

# IEEE 802.11 PHY Standards



Year Released	802.11 Standard	Band	Modulation	Max. MIMO Spatial Streams	Channel Width	Max Data Rate
1997	802.11	2.4 GHz	PPM / FHSS / DSSS	N/A	1 MHz / 22 MHz	2 Mbps
1999	a	5 GHz	OFDM	N/A	20 MHz	54 Mbps
1999	b	2.4 GHz	DSSS	N/A	22 MHz	11 Mbps
2003	g	2.4 GHz	OFDM	N/A	20 MHz	54 Mbps
2004	j	4.9 GHz / 5 GHz	OFDM	N/A	10 MHz / 20 MHz	54 Mbps
2008	y	3.7 GHz	OFDM	N/A	20 MHz	54 Mbps
2009	n	2.4 GHz / 5 GHz	MIMO-OFDM	4	20 MHz / 40 MHz	600 Mbps
2010	p	5.9 GHz	OFDM	N/A	10 MHz	27 Mbps
2012	ad	60 GHz	OFDM / Single Carrier	N/A	2.16 GHz	6.7 Gbps
2013	ac	5 GHz	MIMO-OFDM	8	20 MHz / 40 MHz / 80 MHz / 160 MHz	3.4 Gbps
2014	af	54 MHz - 790 MHz	MIMO-OFDM	4	6-8 MHz	569 Mbps
2016	ah	700 MHz / 800 MHz / 900 MHz	MIMO-OFDM	4	1-16 MHz	347 Mbps
2018	aj	45 GHz / 60 GHz	OFDM / Single Carrier	4	540 MHz / 1.08 GHz	15 Gbps
2021	ax	2.4 GHz / 5 GHz / 6 GHz	MIMO-OFDM	8	20 MHz / 40 MHz / 80 MHz / 80 + 80 MHz	9.6 Gbps
2021	ba	2.4 GHz / 5 GHz	OOK (Multi-carrier OOK)	N/A	4.06 MHz	250 kbps
2021	ay	60 GHz	OFDM / Single Carrier	4	8 GHz	20 Gbps