

# LANCOM wireless LAN devices meet statutory guideline values for electromagnetic waves

**Users of wireless technologies are frequently concerned about the possible adverse effects on their health.**

**Currently there is no scientific evidence to indicate any negative impact of wireless LAN radio waves on people's health. Both the German Federal Office for Radiation Protection (BfS) and the World Health Organization (WHO) confirm this.**

The BfS writes in this regard:

"If the recommended maximum levels are observed, no adverse health effects on body tissues have been demonstrated according to current knowledge."<sup>1</sup>

The CE mark on LANCOM access points confirms their compliance with the statutory limits. In public discussion, the transmission power of various equipment, such as that of wireless LAN, is often compared with the transmission power of mobile or cordless telephones. However, the comparison only applies to a limited degree since the assessment must be based on various factors such as field strength, frequency, and duration of exposure.

## What are the statutory guideline / threshold values?

For wireless LAN devices and other wireless applications, the same provisions regarding possible adverse effects on health apply. To protect the population from high-frequency electromagnetic fields, the European standard EN 62479 outlines a legal basis that supports the reference value in the Council's Recommendation of the European Community 1999/519/EC and of the International Commission on Non-Ionizing Radiation Protection (ICNIRP). This limit for WLAN is 10 W/m<sup>2</sup> at 2.4 GHz.<sup>2</sup>

German studies by the Mobile Telecommunication Research Program initiated by the Federal Office for Radiation Protection found radiation levels from wireless LANs to be scarcely detectable at below 0.1 µW/m<sup>2</sup> to 0.2 W/m<sup>2</sup>.<sup>3</sup>

Even the peak values of 0.2 W/m<sup>2</sup> are thus fifty times below the reference value of 10 W/m<sup>2</sup> recommended by the EU. Basic exposure limits are based on the scientifically proven biological effects of electric, magnetic and electromagnetic fields and are about 50 times below the proven effect thresholds. This means that particularly sensitive groups of the population, such as children, the elderly and sick people, are also protected with a sufficient safety margin.

## How high is the transmission power of access points?

Wireless LAN access points transmit at a maximum permissible radiated power that depends on the frequency range:

- 0.1 W in the 2400 MHz frequency range
- 0.2 W at between 5150 and 5350 MHz when used within enclosed spaces
- 1 W at between 5470 and 5725 MHz when used inside and outside of enclosed spaces (usually point-to-point routes)
- 4 W at between 5725 and 5850 MHz when operating BFWA (Broadband Fixed Wireless Access)
- 0,2 W at between 5925 and 6425 MHz when used within enclosed spaces

Actual transmission power measured by the Mobile Telecommunication Research Program is between 0.02 and 0.04 W in the 2.4 GHz band. Maximum values are 0.08 W and thus 20 % below the permissible maximum level.

## What does the specific absorption rate (SAR) specify?

The SAR is a physical quantity that measures the absorption of electromagnetic fields by biological tissue, which causes it to heat up.

It is affected by two significant factors:

- The field strength of the waves (transmission power and distance to the transmitter)
- The duration of exposure

The field strength of the electromagnetic radiation decreases as the square of the distance to the antenna. This means that at twice the distance from the transmitting antenna, the transmitting power is only a quarter. This is due to the spherical radiation of the usual omnidirectional antennas. The power is thus distributed over the entire surface of this sphere at a certain distance. The formula for the surface area is  $O=4\pi r^2$ . The irradiance is given as the radiation flux through the receiver surface ( $W/m^2$ ). The following table illustrates this using examples with different distances.

	WLAN (2,4 GHz)	WLAN (2,4 GHz)	WLAN (5/6 GHz)
<b>Distance (m)</b>	1	4	4
<b>Surface (m<sup>2</sup>)</b>	12.57	201	201
<b>Transmission power (W)</b>	0.1	0.1	0.2
<b>Irradiance (W/m<sup>2</sup>)</b>	0.008	0.0005	0.001

Specific effects of electromagnetic waves are only relevant after a certain duration. Even when there is no data traffic, a wireless LAN access point continuously transmits a 0.5 ms signal every 100 ms (a beacon) so that other devices can synchronize with it. If a 0.1 W access point transmits the beacon only, the mean radiated power over time is 0.0005 W. When data is being transmitted, the radiated power can reach 0.07 W. During a mobile phone call, the transmitting power is significantly higher at up to 2 W.

The radius or distance to the base station is thus squared. A distance of several meters (in closed rooms) to several hundred meters (outside closed rooms) is usually maintained to WLAN access points.

## Summary

In today's digital society it is impossible to avoid electromagnetic waves. The share of total radiated power contributed by wireless LANs is very low.

*"Despite intensive research, there is no scientific evidence of a health risk from mobile radio fields when the legally valid limits are observed. [...]"*

This is also the assessment of the Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR) of the European Commission. In its updated opinion published in March 2015, the expert panel concludes that there is no scientific evidence of health risks from radiofrequency electromagnetic fields below the applicable limits.<sup>4</sup>

The BfS writes that "the results of the DMF and other recent national and international studies [...] could not confirm health-relevant effects below the limits."<sup>5</sup>

The WHO (World Health Organization) also agrees.<sup>6</sup>

All current LANCOM access points allow transmission power to be reduced to values below 0.01 W.

As long as signal coverage at these power levels remains sufficient, the already low share of overall exposure to electromagnetic fields from WLAN devices can be reduced even further.

## Sources (German)

- 1 BfS Infoblatt Sprach- und Datenübertragung per Funk: ‚Bluetooth und WLAN‘  
[https://www.bfs.de/SharedDocs/Downloads/BfS/DE/broschueren/emf/info-bluetooth-und-wlan.pdf?\\_\\_blob=publicationFile&v=5](https://www.bfs.de/SharedDocs/Downloads/BfS/DE/broschueren/emf/info-bluetooth-und-wlan.pdf?__blob=publicationFile&v=5)
- 2 BfS Infoblatt Sprach- und Datenübertragung per Funk: ‚Bluetooth und WLAN‘  
[https://www.bfs.de/SharedDocs/Downloads/BfS/DE/broschueren/emf/info-bluetooth-und-wlan.pdf?\\_\\_blob=publicationFile&v=5](https://www.bfs.de/SharedDocs/Downloads/BfS/DE/broschueren/emf/info-bluetooth-und-wlan.pdf?__blob=publicationFile&v=5)
- 3 Deutsches Mobilfunk-Forschungsprogramm (DMF):  
‚Bestimmung der Exposition bei Verwendung kabelloser Übermittlungsverfahren im Haushalt und Büro‘  
[https://www.emf-forschungsprogramm.de/forschung/dosimetrie/dosimetrie\\_abges/dosi\\_030.html](https://www.emf-forschungsprogramm.de/forschung/dosimetrie/dosimetrie_abges/dosi_030.html)
- 4 Informationszentrum-Mobilfunk.de:  
Broschüre ‚Was Sie schon immer über Mobilfunk wissen wollten - Fragen und Antworten zur mobilen Kommunikation‘, Seite 15/16  
[https://www.informationszentrum-mobilfunk.de/sites/default/files/medien/izmf\\_faq\\_broschuere\\_2015\\_screen.pdf](https://www.informationszentrum-mobilfunk.de/sites/default/files/medien/izmf_faq_broschuere_2015_screen.pdf)
- 5 BfS:  
‚Wissenschaftlich diskutierte biologische und gesundheitliche Wirkungen hochfrequenter Felder‘  
<https://www.bfs.de/DE/themen/emf/hff/wirkung/hff-diskutiert/hff-diskutiert.html>
- 6 WHO Fact Sheet:  
‚Was sind Elektromagnetische Felder? Gesundheitliche Wirkungen im Überblick‘  
[https://cdn.who.int/media/docs/default-source/documents/radiation/what-is-electromagnetic-fields-german.pdf?sfvrsn=90aacb69\\_2](https://cdn.who.int/media/docs/default-source/documents/radiation/what-is-electromagnetic-fields-german.pdf?sfvrsn=90aacb69_2)

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