

WIRELESS TECHNOLOGIES AND OUTPUT POWER

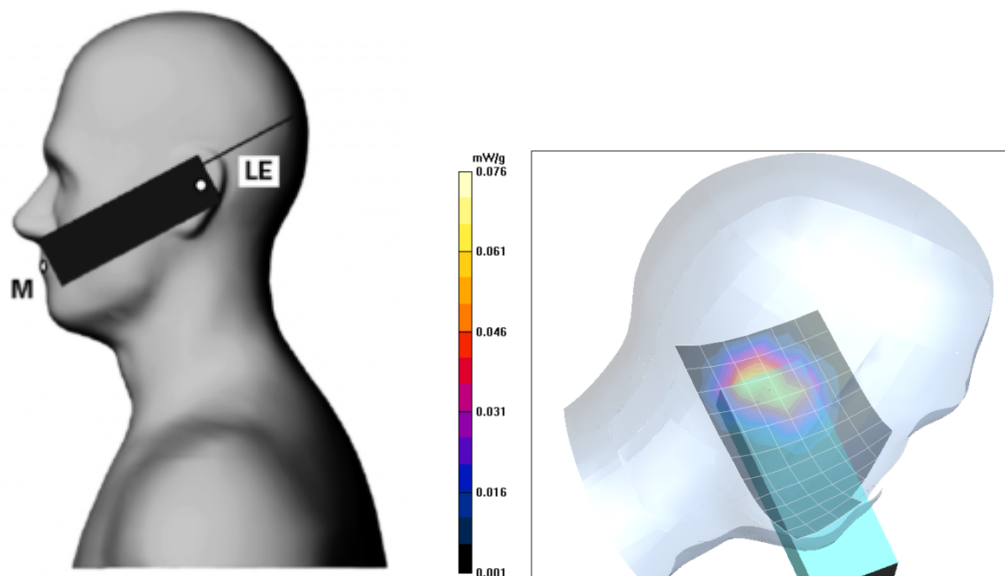
The issue of wireless devices and the effect of radiated power has been a topic for a long time. In order to bring some clarity on different issues I will try to explain some aspects of wireless power. Radiated power could in some cases have an effect on surrounding objects, normally these effects are divided into **human health** and **equipment interference**.

EFFECTS ON HUMAN HEALTH

If we start with the human health issue, several large studies have been performed in order to find out if radio waves can be harmful. To this date no clear evidence has proved to show harmful effects from small handheld devices. However the authorities and the industry have taken a cautious approach and a measurement called SAR (Specific Absorption Rate) has been developed. The SAR value is equivalent to the radio power absorbed by one kilo of human tissue when the device (phone) is held close to the body. The maximum allowed value in Europe (US has a slightly different definition but practically the same level) is 2 W/Kg

All manufacturers state the SAR values for their products and most GSM/3G phones have SAR values from 0.3-1.3 W/Kg

As a comparison our 9d24 has 0.0081W/Kg and i75 has 0.036 W/Kg



Typical test setup and corresponding measurement result

The very low SAR value for DECT phones and WiFi phones is explained by the low output power needed in indoor short range systems. GSM/3G has adaptive output power and when the phone is close to a base the output is reduced together with the SAR value.

The conclusion is that for effect on human health, the **mean** power should be as low as possible. Handset designers also try to direct radio power away from the body to achieve better speech performance as well.

EQUIPMENT INTERFERENCE

Equipment interference is on the other hand a function of **peak power**. Radio signals can interfere with sensitive equipment and its normally short peak pulses that can disturb the equipment. Also in this case, dedicated short range technologies like DECT and WiFi have significant lower peak power.

GSM	1 – 2 W
DECT (EU)	0, 25 W
DECT (US)	0, 1 W
WiFi	0, 05 W

The automatic power control for GSM can, as explained above reduces the actual power. For a traditional wide area GSM network, this normally means that transmitting power is increased indoors (to compensate for building attenuation). Pico cell GSM systems have generally lower output power since the bases are closer.

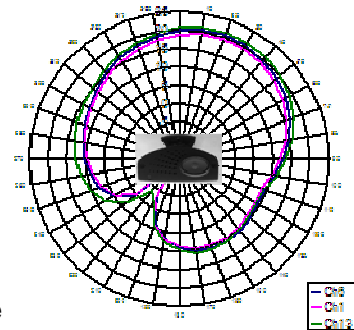
Also standards for sensitive equipment are evolving; since the radio spectrum is continuously “polluted” with different radio standards the tolerance for radiated emissions must be increased. In these tests the electrical field strength (V/m) is the critical parameter.

The standard for general equipment is 3V/m. There are also specific requirements for life sustaining equipment in healthcare where the immunity should be 10V/m minimum.

The automotive industry has adopted tough immunity levels up to 100V/m

All Ascom products are carefully tested with respect to output power and field strength, some examples:

DECT EU	4.7 v/m @ 1m distance
DECT US	2.4 V/m @ 1m distance
WiFi (i75)	1.7 V/m @ 1m distance



We have also sold low power versions of the EU DECT to sensitive environment with >100mW which is equivalent with the US norm.

In our new range of handsets the output power will be dynamically controlled which will reduce the interference even more

CONCLUSION

Short range technologies like DECT and WiFi have much less impact on both human health and equipment. Interference from these technologies is very seldom a problem and with more intelligent power control on one hand and the increasing immunity in devices on the other hand the already today few problems with interference will probably be even more reduced in the future. With our new range of handsets with dynamic power control we can tailor the RF footprint to sensitive environments.