

IEEE 802.11
Wireless Access Method and Physical Layer Specification

Title: IR PHY Template

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General Specifications

Parameter	Value	Comments
Data Rate	1 and 2 Mbps	
Wavelength	850 - 950 nm	
Modulation Method	PPM	16-PPM for 1 Mbps 4-PPM for 2 Mbps
Number of Channels	1	
Propagation Mode	Diffuse	Non aimed transceivers

Transmitter Specifications

Parameter	Value	Comments
Output Peak Power	2.0 W \pm 20%	@900 nm
Pulse Format		See fig. 3 doc:94/96
• tw (pulse width)	250 ns \pm 10 ns	1 and 2 Mbps
• tr (rise time)	40 ns (max)	10 to 90%
• tf (fall time)	40 ns (max)	10 to 90%
• tj (jitter)	10 ns (max)	absolute deviation
Emitter Radiation Pattern	TBD	

Receiver Specifications

Parameter	Value	Comments
Sensitivity (BER=10 ⁻⁹) (max)	-47 dBm/cm ² (1 Mbps) -41 dBm/cm ² (2 Mbps)	-10 dBm/cm ² ambient light
Minimum Dynamic Range	30 dB	On the irradiance at the receiver detector
Minimum Field of View	150°	At the physical limit
Frame Error Rate (FER)	$\leq 4 \times 10^{-5}$	MAC frame = 512 octets
Carrier Sense out to MAC	$\leq 12 \mu$ s	After the preamble start

TX-RX turnaround time	TBD	
RX-TX turnaround time	TBD	
IR silence to Carrier Sense deassert	16 μ s	In case of EFD failure

Frame Specifications I

Parameter	Value	Comments
Preamble	57 - 73 time slots	See "Frame specs. II"
Start of Frame Delimiter	4 time slots	See "Frame specs. II"
Data Rate Field	3 time slots	See "Frame specs. II"
DC Level Adjustment	32 time slots	See "Frame specs. II"
MAC Frame	TBD	Integer number of octets
End of Frame Delimiter	16 time slots	See "Frame specs. II"

Frame Specifications II

Parameter	Format	Comments
Preamble Format	010101...0101010	1 and 2 Mbps
SFD Format	1001	1 and 2 Mbps
DC Level Adjustment	2 x symbol '8':	1 Mbps / 16-PPM
Field Format	8 x symbol '2':	2 Mbps / 4-PPM
Data Rate Field Format	000	1 Mbps
	001	2 Mbps
	other formats:	TBD
EFD Format	0000011011011011	1 and 2 Mbps

PPM Mapping Table

4-PPM	16-PPM	PPM Symbol
00	0000	1 - 0000000000000001
01	0001	2 - 0000000000000010
10	0010	3 - 0000000000000100
11	0011	4 - 0000000000001000
	0100	5 - 0000000000010000
	0101	6 - 0000000000100000
	0110	7 - 0000000001000000
	0111	8 - 0000000010000000
	1000	9 - 0000000100000000
	1001	10 - 0000001000000000
	1010	11 - 0000010000000000
	1011	12 - 0000100000000000
	1100	13 - 0001000000000000
	1101	14 - 0010000000000000
	1110	15 - 0100000000000000
	1111	16 - 1000000000000000