IEEE P802.11
Wireless LANs

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| REVme CC35 CID 97 Basic Rate Set Definition |
|  Date: 2021-10-21 |
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Abstract

This document contains a proposed resolution for CID 97 from TGme CC35 on IEEE P802.11-REVme/D0.0.

References to page and line numbers are to D0.0.

Change history:

r0 (2020-10-21): Initial draft.

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| **CID** | **Clause/Page** | **Comment** | **Proposed Change** |
| **97** | 3.1 / 136.49[Should have been 3.2 (Definitions specific to IEEE Std 802.11)] | Definitions for "basic rate" and "basic rate set" are missing. | Add definitions for "basic rate" and "basic rate set". For example, "Basic rate set: a set of rates designated by the AP. An AP is required not to allow association of a STA that does not declare or imply support for all rates in the basic rate set." (Note: either add equivalent definitions for basic MCS set, or merge definitions into "basic rate/MCS", etc.) |

Proposed resolution:

“Revised [in the direction suggested by the comment]. Add the following definitions in 3.2:

“basic modulation and coding scheme (MCS): An MCS that belongs to the basic MCS set.

basic modulation and coding scheme (MCS) set: A set of MCSs designated by the station (STA) that started the basic service set (BSS) and fixed for the lifetime of the BSS. The basic MCS set is typically advertised in the physical layer (PHY) operation element(s), e.g., HT and VHT Operation elements. Under rules governing association, an access point (AP) or personal basic service set (PBSS) control point (PCP) is required to deny association to any STA that does not signal support for transmitting and receiving each basic MCS, and so is a mesh STA required to deny mesh peering. As a consequence, all STAs in a BSS are capable of, or have signaled that they are capable of, receiving and transmitting at all MCSs in the basic MCS set.

basic rate: A data rate that belongs to the basic rate set.

basic rate set: A set of data rates designated by the station (STA) that started the basic service set (BSS) and fixed for the lifetime of the BSS. The basic rate set is advertised in the Supported Rates and BSS Membership Selectors element and, if present, the Extended Supported Rates and BSS Membership Selectors element. Under rules governing association, an access point (AP) or personal basic service set (PBSS) control point (PCP) is required to deny association to any STA that does not signal support for transmitting and receiving each basic rate, and so is a mesh STA required to deny mesh peering. As a consequence, all STAs in a BSS are capable of, or have signaled that they are capable of, receiving and transmitting at all rates in the basic rate set.”

Discussion:

Though a definition is currently missing, the concept of basic rate set is thoroughly embedded in the spec, and the general concepts and expectations seem to be clear enough:

* All STAs in the BSS are expected to support transmission and reception of all rates in the basic rate set (with the minor exception of Class 2 STAs)
* The basic rate set is selected at BSS start (that is the only place where it can be passed over the MLME SAP) and hence is fixed for the lifetime of the BSS
* APs and PCPs are required to deny association to STAs that don’t declare support for all the rates in the basic rate set (11.3.5.3/5), and similarly mesh STAs to deny mesh peering (10.6.4 and 14.3.6.2)
* The basic rate set does not have to contain all mandatory rates for the PHY of the STA that started the BSS (10.3.1)
* The basic rate set may contain rates that are optional for the PHY of the STA that started the BSS (not explicitly stated, but implied).

The proposed definition of basic rate set takes the third point here (“deny association”) as the fundamental characteristic, and builds the definition from that. The basic rate set is an arbitrary set of data rates determined by the AP, which announces that it will deny association to any STA that does not announce support for each of these rates. The other characteristics follow as consequences.

 There are two other sets of data rates that are similar enough to cause confusion:

* Set S1: the set of all data rates that all STAs in the BSS can transmit and receive
	+ Is this the same as the basic rate set? No—set S1 can vary over the lifetime of the BSS, as STAs associate and disassociate.
	+ For example, consider an HT BSS in which the AP defines the basic rate set as all rates up to and including 54 Mb/s. At various points in the lifetime of the BSS, it might happen that all associated STAs (and the AP) also support 256 Mb/s. Then for those times, 256 Mb/s would belong to set S1, but it would not belong to the basic rate set.
* Set S2: the set of all data rates that all STAs in the BSS “shall support”, on transmit and receive.
	+ Is this the same as the basic rate set? No—the data rates that a STA “shall support” are mandatory data rates. (Cf. Note in 10.3.1: “The basic rate or MCS set that a STA starting a BSS advertises does not necessarily contain all the mandatory rates or MCSs, respectively. […] In this context, “mandatory” describes rates or MCSs that are so described, or described as “shall support”, in reference to the STA type, in the PHY clause applicable to the STA.”)
	+ In order to be a compliant IEEE 802.11 device, a STA “shall support” some data rates. It will cause serious confusion if we write that in some circumstances a STA “shall support” transmission and reception of other, optional, data rates.
	+ (Let’s not get into distinctions between the STA and the PHY that happens to be attached to the STA—it’s very confusing, and several clauses currently don’t make this distinction.)

The proposed definition of basic rate set avoids the problems that arise from adapting the definitions of sets S1 and S2.

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