



Recommendation ITU-R M.1450-5
(02/2014)

**Characteristics of broadband
radio local area networks**

M Series
**Mobile, radiodetermination, amateur
and related satellite services**



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Series	Title
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RA	Radio astronomy
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S	Fixed-satellite service
SA	Space applications and meteorology
SF	Frequency sharing and coordination between fixed-satellite and fixed service systems
SM	Spectrum management
SNG	Satellite news gathering
TF	Time signals and frequency standards emissions
V	Vocabulary and related subjects

Note: This ITU-R Recommendation was approved in English under the procedure detailed in Resolution ITU-R 1.

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RECOMMENDATION ITU-R M.1450-5

Characteristics of broadband radio local area networks

(Questions ITU-R 212/5 and ITU-R 238/5)

(2000-2002-2003-2008-2010-2014)

Scope

This Recommendation provides the characteristics of broadband radio local area networks (RLANs) including technical parameters, and information on RLAN standards and operational characteristics. Basic characteristics of broadband RLANs and general guidance for their system design are also addressed.

The ITU Radiocommunication Assembly,

considering

- a) that broadband radio local area networks (RLANs) are widely used for fixed, semi-fixed (transportable) and portable computer equipment for a variety of broadband applications;
- b) that broadband RLANs are used for fixed, nomadic and mobile wireless access applications;
- c) that broadband RLAN standards currently being developed are compatible with current wired LAN standards;
- d) that it is desirable to establish guidelines for broadband RLANs in various frequency bands;
- e) that broadband RLANs should be implemented with careful consideration to compatibility with other radio applications,

noting

- a) that Report ITU-R F.2086 provides technical and operational characteristics and applications of broadband wireless access systems (WAS) in the fixed service;
- b) that other information on broadband WAS, including RLANs, is contained in Recommendations ITU-R F.1763, ITU-R M.1652, ITU-R M.1739 and ITU-R M.1801,

recommends

- 1 that the broadband RLAN standards in Table 2 should be used (see also Notes 1, 2 and 3);
- 2 that Annex 2 should be used for general information on RLANs, including their basic characteristics;
- 3 that the following Notes should be regarded as part of this Recommendation.

NOTE 1 – Acronyms and terminology used in this Recommendation are given in Table 1.

NOTE 2 – Annex 1 provides detailed information on how to obtain complete standards described in Table 2.

NOTE 3 – This Recommendation does not exclude the implementation of other RLAN systems.

TABLE 1

Acronyms and terms used in this Recommendation

Access method	Scheme used to provide multiple access to a channel
AP	Access point
ARIB	Association of Radio Industries and Businesses
ATM	Asynchronous transfer mode
Bit rate	The rate of transfer of a bit of information from one network device to another
BPSK	Binary phase-shift keying
BRAN	Broadband Radio Access Networks (A technical committee of ETSI)
Channelization	Bandwidth of each channel and number of channels that can be contained in the RF bandwidth allocation
Channel Indexing	The frequency difference between adjacent channel centre frequencies
CSMA/CA	Carrier sensing multiple access with collision avoidance
DAA	Detect and avoid
DFS	Dynamic frequency selection
DSSS	Direct sequence spread spectrum
e.i.r.p.	Equivalent isotropically radiated power
ETSI	European Telecommunications Standards Institute
Frequency band	Nominal operating spectrum of operation
FHSS	Frequency hopping spread spectrum
HIPERLAN2	High performance radio LAN 2
HiSWANa	High speed wireless access network – type a
HSWA	High speed wireless access
IEEE	Institute of Electrical and Electronics Engineers
IETF	Internet Engineering Task Force
LAN	Local area network
LBT	Listen before talk
MU	Medium utilisation
MMAC	Multimedia mobile access communication
Modulation	The method used to put information onto an RF carrier
MIMO	Multiple input multiple output
OFDM	Orthogonal frequency division multiplexing
PSD	Power spectral density
PSTN	Public switched telephone network
QAM	Quadrature amplitude modulation
QoS	Quality of Service
QPSK	Quaternary phase-shift keying
RF	Radio frequency

RLAN	Radio local area network
SSMA	Spread spectrum multiple access
Tx power	Transmitter power – RF power in Watts produced by the transmitter
TCP	Transmission control protocol
TDD	Time division duplex
TDMA	Time-division multiple access
TPC	Transmit power control
WATM	Wireless asynchronous transfer mode

TABLE 2

Characteristics including technical parameters associated with broadband RLAN standards

Characteristics	IEEE Std 802.11-2012 (Clause 17, commonly known as 802.11b)	IEEE Std 802.11-2012 (Clause 18, commonly known as 802.11a ⁽¹⁾)	IEEE Std 802.11-2012 (Clause 19, commonly known as 802.11g ⁽¹⁾)	IEEE Std 802.11-2012 (Clause 18, Annex D and Annex E, commonly known as 802.11j)	IEEE Std 802.11-2012 (Clause 20, commonly known as 802.11n)		IEEE Std 802.11ad-2012	ETSI EN 300 328	ETSI EN 301 893	ARIB HiSWANa, ⁽¹⁾	ETSI EN 302 567
Access method	CSMA/CA, SSMA	CSMA/CA					Scheduled, CSMA/CA		TDMA/TDD		
Modulation	CCK (8 complex chip spreading)	64-QAM-OFDM 16-QAM-OFDM QPSK-OFDM BPSK-OFDM 52 subcarriers (see Fig. 1)	DSSS/CCK OFDM PBCC DSSS-OFDM	64-QAM-OFDM 16-QAM-OFDM QPSK-OFDM BPSK-OFDM 52 subcarriers (see Fig. 1)	64-QAM-OFDM 16-QAM-OFDM QPSK-OFDM BPSK-OFDM 56 subcarriers in 20 MHz 114 subcarriers in 40 MHz MIMO, 1-4 spatial streams	256-QAM-OFDM 64-QAM-OFDM 16-QAM-OFDM QPSK-OFDM BPSK-OFDM 56 subcarriers in 20 MHz 114 subcarriers in 40 MHz 242 subcarriers in 80 MHz 484 subcarriers in 160 MHz and 80+80 MHz MIMO, 1-8 spatial streams	Single Carrier: DPSK, $\pi/2$ -BPSK, $\pi/2$ -QPSK, $\pi/2$ -16QAM OFDM: 64-QAM, 16-QAM, QPSK, SQPSK 352 subcarriers	No restriction on the type of modulation	64-QAM-OFDM 16-QAM-OFDM QPSK-OFDM BPSK-OFDM 52 subcarriers (see Fig. 1)		