

# LANCOM™ Techpaper

## Wireless LAN access points in the medical field

### What are the considerations when operating wireless LANs in medical environments?

Many people view the use of wireless systems for the transfer of voice and data as a cause for concern regarding the potentially adverse effects of radiation on humans. The widespread availability of mobile telephone systems has led to an increased sensitivity to this theme among the public. This subject is of special significance to the medical environment, such as in hospitals, where the wealth of technical devices must be able to function without interference: A multitude of devices emit electromagnetic radiation which could potentially cause a disturbance to other equipment.

This is why electromagnetic compatibility (EMC) plays a decisive role for products that enable voice and data communications. However, it is exactly this radiation that is used by wireless LANs to transfer data. Because of this, national and European standards have been established which aim to ensure the safety for humans and for machines when using radio systems in medical environments.

If medical equipment is also to be integrated into the wireless LAN, the requirements to be met by the WLAN network have to be clarified in tests, which are specific to the manufacturer of the medical technology concerned. LANCOM products have been subjected to tests by Dräger, the manufacturer of patient monitoring systems, with the aim of testing their suitability to applications such as patient monitoring and electronic ward rounds.

This tech-paper deals primarily with the two most important European standards on EMC. It explains the extent to which LANCOM products meet these standards, and it outlines the other tests which LANCOM products passed successfully.

### EN 60601-1-2

The European standard for the electromagnetic compatibility of medical equipment

The various standards from CENELEC, the European Committee for Electrotechnical Standardisation in Brussels, focus mainly on electromagnetic compatibility.

According to German EMC law, electromagnetic compatibility is defined as "the ability of an item of equipment to operate satisfactorily in the electromagnetic environment, without itself causing electromagnetic interference that would be unacceptable for other equipment".

EN 60601-1-2 defines the requirements and inspections that apply in particular to the EMC of equipment used in medical environments. In addition, and depending on the type of construction, the maximum emitted radio signal is not to exceed 100 mW.

In comparison: A mobile telephone transmits with up to 2000 mW; a microwave operates with ca. 1000 watts and, according to CE regulations, it may emit no more than 1 watt of energy externally. LANCOM access points maintain the specified 100 mW in the 2.4-GHz frequency range. In indoor environments, the less widespread 5-GHz frequency band can typically be operated with a physical transmission power of up to 200 mW.

### EN 60950

Product safety guidelines

All equipment sold in the European market must fulfill the low-voltage directive. This means that users of the equipment may not be endangered, even though the equipment is to be connected to the public electricity supply (230 V) that is potentially lethal to humans. The standard EN 60950

describes the requirements and inspections that equipment must satisfy in order to meet this level of protection.

The LANCOM network products listed below satisfy both of these standards and are thus suitable for use in medical environments. The standards are considered as a part of the CE certification of LANCOM products. The relevant declarations of conformity can be found in the Internet under <http://lancom.eu>. Text materials concerning European standards are subject to fees and can be ordered from specialist publishers such as the Beuth Verlag in Berlin ([www.beuth.de](http://www.beuth.de)).

#### Manufacturer-specific WLAN tests

The standards mentioned above require that WLANs have no influence on equipment in medical environments. In modern hospitals, however, things are being taken a step further: Not only does WLAN offer Internet access for patients, but it also supports doctors, nurses and other personnel in their daily business. The latest technology for the doctor's ward rounds are WLAN based, i.e. the notes that doctors write on PDAs or notebooks during their visits are entered directly into the patient's records stored on a central server. WLAN supports the monitoring of a patient's vital signs, even for mobile patients, as patient-monitoring equipment can report directly to the doctor via WLAN.

Where medical data is required to be transported via the WLAN, it is essential to clarify the technical specifications demanded of the network in consultation with the respective manufacturer of the medical technology. To clarify these specifications, LANCOM approached the company Dräger with the aim of carrying out compatibility tests. Dräger verified the compatibility of their Infinity Monitors with the LANCOM access points L-305agn, L-310agn,

L-315agn and L-54ag, and also with the WLAN controller WLC-4025. Emphasis was placed on the performance of the LANCOM devices under high network load, and to ensure trouble-free operation in the multicasting environment used by Dräger Infinity monitors.

#### Summary

The LANCOM access points meet with all of the interference requirements of EN60601-1-2 for operation in medical environments, meaning that they are suitable for operation anywhere in hospitals. The LANCOM devices also fulfilled the more rigorous conditions of the interference requirements under EN 60601-1-2. However, before employing the equipment for transmitting data from medical equipment via the WLAN, a risk assessment should be carried out regarding the demands that the other medical equipment makes of the network. The LANCOM indoor access points mentioned before have already undergone successful compatibility tests with Dräger Infinity monitors, and they have received a validation.

Declarations of conformity for the access points can be found on the relevant product pages on the Web site. We would be happy to provide you with copies of the Dräger validations on request. Simply write an e-mail to [myLANCOM@lancom.de](mailto:myLANCOM@lancom.de).