IEEE P802.11
Wireless LANs

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| Resolution for CIDs 1000, 1147  |
| Date: 2018-04 |
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Abstract

This submission proposes resolutions for CIDs 1000, 1147

Green indicates material agreed to in the group,

yellow material to be discussed, red material rejected by the group and

cyan material not to be overlooked.

The “Final” view should be selected in Word.

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| --- | --- | --- | --- | --- | --- | --- |
| CID | Commenter | Clause  | Page  | Line | Comment | Proposed |
| 1000 | Lei Huang | 3.2 | 162 | 31 | since PCF has been removed, "point-coordinated BSS" should be changed to "BSS" | As per comment |

**Cited sentence:**

**contention period (CP):** The time period outside of the contention free period (CFP) in a point-coordinated

basic service set (BSS).(#65)

**In D0.1 149.7 we see**

**contention period (CP):** The time period outside of the contention free period (CFP) in a point-coordinated

basic service set (BSS). In a BSS where there is no point coordinator (PC), this corresponds to the entire

time of operation of the BSS.

CID 63 Resolution edited this as follows:

149.7 modify as follows:

“**contention period (CP):** The time period outside of the contention free period (CFP) in a basic service set (BSS).

The error can be seen; although deleted, “point-coodinated” was not shown as deleted,

The resolution should have been

**contention period (CP):** The time period outside of the contention free period (CFP) in a

basic service set (BSS).

Commenter is correct.

RESOLUTION:
REVISED

At 162.31 delete “point-cordinated”

**contention period (CP):** The time period outside of the contention free period (CFP) in a

basic service set (BSS).

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| --- | --- | --- | --- | --- | --- | --- |
| CID | Commenter | Clause  | Page  | Line | Comment | Proposed |
| 1147 | Yongho Seok | 10.3.5 | 1612 | 39 | "A STA using the DCF shall use an RTS/CTS exchange for individually addressed frames when the length of the PSDU is greater than the length threshold indicated by dot11RTSThreshold."When dot11RTSThreshold is equal to 0, does a PS-Poll frame transmission need an RTS/CTS exchange?Because a PS-Poll frame is also an individually addressed frame, the above sentence allows this.But, the Annex G disallows this sequence.If this is allowed, please update the Annex G. Otherwise, change the sentence like "individually addressed DATA, management frames". | As in comment |

**10.3.5 Individually addressed MPDU transfer procedure**

***A STA using the DCF shall use an RTS/CTS exchange for individually addressed frames when the length of***

***the PSDU is greater than the length threshold indicated by dot11RTSThreshold*.** A STA may also use an RTS/

CTS exchange for individually addressed frames when it is necessary to distribute the NAV or when it is

necessary to establish protection (see 10.27 (Protection mechanisms)). Otherwise a STA using the DCF shall

not use the RTS/CTS exchange.

***If dot11RTSThreshold is 0, all MPDUs shall be delivered with the use of RTS/CTS*.** If dot11RTSThreshold is

larger than the maximum PSDU length, all PSDUs shall be delivered without RTS/CTS exchanges.

When an RTS/CTS exchange is used, the PPDU containing the PSDU shall be transmitted starting one SIFS

after the end of the CTS frame.

Other cites for RTS/CTS

P15733.37

The use of the RTS/CTS mechanism is under control of dot11RTSThreshold. This attribute may be set on a

per-STA basis. This mechanism allows STAs to be configured to initiate RTS/CTS either always, never, or

only on frames longer than a specified length.

1586.8 Fragmentation

Each fragment and Ack frame acts as a virtual RTS frame and CTS frame; therefore no further RTS/CTS frames need to be generated after the RTS/CTS that began the frame exchange sequence ***even though the PSDUs carrying subsequent fragments may be larger than dot11RTSThreshold***.

**10.23.3.5.3 Use of RTS/CTS**

In order to provide improved NAV protection, a STA ***may send an RTS frame*** ***as the first frame of any frame***

***exchange sequenc***e (#65)***without regard for dot11RTSThreshold***.

We also have the MIB itself

3765.37

dot11RTSThreshold OBJECT-TYPE

SYNTAX Unsigned32 (0..65536)

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"This is a control variable.

It is written by an external management entity.

Changes take effect as soon as practical in the implementation.

This attribute indicates the number of octets in a PSDU, below which an

RTS/CTS handshake is not performed, except as RTS/CTS is used as a cross

modulation protection mechanism as defined in 10.27 (Protection mechanisms).

**An RTS/CTS handshake is performed at the beginning of any frame**

**exchange sequence where the PSDU is with the Type subfield equal to Data**

**or Management, the PSDU has an individual address in the Address 1 field,**

**and the length of the PSDU is greater than this threshold**. Setting this

attribute to be larger than the maximum PSDU size has the effect of turning

off the RTS/CTS handshake for frames of Data or Management type transmitted

by this STA. Setting this attribute to 0 has the effect of turning

on the RTS/CTS handshake for all frames of Data or Management type transmitted

by this STA."

DEFVAL { 65536 }

::= { dot11OperationEntry 2 }

This clearly stating **frame exchange sequence where the PSDU is with the Type subfield equal to Data**

**or Management**

So what is the point of setting dot11RTSThreshold?

* Fragmentation? Use RTS/CTS to set the NAV, but why then have a dot11RTSThreshold setting of 0?
* NAV setting? Can use RTS/CTS irrespective of the dot11RTSThreshold setting.

So setting dot11RTSThreshold is clearly a setting to make sure that every exchange is preceded by the RTS/CTS exchange. Why or when to use it is unclear.

Discussion

The rule is clear, if dot11RTSThreshold is 0, then STA shall use RTS/CTS ***for individually addressed frames. But the MIB is clearer.***

Also true that PS-Poll is an individually addressed frame, albeit a short one.

One could also point out that Ack and Block Ack are also individually addressed, but in no way do we want an RTS/CTS in front of them.

The intention appears to be that the RTS/CTS is only used to precede an exchange of Data or Management frames – maybe it should say that at the cited place.

We need to be clear if Annex G disallows this sequence.

**G.2 Basic sequences**

An allowable frame exchange sequence is defined by the rule frame-exchange-sequence. Except where

modified by the *pifs* attribute, frames are separated by a SIFS or RIFS.

(\* This rule defines all of the allowable frame exchange sequences \*)

frame-exchange-sequence =

( [**CTS**] (**Management** +*broadcast* | **Data** +*group*) ) |

( [**CTS** | **RTS CTS** | **PS-Poll**] {frag-frame **Ack**} last-frame **Ack** ) |

(**PS-Poll Ack**) |

hcf-sequence |

mcf-sequence |

s1g-sequence(11ah)(#65);

(\* A frag-frame is a nonfinal part of an individually addressed MSDU or MMPDU \*)

frag-frame = (**Data** | **Management**) +*individual* +*frag*;

(\* This is the last (or only) part of an individually addressed MSDU or MMPDU \*)

last-frame = (**Data** | **Management**) +*individual* +*last*;(#65)

 ( [**CTS** | **RTS CTS** | **PS-Poll**] {frag-frame **Ack**} last-frame **Ack** ) | (**PS-Poll Ack**) |

In words:

Optional (Optional CTS, **RTS CTS OR PS-Poll**)

Frag-frame ACK repeated, Last frame Ack

OR PS Poll Ack

Here is how to interpret this code (curtesy Yongho)

— [a] = a is optional.

— {a} = a is repeated zero or more times.

— n{a} = a is repeated n or more times. For example, 3{a} requires 3 or more "a". This notation is an

extension to ISO/IEC 14977 and equivalent to n\*a{a} as defined in that standard.

— a|b|c|... = selection between mutually exclusive alternatives, a, b, c ....

— ( ) = grouping, e.g., "a (b|c)" is equivalent to "a b | a c".

frame-exchange-sequence is interpreted as the following:

frame-exchange-sequence = A or B or C or D or  E or F

A is ( [CTS] (Management +broadcast | Data +group) ). It can be one of the below:

* CTS - BroadcaseManagement
* CTS - GroupDATA
* BroadcaseManagement
* GroupDATA

B is ( [CTS | RTS CTS | PS-Poll] {fragframe Ack} lastframe Ack ). It can be one of the below:

* CTS - fragframe - Ack - … - fragframe - Ack - lastframe - Ack
* CTS - lastframe - Ack
* RTS – CTS - fragframe - Ack - … - fragframe - Ack - lastframe – Ack
* RTS – CTS - lastframe - Ack
* PSPoll - fragframe - Ack - … - fragframe - Ack - lastframe – Ack
* PSPoll - lastframe – Ack
* fragframe - Ack - … - fragframe - Ack - lastframe – Ack
* lastframe – Ack

C is PSPoll – Ack.

D is hcf-sequence.

E is mcf-sequence.

F is s1g-sequence.

So the commenter is correct PS Poll is not preceded by RTS/CTS. Note that PS-Poll is a Control frame.

**My Conclusion**

If the STA sends a PS Poll, the question becomes why would it also send an RTS/CTS? It does not know how long before the data response comes and does not know the duration. Hence, I propose we go with Annex G as is.

**RESOLUTION**

**REVISED**

At 1612.39 make following changes

**10.3.5 Individually addressed MPDU transfer procedure**

A STA using the DCF shall use an RTS/CTS preceding a frame exchange including an individually addressed data or management frame when the length of the PSDU is greater than the length threshold indicated by dot11RTSThreshold. A STA may also use an RTS/CTS exchange for individually addressed frames when it is necessary to distribute the NAV or when it is necessary to establish protection (see 10.27 (Protection mechanisms)). A STA may also use an RTS/CTS exchange for other purposes.

If dot11RTSThreshold is 0, an RTS/CTS exchange shall precede all frame exchanges including an individually addressed data or management frame..