

WiFi Training Program 2025

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Question-12:

How is the data rate calculated ?

Formulae:

1. OFDM-based PHY (like 802.11a/g/n/ac/ax), the data rate is given by:

$$\text{Data Rate} = N_{SS} \times N_{BPSC} \times CR \times \frac{N_{SD}}{T_{\text{symbol}}}$$

Nss- Number of spatial streams

Nbpsc- Number of Bits Per SubCarrier (1 for BPSK, 2 for QPSK, 4 for 16-QAM, 6 for 64-QAM, 8 for 256-QAM)

CR- Code Rate

Nsd- Number of data subcarriers per OFDM symbol

Tsys- OFDM symbol duration

2. For Common use:

$$\text{Data Rate} = N_{SS} \times MCS_{\text{rate}} \times BW_{\text{factor}}$$

Nss- Number of spatial streams

MCS- Modulation and Coding Scheme (MCS) index defines modulation, coding rate, and number of spatial streams.

BW- channel bandwidth factor