact frame with Message Control field value 0). The

responders then send their One-to-many Response Compact frames in response to the polls from

the initiator, each responder contending by randomly choosing the ranging sub-round in which to

attempt to respond.

⎯ When the initiator uses the One-to-many Poll Compact frame with Message Control field value

6 in the first ranging sub-round, then in the subsequent sub-rounds the order of transmission is

reversed, i.e., the responders send first. Each responder contends by randomly choosing the

ranging sub-round in which to attempt to respond and, if this is not the first sub-round, the

responder contends to transmit the One-to-many Response Compact frame, and the initiator sends

its One-to-many Poll Compact frame in reply.

When the Message Control field value is 1 and the Message Version is 2 the Message Content field shall be formatted as shown in

Figure 94.

**Octets: 1 1 1 1 variable**

Number of

Responders

Slots per

Responder

Request

Bitmap

Presence

Bitmap

Responder

Detail List

**Figure 94—Format of the Message Content field in the One-to-many Poll Compact frame**

**when the Message Control field value is 7**

On page 106, line 1 change:

**Figure 95—Responder Detail element format (Message Control = 7)**

The Responder Address field identifies a responder participating in the current one-to-many ranging. The

Responder Address field value shall contain an eligible responder’s RPA hash generated using the

initiator’s RPA\_prand in the one-to-many Poll Compact frame along with the responder’s IRK.

The NB Channel Map field if present shall be set as per 10.38.9.3.7.

The Management PHY Configuration field if present shall be set as per 10.38.9.3.17.

The Management MAC Configuration field if present shall be set as per 10.38.9.3.12.

The Ranging PHY Configuration if present shall be as per 10.38.9.3.10.

The Ranging MAC Configuration field if present shall be set as per 10.38.9.3.11.

The Block Index field if present shall be set as per 10.38.9.3.19.

The Round Index field if present shall be set as per 10.38.9.3.20.

When the Message Control field value is 2 and the Message Version is 2 the Message Content field shall be formatted as shown in

Figure 96.

**Octets: 1** Number of

Responders

**Figure 96—Format of the Message Content field in the One-to-many Poll Compact frame**

**when the Message Control field value is 8**

On page 107, line 1 change:

**Figure 97—Responder Detail element format (Message Control = 8)**

The Responder Address field identifies a responder participating in the current one-to-many ranging. The

Responder Address field value shall contain an eligible responder’s RPA hash generated using the

initiator’s RPA\_prand in the one-to-many Poll Compact frame along with the responder’s IRK.

The NB Channel Map field if present shall be set as per 10.38.9.3.7.

The Management PHY Configuration field if present shall be set as per 10.38.9.3.17.

The Management MAC Configuration field if present shall be set as per 10.38.9.3.12.

The Ranging PHY Configuration if present shall be as per 10.38.9.3.10.

The Ranging MAC Configuration field if present shall be set as per 10.38.9.3.11.

The Start Slot Index field if present shall be set to the index of the first slot of the ranging sub-round.

The End Slot Index field if present shall be set to the index of the last slot of the ranging sub-round.

The Block Index field if present shall be set as per 10.38.9.3.19.

The Round Index field if present shall be set as per 10.38.9.3.20.

When the Message Control field value is 9 the Message Content field shall be formatted as shown in

Figure 98.

**Octets: 1 variable**

Number of Responders Responder Detail List

**Figure 98—Format of the Message Content field in the One-to-many Poll Compact frame**

**when the Message Control field value is 9**

On page 108, line 1 change:

**Figure 99—Responder Detail element format (Message Control = 9)**

The Responder Address field identifies a responder participating in the current one-to-many ranging. The

Responder Address field value shall contain an eligible responder’s RPA hash generated using the

initiator’s RPA\_prand in the one-to-many Poll Compact frame along with the responder’s IRK.

The Start Slot Index field is a 16-bit index of the first ranging slot of a ranging sub-round.

The Time Shift Indication field when zero indicates the corresponding responder transmits its initial UWB

fragment offset by 400 RSTUs from the start of the ranging phase, and when one indicates the

corresponding responder transmits its initial UWB fragment offset by 800 RSTUs from the start of the

ranging phase.

When the Message Control field value is 9 and the Message Version is 1 the Message Content is the same as for Message Control

field value is 9. The difference between these is informing the responders whether to expect initiator

measurement reports. When the One-to-many Poll Compact frame with Message Control field value 10

is used, then in the measurement report phase both initiator and responders send measurement reports;

alternatively, when the One-to-many Poll Compact frame with Message Control field value 9 is used,

then in the measurement report phase only the responders send measurement reports.

**10.38.9.13 One-to-many Response Compact frame**

This is the response sent by a responder during the control phase in one-to-many ranging, this serves to

enable carrier coherent transmissions from the responder to the initiator device and may also convey short

term operating parameters requests. The Compact Frame Content field of the One-to-many Response

Compact frame shall be formatted as shown in Figure 100.

****

Message

Control

Version

**Figure 100—One-to-many Response Compact Frame Content field format**

The Responder RPA Hash field shall be calculated as specified in 10.38.9.2.1 using the responder's IRK.

The Message Control field value (contained in the Message Control Version field) shall be either 0 or 1. This value determines the formatting of the

Message Content field.

When the Message Control field value is 0 the Message Content field shall be formatted as shown in

Figure 101.

On page 109, line 1 change:

**Figure 101—Format of the Message Content field in the One-to-many Response Compact**

**frame when the Message Control field value is 0**

When the Message Control field value is 1 the Message Content field shall be formatted as shown in.

Figure 102.

**Figure 102—Format of the Message Content field in the One-to-many Response Compact**

**frame when the Message Control field value is 1**

On page 110, line 1 change:



Message

Control

Version

**Figure 103—One-to-many Responder Report Compact Frame Content field format**

The Responder RPA Hash field shall be calculated as specified in 10.38.9.2.1 using the responder's IRK.

The Message Control field value shall be either 0 or 1. This value determines the formatting of the

Message Content field.

When the Message Control field value (contained in the Message Control Version field) is 0 the Message Content field shall be formatted as shown in

Figure 104.

**Octets: 5 0/variable**

Reply Time Passthrough

**Figure 104—Format of the Message Content field in the One-to-many Responder Report**

**Compact frame when the Message Control field value is 0**

When the Message Control field value is 1 the Message Content field shall be formatted as shown in

Figure 105.

**Octets: 5 1 0/6 0/1 0/8 0/4 0/1 0/variable**

Reply Time

Presence

Bitmap

NB Channel

Map

Management

PHY

Configuration

Management

MAC

Configuration

Ranging PHY

Configuration

Ranging MAC

Configuration

Passthrough

**Figure 105—Format of the Message Content field in the One-to-many Responder Report**

**Compact frame when the Message Control field value is 1**

The Reply Time field value is an unsigned integer reporting the time difference, measured at the responder,

between the RMARKERs of the MMS fragments received from the initiator and the MMS fragments

transmitted by the responder. The units of time are specified in 10.29.1.4 *(Ranging counter time unit)*.

The Presence Bitmap field shall be formatted as shown in Figure 58, and the encoding and meaning of the

Presence Bitmap field and subsequent fields in the message content is identical to that of the Advertising

Response Compact frame with Message Control field value of 1.

For the One-to-many Responder Report Compact frame with Message Control field value 1, at least one

of the NB Channel Map, Management PHY Configuration, Management MAC Configuration, Ranging

PHY Configuration, or Ranging MAC Configuration fields shall be present in the Message Content field.

On page 111, line 5 change:



Message

Control

Version

**Figure 106—One-to-many Initiator Report Compact Frame Content field format**

The Initiator RPA Hash field shall be calculated as specified in 10.38.9.2.1 using the initiator's IRK.

The Message Control field value (contained in the Message Control Version field) shall be either 0 or 1. This value determines the formatting of the

Message Control field.

When the Message Control field value is 0, the Message Content field shall be formatted as shown in

Figure 107.

**Octets: 5 0/variable**

Round-trip Time Passthrough

**Figure 107—Format of the Message Content field in the One-to-many Initiator Report**

**Compact frame when the Message Control field value is 0**

The Round-trip Time field value is an unsigned integer that reports the time difference, measured at the

initiator, between the RMARKERs of the initiator’s MMS fragments and the responder’s MMS fragments.

The units of time are specified in 10.29.1.4 *(Ranging counter time unit)*.

The Passthrough field is defined in 10.38.9.3.6. Its presence can be inferred from the frame length.

When the Message Control field value is 1, the Message Content field shall be formatted as shown in

Figure 108.

**Octets: 5 5 0/variable**

Round-trip Time One Round-trip Time Two Passthrough

**Figure 108—Format of the Message Content field in the One-to-many Initiator Report**

**Compact frame when the Message Control field value is 1**

On page 112, line 10 change:



Message

Control

Version

**Figure 109—Public Advertising Poll Compact Frame Content field format**

The Initiator Address field shall be set as specified in 10.38.9.2.2.

The Message Control field value (contained in the Message Control Version field) shall be one of the values: 0, 1. . This value

determines the formatting of the Message Content field.

When the Message Control field value is 0 the Message Content field is empty, i.e., has zero length.

When the Message Control field value is 1 the Message Content field shall be formatted as shown in

Figure 110.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Octets: 1** | **1** | **1/2** | **0/3** | **variable** | **0/variable** |
| Initialization Slot Duration | Cap Duration | Presence Bitmap | Group ID | Advertising Data | SMC TLVs |

**Figure 110—Format of the Message Content field in the Public Advertising Poll Compact**

**frame when the Message Control field value is 1**

On page 113, line 1 change:

**Figure 112—Format of the Message Content field in the Public Advertising Poll Compact**

**frame when the Message Control field value is 0x21**

When the Message Control field value is 0x30 the Message Content field shall be formatted as shown in

Figure 63.

**Octets: 1 1 variable variable**

Cap Duration SMC TLVs Advertising Data

Initialization Slot

Duration

**Figure 113—Format of the Message Content field in the Public Advertising Poll Compact**

**frame when the Message Control field value is 0x30**

The CAP Duration field is an unsigned integer that specifies the duration of the contention access period in

units of initialization slots.

The Initialization Slot Duration field is an unsigned integer that specifies the duration of an initialization

slot. The duration in RSTU is given by the expression: 600 + 300 × *N*, where *N* is the Initialization Slot

Duration field value.

The Group ID field is the ID of a group of multiple responders in a one-to-many ranging session, as

described in 10.38.3.6.

The SMC TLVs field is a sequence of structure which shall have Type, Length and Value (TLV). It is the

list of supported message control commands.

The Advertising Data field shall be set as specified in 10.38.9.3.22.

**10.38.9.17 Public Advertising Response Compact frame**

The Public Advertising Response Compact frame is transmitted by the responder during the initialization

phase. The Compact Frame Content field of the Public Advertising Response Compact frame shall be

formatted as shown in Figure 114.

****

Message

Control

Version

**Figure 114—Public Advertising Response Compact Frame Content field format**

The Initiator Address field and Responder Address field shall be set as specified in 10.38.9.2.2.

The Message Control field value (contained in the Message Control Version field) shall be 0.

On page 114, line 1 change:

The Message Content is formatted the same as for the Advertising Response Compact frame Message

Content field with Message Control field value 1, as shown in Figure 67, with the same function and

meaning for each of the fields.

**10.38.9.18 Public Start of Ranging Compact frame**

The Public Start of Ranging Compact frame is transmitted by the initiator during the initialization phase.

The Compact Frame Content field of the Public Start of Ranging Compact frame shall be formatted as

shown in Figure 115.

****

Message

Control

Version

**Figure 115—Public Start of Ranging Compact Frame Content Field format**

The Initiator Address field and Responder Address field shall be set as specified in 10.38.9.2.2.

The Message Control field value shall be one of 0 or 1. This value determines the formatting of the

Message Content field.

When the Message Control field value is 0, the Message Content field shall be formatted the same as

for the Start of Ranging Compact frame Message Content field with Message Control field value 0, as

shown in Figure 69, with the same function and meaning for each of the fields.

The Public Start of Ranging Compact frame with Message Control field value equal 1 is sent by the initiator to indicate the status of the initialization setup phase. When the Message Control field value is 1 the Message Content field shall be formatted as shown in Figure XX.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Octets:1 | 0/4 | 0/1 | 0/1 | 0/6 | 0/1 | 0/7 | 0/4 | 0/1 | 0/2 | 0/1 | 0/3 |
| Status | Time Offset | NB Channel Seed | Presence Bitmap | NB Channel Map | Management PHY Configuration | Management MAC Configuration | Ranging PHY Configuration | Ranging MAC Configuration | Starting Block Index | MMS Ranging Mode Configuration | New Responder Address |

**Figure XX—Format of the Message Content field in the Public Start of Ranging Compact frame when the Message Control field value is 1**

The subfields in the Message Content when the Message Control field value is 1 are same as described in 10.38.9.2.2, except for the New Responder Address subfield. The value of the New Responder Address subfield is set to the value generating randomly by an initiator when the Status field value is ACCEPT\_WITH\_NEW\_ADDR. This subfield is omitted unless the Status field value is ACCEPT\_WITH\_NEW\_ADDR.

**10.38.9.19 Public Advertising Confirmation Compact frame**

The Public Advertising Confirmation Compact frame is transmitted by the initiator during the initialization

phase. The Compact Frame Content field of the Public Advertising Confirmation Compact frame shall be

formatted as shown in Figure 116.

****

Message

Control

Version

**Figure 116—Public Advertising Confirmation Compact Frame Content field format**

The Initiator Address field shall be set as specified in 10.38.9.2.2.

The Message Control field value shall (contained in the Message Control Version field) be either 0 or 1. This value determines the formatting of the

Message Content field.

When the Message Control field value is 0 the Message Content is formatted the same as for the

Advertising Confirmation Compact frame Message Content field with Message Control field value of 0,

as shown in Figure 85, with the same function and meaning.

On page 115, line 1 change:

When the Message Control field value is 1 the Message Content is formatted the same as for the

Advertising Response Compact frame Message Content field with Message Control field value of 1, as

shown in Figure 86, with the same function and meaning for each of the fields.

**10.38.9.20 Acquisition Compact frame**

**10.38.9.20.1 General**

The Acquisition Compact frame is used for coordination. The Compact Frame Content field of the

Acquisition Compact frame shall be formatted as shown in Figure 117.

****

Message

Control

Version

**Figure 117—Acquisition Compact Frame Content field format**

The Address field shall be set as specified in 10.38.9.2.2 for Public Address. When a device sends the

Acquisition Compact frame in the UWB channel and the NB channel, the Address field value used shall be

the same in both frames.

The Message Control field value (contained in the Message Control Version field) determines the encoding and Message Content Field and identifies the

type and usage for the Acquisition Compact frame. Table 18 lists the defined values of the Message

Control field with a description and a clause reference to the Message Content Field encoding. The

Message Control field shall have one of the values listed in Table 18.

**Table 18—Message Control Field values of the Acquisition Compact frame**

**Message Control**

**Field Value**

**Description**

**Message Content Field**

**encoding clause**

0 This is a NB Acquisition Compact frame. 10.38.9.20.2

1 This is a UWB Acquisition Compact frame. 10.38.9.20.3

**10.38.9.20.2 Acquisition Compact frame with Message Control field value of 0**

When the Acquisition Compact frame has a Message Control field value is 0 the Message Content field

shall be formatted as shown in Figure 118. This is an NB Acquisition Compact frame.

**Octets: 2/4 0/4** Common InfoUWB AP Info **variable**

UWB Per-Session Info List

**Figure 118—Format of the Message Content field in the Acquisition Compact frame when**

**the Message Control field value is 0**

On page 118, line 18 change:

**10.38.9.20.3 Acquisition Compact frame with Message Control field value of 1**

When the Acquisition Compact frame has a Message Control field value of 1 the Message Content field

shall be formatted as shown in Figure 124. This is a UWB Acquisition Compact frame.

**Octets: 2/4 variable**

Common InfoUWB Per-Session Info List

**Figure 124—Format of the Message Content field in the Acquisition Compact frame when**

**the Message Control field value is 1**

On page 119, line 23 change:



Message

Control

Version

**Figure 126—One-to-one Initiator Secure Report Compact Frame Content field format**

The Initiator RPA Hash field shall be calculated as specified in 10.38.9.2.1 using the initiator's IRK.

The Message Control field value (contained in the Message Control Version field) shall be 0.

On page 120, line 11 change:



Message

Control

Version

**Figure 128—One-to-one Responder Secure Report Compact Frame Content field format**

The Responder RPA Hash field shall be calculated as specified in 10.38.9.2.1 using the responder's IRK.

The Message Control field value (contained in the Message Control Version field) shall be either 0 or 1. This value determines the formatting of the

Message Content field.

When the Message Control field value is 0 the Message Content field shall be formatted as shown in

Figure 129.

The MIC field shall be set as specified in 10.38.9.3.18.

**Octets: 1 0/variable 5**

Key ID Passthrough Reply Time

**Figure 129—Format of the Message Content field in the One-to-one Responder Secure**

**Report Compact frame when the Message Control field value is 0**

The Key ID field is defined in 10.38.9.3.21.

The Passthrough field is defined in 10.38.9.3.6. Its presence can be inferred from the frame length.

The Reply Time field value is an unsigned integer reporting the time difference, measured at the responder,

between the RMARKERs of the MMS fragments received from the initiator and the MMS fragments

transmitted by the responder. The units of time are specified in 10.29.1.4 *(Ranging counter time unit)*.

NOTE—The Reply Time field is encrypted if a security level with encryption is negotiated.

When the Message Control field value is 1 the Message Content field shall be formatted as shown in

Figure 130.

On page 121, line 1 change:

**Figure 130—Format of the Message Content field in the One-to-one Responder Secure**

**Report Compact frame when the Message Control field value is 1**

The Key ID field is defined in 10.38.9.3.21.

The Presence Bitmap field shall be formatted as shown in Figure 58, and the encoding and meaning of the

Presence Bitmap field and subsequent optional fields in the message content are identical to that of the

Advertising Response Compact frame with Message Control field value is 1.

The Passthrough field is defined in 10.38.9.3.6. Its presence can be inferred from the frame length.

The Reply Time field value is an unsigned integer reporting the time difference, measured at the responder,

between the RMARKERs of the MMS fragments received from the initiator and the MMS fragments

transmitted by the responder. The units of time are specified in 10.29.1.4 *(Ranging counter time unit)*.

NOTE—The Reply Time field is encrypted if a security level with encryption is negotiated.

For this one-to-one Secure REPORT (Responder) Compact frame with Message Control field value of

1, at least one of the NB Channel Map, Management PHY Configuration, Management MAC

Configuration, Ranging PHY Configuration, or Ranging MAC Configuration fields shall be present in the

Message Content field.

**10.38.9.23 One-to-many Initiator Secure Report Compact frame**

This is the secure version of the report message used by the initiator during the reporting phase in one-to-

many ranging. The Compact Frame Content field of the One-to-many Initiator Secure Report Compact

frame shall be formatted as shown in Figure 131.



Message

Control

Version

**Figure 131—One-to-many Initiator Secure Report Compact Frame Content field format**

The Initiator RPA Hash field shall be calculated as specified in 10.38.9.2.1 using the initiator's IRK.

The Message Control field value shall be either 0 or 1. This value determines the formatting of the

Message Control field.

When the Message Control field value (contained in the Message Control Version field) is 0, the Message Content field shall be formatted as shown in

Figure 132.

On page 122, line 1 change:

**Figure 132—Format of the Message Content field in the One-to-many Initiator Secure**

**Report Compact frame when the Message Control field value is 0**

The Key ID field is defined in 10.38.9.3.21.

The Passthrough field is defined in 10.38.9.3.6. Its presence can be inferred from the frame length.

The Round-trip Time field value is an unsigned integer that reports the time difference, measured at the

initiator, between the RMARKERs of the initiator’s MMS fragments and the responder’s MMS fragments.

The units of time are specified in 10.29.1.4 *(Ranging counter time unit)*.

NOTE—The Round-trip Time field is encrypted if a security level with encryption is negotiated.

When the Message Control field value is 1, the Message Content field shall be formatted as shown in

Figure 133.

**Octets: 1 0/variable 5 5**

Key ID Passthrough Round-trip Time One Round-trip Time Two

**Figure 133—Format of the Message Content field in the One-to-many Initiator Secure**

**Report Compact frame when the Message Control field value is 1**

On page 123, line 1 change:



Message

Control

Version

**Figure 134—One-to-many Responder Secure Report Compact Frame Content field format**

The Responder RPA Hash field shall be calculated as specified in 10.38.9.2.1 using the responder's IRK.

The Message Control field value (contained in the Message Control Version field) shall be either 0 or 1. This value determines the formatting of the

Message Content field.

The MIC field shall be set as specified in 10.38.9.3.18.

When the Message Control field value is 0 the Message Content field shall be formatted as shown in

Figure 135.

**0/variable 5**

Reply Time

**Octets: 1** Key ID Passthrough **Figure 135—Format of the Message Content field in the One-to-many Responder Secure**

**Report Compact frame when the Message Control field value is 0**

The Key ID field is defined in 10.38.9.3.21.

The Passthrough field is defined in 10.38.9.3.6. Its presence can be inferred from the frame length.

The Reply Time field value is an unsigned integer reporting the time difference, measured at the responder,

between the RMARKERs of the MMS fragments received from the initiator and the MMS fragments

transmitted by the responder. The units of time are specified in 10.29.1.4 *(Ranging counter time unit)*.

NOTE—The Reply Time field is encrypted if a security level with encryption is negotiated.

When the Message Control field value is 1 the Message Content field shall be formatted as shown in

Figure 136.

**Octets:**

**1 1 0/6 0/1 0/8 0/4 0/1 0/variable 5**

Key ID

Presence

Bitmap

NB Channel

Map

Management

PHY

Configuration

Management

MAC

Configuration

Ranging PHY

Configuration

Ranging MAC

Configuration

Passthrough

Reply Time

**Figure 136—Format of the Message Content field in the One-to-many Responder Secure**

**Report Compact frame when the Message Control field value is 1**

On page 124, line 1 change:

The Presence Bitmap field shall be formatted as shown in Figure 58, and the encoding and meaning of the

Presence Bitmap field and subsequent optional fields in the message content are identical to that of the

Advertising Response Compact frame with Message Control field value of 1.

For this One-to-many Responder Secure Report Compact frame with Message Control field value of 1,

at least one of the NB Channel Map, Management PHY Configuration, Management MAC Configuration,

Ranging PHY Configuration, or Ranging MAC Configuration fields shall be present in the Message

Content field.