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**IEEE P802.11  
Wireless LANs**

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**Title**

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**Abstract**

**Text supporting comments for 802.11b Letter Ballot 16.**

### 1.3.4 HR/DSSS PHY Extended Characteristics

The static HR/DSSS PHY Extended characteristics, provided through the PLME-EXTENDEDCHARACTERISTICS service primitive, are shown in Table 8.

Name	Value	Description
aShortPreambleLength	72	The short header Preamble Length (in $\mu$ s).
aShortPLCPHeaderLength	24	The short header PLCP Header Length (in $\mu$ s).

### 3.8 basic service set (BSS) basic rate set:

The set of data transfer rates that all the stations in a BSS will be capable of using to receive and transmit frames from/to the wireless medium (WM). The BSS basic rate set data rates are preset for all stations in the BSS.

#### 7.3.2.2 Supported Rates element

The Supported Rates element specifies the rates-values in the Operational-Rate-Set parameter as described in the MLME\_Join.request and MLME\_Start.request primitives. The information field is encoded as 1 to 8 octets where each octet describes a single supported rate in units of 500 kbit/s.

Within Beacon, Probe Response, Association Response, and Reassociation Response management frames, each supported rate belonging to the BSSBasicRateSet-BSS basic rate set, as defined in 10.3.10.1, is encoded as an octet with the msb (bit 7) set to 1 (e.g., a 1 Mbit/s rate belonging to the BSSBasicRateSet-BSS basic rate set is encoded as X'82'). Rates not belonging to the BSS basic rate setBSSBasicRateSet are encoded with the msb set to 0 (e.g., a 2 Mbit/s rate not belonging to the BSS basic rate setBSSBasicRate-Set is encoded as X'04'). The msb of each Supported Rate octet in other management frame types is ignored by receiving STAs.

The BSS basic rate setBSSBasicRateSet information in Beacon and Probe Response management frames is delivered to the management entity in an STA via the BSSBasicRateSet parameter in the MLME\_Scan.confirm primitive. It is used by the management entity in an STA STAs in order to avoid associating with a BSS if they the STA do not supportcannot receive and transmit at all the data rates in the BSSBasicRateSetBSS basic rate set. See Figure 36.

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## 9.2 DCF

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The medium access protocol allows for stations to support different sets of data rates. All STAs shall be able to receive and transmit at all the data rates in the aBasicRateSetspecified in the -BSSBasicRateSet parameter of the MLME\_Join.request and MLME\_Start.request primitives and transmit at one or more of the aBasicRateSet data rates. To support the proper operation of the RTS/CTS and the Virtual Carrier Sense mechanism, all STAs shall must be able to detect the RTS and CTS frames. For this reason the RTS and CTS frames shall be transmitted at one of the rates in the BSS basic rateaBasicRateSet-rates. (See Clause 9.6 for a description of multirate operation).

Data frames sent under the DCF shall use the Frame Type Data and Subtype Data or Null Function. Stations receiving Data Type frames shall only consider the frame body as the basis of a possible indication to LLC.

## 9.6 Multirate support

Some PHYs have multiple data transfer rate capabilities that allow implementations to perform dynamic rate switching with the objective of improving performance. The algorithm for performing rate switching is beyond the scope of this standard, but in order to ensure coexistence and interoperability on multirate-capable PHYs, this standard defines a set of rules that shall be followed by all STAs.

All Control frames shall be transmitted at one of the rates in the BSSBasicRateSet-BSS basic rate set (see 10.3.10.1), or at one of the rates in the PHY mandatory rate set so that they will be understood by all STAs in the BSS.

All frames with multicast and broadcast RA shall be transmitted at one of the rates included in the ~~BSSBasicRateSet~~[BSS basic rate set](#), regardless of their type [or subtype](#)

Data and/or management MPDUs with a unicast immediate address shall be sent on any supported data rate selected by the rate switching mechanism (whose output is an internal MAC variable called MACCurrentRate, ~~defined in units of 500 kbit/s~~, which is used for calculating the Duration/ID field of each frame). A STA shall not transmit at a rate that is known not to be supported by the destination STA, as reported in the supported rates element in the management frames. For frames of type Data+CF-ACK, Data+CF-Poll+CF-ACK and CF-Poll+CF-ACK, the rate chosen to transmit the frame must be supported by both the addressed recipient STA and the STA to which the ACK is intended.

~~In order to~~[To](#) allow the transmitting STA to calculate the contents of the Duration/ID field, the responding STA shall transmit its Control Response frame (either CTS or ACK) [at the highest rate in the BSS basic rate set that is less than or equal to the the rate of at the same rate as](#) the immediately previous frame in the frame exchange sequence (as defined in 9.7); ~~if this rate belongs to the PHY mandatory rates, or else at the highest possible rate belonging to the PHY rates in the BSSBasicRateSet.~~[In addition the Control Response frame shall be sent using the same PHY options as the received frame.](#)

[The time required to transmit a frame, for use in the Duration/ID field, can be calculated using the following equation:](#)

$$\text{Frame duration} = \frac{\text{aPreambleLength} + \text{aPLCPHeaderLength} + (\text{8 x MPDU length x aMPDUDurationFactor})}{(\text{MACCurrentRate x 32768})}$$

[Where PreambleLength is the length of the preamble in microseconds for the set of PHY options used to transmit the frame and where PLCPHeaderLength is the length of the PLCP header in microseconds for the set of PHY options used to transmit the frame.](#)

### 10.3.3.1.2 Semantics of the service primitive

The primitive parameters are as follows:

```
MLME-JOIN.request (
    BSSDescription,
    JoinFailureTimeout,
    ProbeDelay,
    OperationalRateSet
)
```

Name	Type	Valid Range	Description
BSSDescription	BSSDescription	N/A	The BSSDescription of the BSS to join. The BSSDescription is a member of the set of descriptions that was returned as a result of a MLME-SCAN.request.
JoinFailureTimeout	integer	greater than or equal to 1	The time limit, in units of beacon intervals, after which the join procedure will be terminated
ProbeDelay	integer	N/A	Delay (in μs) to be used prior to transmitting a Probe frame during active scanning
OperationalRateSet	set of integers	1 through 127 inclusive (for each integer in the set)	The set of data rates <del>(in units of 500kbit/s)</del> that the STA desires to use for communication within the BSS. The STA must be able to receive at each of the data rates listed in the set. <del>The OperationalRateSet</del> <a href="#">This set</a> is a superset of the <del>BSSBasicRateSet</del> <a href="#">BSS basic rate set</a> advertised by the BSS.

10.3.10.1.2 Semantics of the service primitive

The primitive parameters are as follows:

```

MLME-START.request      (
    SSID,
    BSSType,
    BeaconPeriod,
    DTIMPeriod,
    CF parameter set,
    PHY parameter set,
    IBSS parameter set,
    ProbeDelay,
    CapabilityInformation,
    BSSBasicRateSet,
    OperationalRateSet
)
    
```

Name	Type	Valid Range	Description
SSID	octet string	1 - 32 octets	The SSID of the BSS.
BSSType	Enumeration	INFRA-STRUCTURE, INDEPENDENT	The type of the BSS.
Beacon Period	integer	greater than or equal to 1	The Beacon period of the BSS (in Kμs).
DTIM Period	integer	As defined in Frame Format	The DTIM Period of the BSS (in Beacon Periods)
CF parameter set	As defined in Frame Format	As defined in Frame Format	The parameter set for CF periods, if the BSS supports CF mode. aCFPPeriod is modified as a side effect of the issuance of a MLME-START.request primitive.
PHY parameter set	As defined in Frame Format	As defined in Frame Format	The parameter set relevant to the PHY.
IBSS parameter set	As defined in Frame Format	As defined in Frame Format	The parameter set for the IBSS, if BSS is an IBSS.
ProbeDelay	integer	N/A	Delay (in μs) to be used prior to transmitting a Probe frame during active scanning
CapabilityInformation	As defined in Frame Format	As defined in Frame Format	The capabilities to be advertised for the BSS.
BSSBasicRateSet	set of integers	1 through 127 inclusive (for each integer in the set)	The set of data rates <del>(in units of 500 kbit/s)</del> that must be supported by all STAs that desire to join this BSS. The STA that is creating the BSS must be able to receive <u>and transmit</u> at each of the data rates listed in the set.
OperationalRateSet	set of integers	1 through 127 inclusive (for each integer in the set)	The set of data rates <del>(in units of 500 kbit/s)</del> that the STA desires to use for communication within the BSS. The STA must be able to receive at each of the data rates listed in the set. <del>The OperationalRateSet</del> <u>This Set</u> is a superset of the <u>BSS basic rate set</u> <del>BSSBasicRateSet</del> advertised by the BSS.