LANCOM Techpaper
Wi-Fi Access Points in the Medical Field

What are the considerations when operating Wi-Fi 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 lead 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 Wi-Fi 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 Wi-Fi, the requirements to be met by the wireless network have to be clarified in tests, which are specific to the manufacturer of the medical technology concerned. LANCOM has had the compatibility of its products confirmed via validations and certifications from leading manufacturers such as Dräger, Philips Healthcare, ascom, and Spectralink, with the aim of testing their suitability to applications such as patient monitoring, electronic ward rounds or Voice-over-WLAN telephony.

This techpaper 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 electro magnetic 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 must not exceed 100 mW. In comparison: A mobile phone transmits with up to 2000 mW; a microwave operates with ca. 1000 watts. LANCOM access points maintain the specified 100 mW in the 2.4-GHz frequency range. The

physical transmission power in the 5-GHz frequency band is typically 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.

Declarations of conformity

The LANCOM network products listed below satisfy both of these standards and are thus suitable for use as IT devices in medical environments. The standards are considered as a part of the EC certification of LANCOM products. The full text of the EU declarations of conformity is available at the following internet address: www.lancom-systems.com/ce/

Manufacturer-specific Wi-Fi tests

Instead of providing just Internet access for patients, in modern hospitals things are being taken a step further. It is also used to supports doctors, nurses and other personnel in their daily business. The latest technology for the doctor's ward rounds are Wi-Fi 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. Wi-Fi supports the monitoring of a patient's vital signs, even for mobile patients, as patient-monitoring equipment can report directly to the doctor via Wi-Fi.

Where medical data is required to be transported via the Wi-Fi, it is essential to clarify the technical specifications demanded of the network in consultation with the respective manufacturer of the medical technology. To validate these specifications, LANCOM and the Dräger company ran a compatibility test.

Emphasis was placed on the performance of the LANCOM devices under high networkload, and to ensure trouble-free operation in the multicast environment used by Dräger Infinity monitors.

Summary

LANCOM access points meet with all of the interference requirements of EN 60601-1-2 for operation in medical environments. They are suitable for operation anywhere in hospitals. However, before employing the equipment for transmitting data from medical equipment via the Wi-Fi, a risk assessment should be carried out regarding the demands that the other medical equipment make of the network. The LANCOM indoor access points mentionend before have already undergone successful compatibility tests with the companies Dräger, Philips Healthcare, Spectralink, and ascom.

Declarations of conformity for the access points can be found on www.lancom-systems.com/ce/. We would be happy to provide you with copies of the Dräger validations on request. Simply write an e-mail to sales@lancom.de