

# Specific Absorption Rate (SAR)



# Executive Summary

This paper addresses the Specific Absorption Rate (SAR) of EPOS DECT and Bluetooth® contact center and office headsets.

First, radiation and the Specific Absorption Rate (SAR) are explained in detail. Second, SAR measurements of EPOS' Bluetooth® and DECT headsets are presented. The results show that all SAR-levels of EPOS headsets are well below the recommended limits of 2 W/kg (EU limit) and 1.6 W/kg (US limit)<sup>1</sup> and therefore it cannot be confirmed that they will negatively impact health.

<sup>1</sup> Specific absorption rate (Sar) - Limits US level at or below 1.6 w/kg 1 gram of tissue and EU level at or below 2.0 w/kg 10 grams of tissue



# About Radiation and Specific Absorption Rate (SAR)

Radio frequency (RF) generally lies between 3 kilohertz (3kHz) and 300 gigahertz (300 GHz)<sup>1</sup>. Radio waves are a form of electromagnetic radiation of which there are two types: ionizing radiation with high levels of electromagnetic energy that can cause genetic damage and Non-ionizing radiation, which has a lower energy and is used in household electrical appliances, mobile phones, wireless headsets, Wi-Fi and microwaves<sup>2,3</sup>.

The International Commission on Non-Ionizing Radiation Protection (ICNIRP) has set human exposure limits for all types of radiation<sup>3</sup>. The measurement unit Specific Absorption Rate (SAR) is used to measure the RF energy absorbed by a person using a mobile phone or wireless headset. It is defined as the power (W) absorption per mass unit (kg) averaged over a small volume of tissue<sup>4</sup>. SAR limits for products such as wireless headsets and mobile phones are defined by ICNIRP together with federal institutions. According to the US based Federal Communications Commission (FCC) the limit is 1.6 W/kg and according to the European Recommendation 1999/519/EC it is 2 W/kg.



1 [www.fcc.gov/engineering-technology/electromagnetic-compatibility-division/radio-frequency-safety/faq/ef-safety#O1](http://www.fcc.gov/engineering-technology/electromagnetic-compatibility-division/radio-frequency-safety/faq/ef-safety#O1)  
2 [www.fcc.gov/engineering-technology/electromagnetic-compatibility-division/radio-frequency-safety/faq/ef-safety#Q2](http://www.fcc.gov/engineering-technology/electromagnetic-compatibility-division/radio-frequency-safety/faq/ef-safety#Q2)  
3 [www.icnirp.org/en/home/home-read-more.html](http://www.icnirp.org/en/home/home-read-more.html)  
4 [www.fcc.gov/general/specific-absorption-rate-sar-cellular-telephones](http://www.fcc.gov/general/specific-absorption-rate-sar-cellular-telephones)

# EPOS Wireless Headsets and Radiation

All EPOS wireless headsets comply with the international standards of SAR to protect consumers against excess radiation. All values were verified by an independent test laboratory. Headset measurements are based on internationally acknowledged standardized methods and are taken at maximum radio output levels (long range & wideband mode). The actual SAR-levels of EPOS headsets are well below the recommended limits of 2 W/kg (EU limit) and 1.6 W/kg (US limit).

All EPOS wireless headsets use Bluetooth® or DECT radio technology.

## **Bluetooth® Headsets**

Bluetooth® technology is a global radio transmission standard, which supports the application of a wide range of wireless electronic devices. The technology connects devices over a distance of up to 100 meters in line of sight, depending on the Bluetooth® class and device.

EPOS Bluetooth® headsets use radio signals in the frequency range from 2.4GHz to 2.485 GHz and have power class 1 which is up to 20 dBm (100 mW). However, EPOS Bluetooth® headsets have a maximum output of just 10 dBm (10 mW). Moreover, they use dynamic and adaptive power control which means that they reduce the transmitted power to a minimum to preserve power consumption

and extend talk time. Only when the maximum range is needed does the headset require maximum output power.

Taking this into account, it can be demonstrated that the very low output power of EPOS Bluetooth® headsets is considerably below the required threshold. As a result, compliance can be claimed without having to show SAR measurements.

## **DECT Headsets**

Digital Enhanced Cordless Telecommunications (DECT™) is the ETSI (European Telecommunications Standards Institute) standard for short-range cordless communications, which can be adapted for many applications, including voice, data and networking applications and can be used over unlicensed frequency allocations world-wide. The most common spectrum allocation is 1,880 MHz to 1,900 MHz, which is used in Europe. This spectrum is unlicensed and exclusively for technology, which ensures an interference-free operation. In the United States, the FCC (Federal Communications Commission) changed channelization and licensing costs in 1,920 MHz-1,930 MHz, or 1.9 GHz, known as Unlicensed Personal Communications Services (UPCS), allowing DECT devices to be sold in the U.S. with only minimal changes.

Exposure from DECT devices can be considered as far field exposure in relation to the local base station and as near field exposure in relation to the portable phone or monitor.

DECT telephone users experience less RF exposure than mobile telephone users due to the short distance between base station and phone. This is because the power required to transmit the signal over a short distance is less than that needed to transmit to mobile phones.

Like Bluetooth® headsets, all EPOS DECT headsets use dynamic and adaptive power control. The headset can also be forced by the user to reduce its transmission to the lowest value by setting the base station into low power mode. This can be done by setting the base station to short range and narrowband audio mode (see user manual for details). In that case, the transmitted level will be lower than the levels from Bluetooth® devices.

The values listed on the right represent worst case scenarios, in which the headset is forced to use maximum power as it is located far from the base station. In addition, it is set to wideband mode which requires a higher energy.

# Specific Absorption Rates for EPOS Wireless Headsets



## Product overview

	Art. no.	Maximum value SAR10g [W/kg] EU standard	Maximum value SAR1g [W/kg] US standard
D 10 without headband	506420	0.029	0.048
D 10 with headband	506420	0.050	0.048
DW Office / SD Office / Office Runner* headset without headband	504324 506000 506677	0.029	0.048
DW Office / SD Office / Office Runner* headset with headband	504324 506000 506677	0.050	0.048
IMPACT DW Pro 1 / SD Pro 1 headset*	504325 506001	0.139	0.135
IMPACT DW Pro 2 / SD Pro 2 headset*	504326 506002	0.070	0.124
IMPACT SDW 10 headset	507058	0.131	0.058
IMPACT SDW 30 headset	507059	0.045	0.024
IMPACT SDW 60 headset	507060	0.045	0.024

\* SD Series and Office Runner for the American market only

All values are far below the threshold of 2 W/kg / 1.6 W/kg and therefore it cannot be confirmed that EPOS DECT headsets will negatively impact health.

### Sources

- The international commission on non-ionizing radiation protection: [www.icnirp.org](http://www.icnirp.org)
- Federal Communications Commission: [www.fcc.gov/engineering-technology/electromagnetic-compatibility-division/radio-frequency-safety/faq/ef-safety#block-menu-block-4](http://www.fcc.gov/engineering-technology/electromagnetic-compatibility-division/radio-frequency-safety/faq/ef-safety#block-menu-block-4)

