Mobile communication and health

Simply A1.

For mobility and safety

5.9 billion people worldwide use mobile phones. For most of us, the mobile phone has become an indispensable part of our lives: In Austria alone, the distribution of SIM cards has already exceeded 161 %*.

The future of telecommunication lies in mobile wireless communication. Controversial statements in scientific studies show the possible effects of electromagnetic waves and raise many questions. As the market and innovation leader, it is our responsibility to inform our customers.

We not only keep to exposure limits – we remain well below them. Our priority is your health and safety. This has to do with the future, for all of us.

Hannes Ametsreiter
CEO of A1 Telekom Austria AG

* Average number of SIM cards for every Austrian, according RTR Telekom monitor Q3/2013

Content

Mobile communication can save lives

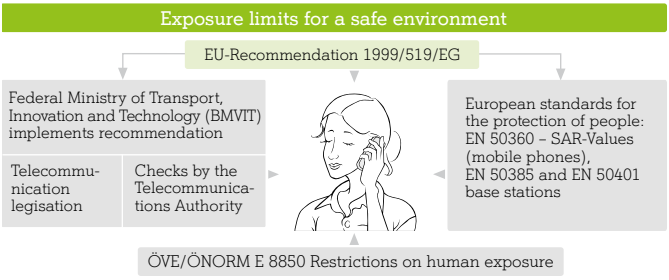
We offer an extensive nationwide landline and mobile phone network. Whether you're playing sports, are stuck in traffic or you are at home, the mobile phone is a life line: "When it comes to your safety or if something happens while you are out, then the mobile phone is particularly important. More than 75% of emergency calls in the event of sport and leisure accidents are made using a mobile phone. Through wireless and advanced air ambulance systems, we carry out mountain rescues in the same time frame as we would in built-up areas."
Ing. Gernot Vergeiner, Head of the Tyrolean Control Center

Base stations and mobile phones go together

Base stations are in periodic contact with switched on mobile phones. Both send and receive radio waves in order to establish a connection. You can only make calls and transmit data if a base station is nearby. Since the capacity of base stations is limited, they are built wherever a lot of calls are made. The more mobile phones and data modems people use, the more base stations are needed. Just under 5.8 million Austrians use A1's mobile network. Our task is to ensure the best nationwide coverage service whilst complying with applicable exposure limits for Austria.

How exposure limits are determined

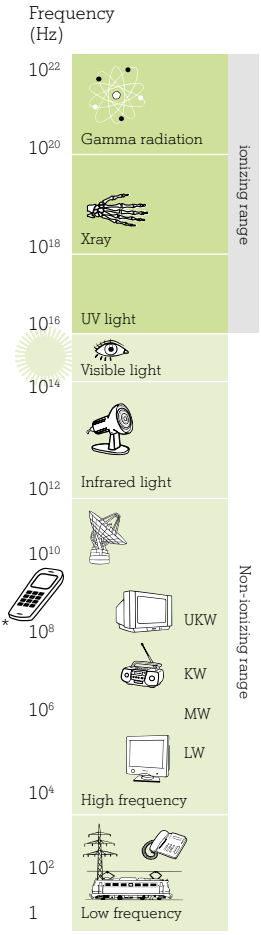
To protect our health, the international scientific organization ICNIRP checks scientific studies and issues recommendations for limit values. Many national and international professional bodies, as well as the WHO, the EU and Austria, depend on these limits.



How we protect you

Radio applications have been in use for over 100 years. For the same length of time, scientists have studied the effects of radio waves. Safety concepts were created whose aim was to keep the effect on humans as low as possible. This basically affects all wireless applications. The limit values by the Independent Commission on Non-Ionizing Radiation Protection (ICNIRP) take into account all previous scientific findings and effects of radio waves and thus form the basis for legal limit value regulations. The World Health Organization (WHO), the European Union and numerous expert committees depend on the limit values issued by the ICNIRP exposure limits, and these are also valid in Austria. These serve to protect people. Protecting people is also the top priority for A1.

WHO Fact Sheet No. 193, June 2011:
"A large number of studies have been performed over the last two decades to assess whether mobile phones pose a potential health risk. To date, no adverse health effects have been established as being caused by mobile phone use."



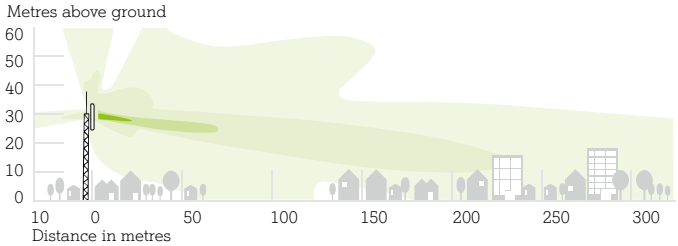
*Frequency spectrum 800, 900, 1,800, 2,100 and 2,600 MHz of mobile phones

Health protection thanks to exposure limits

WHO limit values are in use in Austria to protect the health of people. The 50-fold safety factor for these limit values also guarantees sufficient safety for the elderly and children. Nevertheless, there are always demands for lower limit values despite a lack of scientific evidence. Therefore, most of the national and international institutions depend on scientifically based limit values by WHO. The Austrian legislator also relies on this scientific basis and thus such limits are binding for A1.

WHO limit values in ÖVE/ÖNORM E 8850	
At 800 MHz (LTE)	4 W/m²
At 900 MHz (GSM)	4.5 W/m²
At 1,800 MHz (GSM)	9 W/m²
Over 2,000 MHz (UMTS, LTE)	10 W/m²

From a distance of about 2–8 metres, these limit values fall below the regulation. Access to this area is not public.



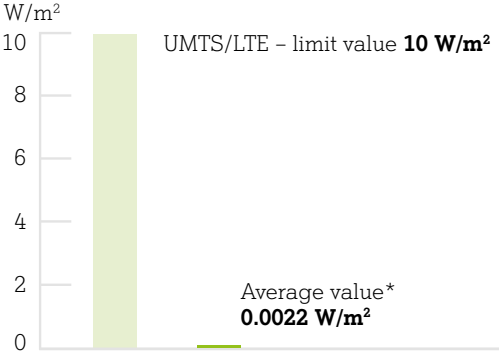
Propagation effects of radio waves

What we adhere to

To be sure that the applicable WHO exposure limit values are adhered to, the Telecommunications Authority carries out regular measurements with regards to exposure of radio applications. Checks are also carried out with regards to the exposure (radio waves at a particular location) of base stations.

BMVIT test series
To gain an overview of exposure across Austria, the Federal Ministry for the Transport, Innovation and Technology (BMVIT) is carrying out a comprehensive series of measurements throughout Austria.

During these 2012 tests, TÜV checked 92 measuring points in 50 Austrian municipalities. The current measurement results are reassuring: All mobile phone values are well below the applicable limit values. The exposure for UMTS alone require a max. 0.022% of the limit value – and are therefore 4,500 times lower.



Result of the measuring series by Federal Ministry for Transport, Innovation and technology for the UMTS-frequency ranges

Exposure Limits for mobile phones

The SAR value

The value of the specific absorption rate (SAR) indicates to what extent the transmitting power of the mobile phone is absorbed by the body. Different SAR values are measured depending on whether the whole person or just the head area is considered.

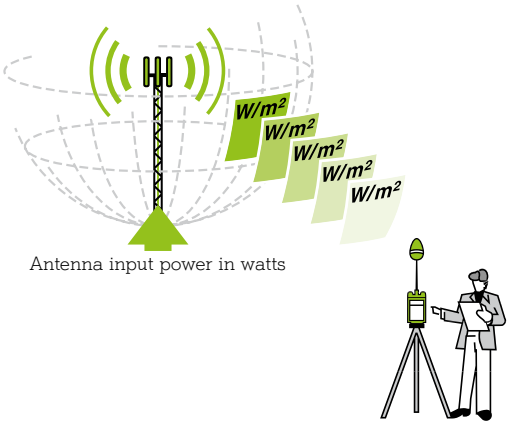
The SAR limit value for mobile phones of 2 W/kg ensures that you can call around the clock without any health effects. According to EN 50360, the SAR limit must be adhered to by all mobile phones.

If the distance between mobile phone and base station increases, so too do the emissions.

Low SAR values do not automatically mean greater safety when making calls. Rather, it depends on how far away the nearest base station is from the mobile phone. The better the connection between a mobile phone and a base station, the less energy the phone needs. Therefore, a well-developed mobile network means lower exposure when making calls.

What are emissions?

Emissions (radio waves at a particular location) can be calculated either using technology or can be measured directly on site. The result of emission monitoring, called the power flux density (S), is expressed in watts per square meter (W/m^2).



A1 adheres to the prescribed limit values for all mobile phone equipment. These values fall significantly below the limit values at a distance of about 2–8 metres away from the antenna. Access to this area is, therefore, denied to the public.

Due to varying call volumes, the exposure at a base station depend on local and daily fluctuations. The more the mobile phone network is used, the higher the total exposure.

Measuring emissions

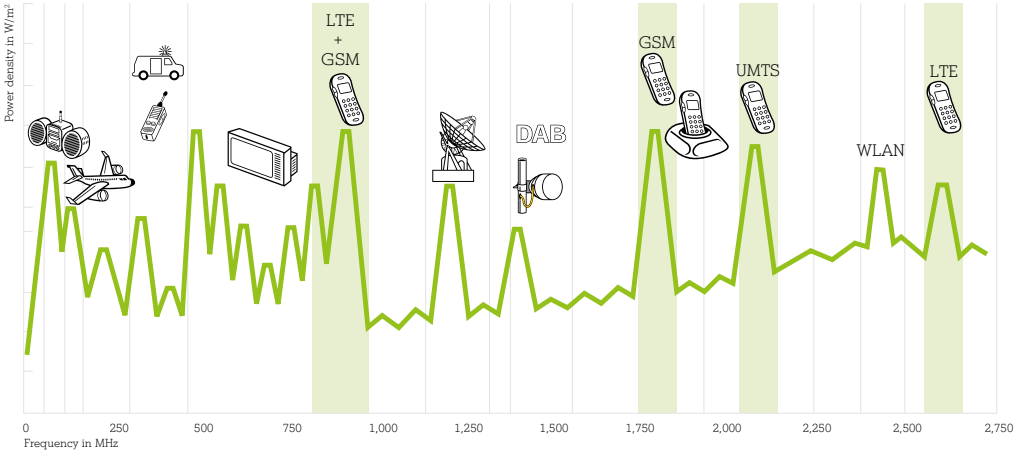
We prove and measure

The mobile communication systems of A1 are continuously checked. These checks are done by measuring existing exposure.

A portion of the exposure in the air come from other radio applications such as radio and TV stations, radar installations and even energy-saving lamps. Radio waves can vary greatly depending on location and over a period of time.

It is therefore important to determine exactly where and how to measure them.

The results of measurement is a value in watts per square meter (W/m^2), which is then compared to the permissible exposure limits.



Measuring results of an exposure measurement

The measuring methods for a result that is as accurate as possible

Broadband measurement
This method checks to see the sum of the exposure of all wireless applications – from radio to aircraft radio to mobile phones.

Frequency-selective measurement
The exposure of a single base station can be measured specifically in a certain frequency range.

Code-selective measurement
This measurement method is used in UMTS technology to measure the exposure of a UMTS mobile phone system. For this purpose, the signal of the base station is decrypted and the emissions are allocated to the respective base station.

Selective LTE measurement
The exposure of individual base stations can be found using LTE. The signalling channels are measured and their emissions are projected to the maximum transmitting power of the base station.

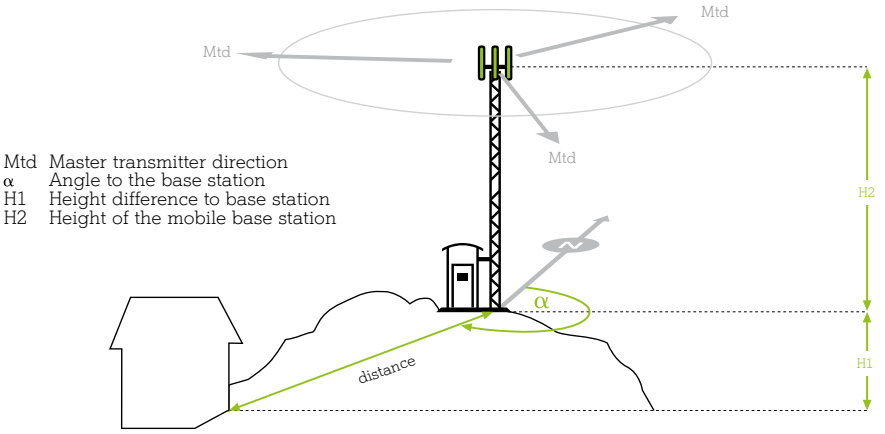
Exposure in Austria

You may well be wondering what the exposure is like in comparable cities. To answer this question, the Federal Ministry for Transport, Innovation and Technology commissions TÜV to carry out test series all over Austria.

TÜV measurement, 2012
The current measurement results are reassuring: All mobile phone values are well below the applicable limit values.

Calculating exposure

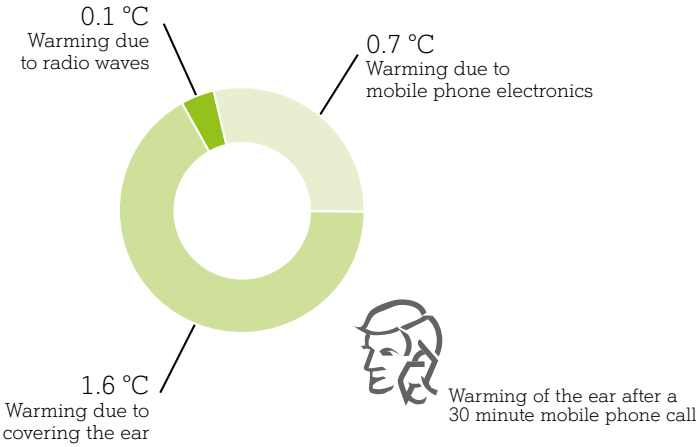
Using calculations it is already possible to provide details of expected exposure prior to the construction of a base station. The results of exposure calculations show the exposure during maximum possible use of the base station, which rarely occur in practice. Therefore, calculations usually overestimate the exposure. Previously calculated values are rarely reached when measurements are carried out.



Effects of radio waves

Electromagnetic fields are everywhere. The sun, for example, produces on our skin a feeling of warmth, and mobile phones also produce a thermal effect. In order to protect us all, there are internationally agreed exposure limits for radio waves. Phones must not exceed the maximum SAR value of 2 watts per kilogram of body weight. This ensures that the ear is not warmed by more than 0.1 °C when making a call. These limit values for using a mobile phone ensure that there are no health effects when making calls, even around the clock.

Often the heating by radio waves is equated to heat around the ear area when making calls – but this assumption is wrong. As studies about making mobile phone calls have shown, most of the warming is caused by covering the ear and only a fraction is caused by heat from radio waves.



What science states

Whether electromagnetic fields can lead to a health risk is a central question for science. A lot of research in this area has been carried out since the 1960s. Science observes the interaction between man and radio waves today in a much more sophisticated way and knowledge is growing steadily.

In Austria there is an independent multidisciplinary committee of experts, the Scientific Radio Advisory (WBF), who act as an advisory body to the Federal Ministry of Transport, Innovation and Technology.

During the WBF Experts Forum 2013, Austrian and international professionals from various specialist disciplines analysed a total of 105 scientific papers on "Mobile Telecommunications and Health". They came to the conclusion that there is no immediate danger to health if there is compliance to the exposure limits.

The expert panel of the European Commission's SCENIHR (Scientific Committee for Emerging and Newly Identified Health Risks) was commissioned to conduct a study about potential risks of electromagnetic fields. The result: There is no evidence of health risks from high frequency fields.

The updated 193 fact sheet by the World Health Organization points out that there is no consistent evidence of adverse health effects due to mobile phone radiation.

The valid WHO limit values, which are also in use in Austria, are regularly checked during scientific research evaluation. All studies are evaluated according to a set of criteria.
The five key questions for the evaluation are:

- Is there proof of a biological effect on humans or animals?
- Is the effect caused by the mobile phones?
- Is there a health effect?
- Can you identify a threshold value above which an effect occurs?
- Has the effect been confirmed by other research groups?

Mobile communication and pacemakers

Modern pacemakers must be constructed in such a way that they cannot suffer interference from radio waves emitted by other devices. International standards are applied on the basis of Directive 90/385/EEC, which ensures the protection of people with electronic implants.
To make calls with a mobile phone, a connection between a base station and the mobile phone is made. For each call, the mobile phone and base station send and receive radio signals.
In rare cases, the mobile phone can cause interference to the pacemaker. A study by the University of Cologne has shown that only 2 % of 200 investigated pacemakers were impaired due to interference from mobile phones. At distances of more than two inches between mobile phone and pacemaker no interference was detectable for any of the tested pacemakers.

The interference to the pacemaker by base stations is virtually non-existent due to the distance to the base station. A fault would only be possible if one was directly in front of a base station antenna – but this area is not accessible to the public.

Ask your doctor for advice regarding the interference immunity for your implant. As interference to pacemakers can not be completely ruled out, a distance of 25 centimeters between the pacemaker and the phone is recommended. Therefore, the mobile phone should not be put into the breast pocket.
If you follow these precautions, even people with cardiac pacemakers can safely use mobile phones.

No persons with pacemakers

Areas with a pacemaker ban should not be entered by people who have a pacemaker.

Media protection for children and teenagers: using mobile phones and the internet safely

For years, A1 has been campaigning for safe and responsible mobile phone and internet use by children and adolescents. Since 2006, A1 cooperates with "Saferinternet.at" and offers free internet safety training with "A1 Internet for all". Information and practical assistance from emergency calls to cost control are included in the A1 internet guide. A1 is a signatory of the Mobile Phone Children Code of Conduct which complies with common standards regarding the protection of minors.

What can I do as a parent to protect my child from inappropriate and unacceptable content?

- Be present with your child when he/she surfs the internet on the smartphone for the first time.
- Have your child's contract mobile phone locked for inappropriate content.
- Consider the option to block Premium text messaging and Value-Added text messaging.
- Let your child show you how he/she uses the mobile phone – he/she can also show you phone functions you may not know. Your child will love being the expert!
- Secret checks may lead to a breach of trust. Do not forget that your child has a right to privacy too!
- In the event of unsuitable or inappropriate content, it is advisable that you store incriminating text messages or voicemail messages with date and time to safeguard evidence for the police.
- Instruct your child to download apps only from the official app stores.
  Apps are checked before they are listed in the apps store or they are removed once significant complaints have been made (even from a mobile phone).

With children, it's often just to enable children and parents to contact each other. The mobile phone serves as a communication tool to simplify your life and to inform parents so they know where their children are. The mobile phone also brings more safety, especially in remote areas of Austria, where mobile phones are often the only way to make an emergency call.

For more information:
a1internetfüralle.at
saferinternet.at

FAQs

Who checks compliance with these exposure limits in Austria?
The limit values for radio waves are checked by the Telecommunications Authority in cases of suspected violation. In addition, A1 regularly checks its own base stations.

Are children also protected by the exposure limits?
The limit values of the ÖVE/ÖNORM E 8850 provide an additional safety cushion for the protection of children and the sick or elderly. This applies both for base stations as well as mobile phones, which are rigorously tested for compliance with the limit values.

Why are base stations located in populated areas?
Mobile phone antennas are needed where the majority of mobile users reside. The more developed the mobile network, the lower the exposure of mobile phones and base stations.

What is the actual SAR value?
The specific absorption rate SAR indicates how much of the transmitting power of the mobile phones is absorbed by the body when making a call. The SAR of a mobile phone is determined by the maximum technically possible mobile phone transmitting power. The maximum permissible SAR value of 2 W/kg for mobile phones ensures that you can make calls around the clock without any harmful effects on your health. According to EN 50360, the SAR limit for mobile phones has to be adhered to.

Is the specified SAR value of my mobile phone ever reached?
During a call, mobile phone and base station automatically work with the lowest possible transmitting power. Therefore, this value is rarely reached.

Are there any long-term health effects?
The scientific evidence regarding the effects of mobile communications is comprehensive thanks to intensive research. The resulting limit values protect us against harmful effects. The international science community expects that this will not change in future.

Is there a law in Austria regarding radio systems and health?

The Telecommunications Act § 73 (2) is to do with the protection of life and people's health.

Why is the ear warmed when making a call?

The heating of the ear is caused by covering most of the outer ear. This effect is produced whenever the ear is covered by an object. Mobile electronics contribute to the warming while making a call. Only an insignificantly small part of the warming is caused by radio waves themselves (see illustration on page 12).

What are emissions in mobile communication?

Emissions are radio waves at a particular location and can be accurately calculated and measured. The results, however, are always an estimate since exposure can vary depending on the time of day and location.

How are exposure calculations made and who carries them out?

With the technical data of a transmitter plant (antenna input power in watts, location, etc.), it is possible to calculate the exposure – even as projections. As a developer of a system, A1 carries out exposure calculations, free of charge, so you can be sure from the beginning that the limits are indeed being met.

Are exposure calculations reliable?

The current technical base station data during maximum transmitting power is used for the exposure calculation. The technical data can be adapted to an increase in call volume over time. At night, or when fewer calls are being made, only a fraction of these emissions actually arises.

Who carries out the exposure measurements?

Mobile phone measurements are demanding with regards to the measuring devices used. They are very sensitive and can detect exposure accurately and evaluate them. These instruments are very expensive to purchase. In addition to the EMF-Team at A1, there are three state-certified institutes which can carry out such measurements. Please note that measurements must always be carried out according to the applicable industry standards.

What kind of measurements are available?

Exposure can be measured at broadband frequency, frequency selective or code selective. A broadband measurement measures the exposure of all radio applications. The frequency-selective measurement shows the exposure of a particular base station. The code-selective measurement shows the exposure of a UMTS or LTE base station.

What happens with the measured values?

The values of power density are compared with the exposure limit values by the World Health Organization and the ÖVE/ÖNORM E 8850 to ensure that the values are not exceeded. These limit values are binding for all Austrian mobile phone operators.

What do the measurement results depend on?

A measurement shows the exposure at a certain time in a certain place. The exposure from mobile equipment has to be filtered out, because in addition to mobile communications, radio, TV and other radio applications are responsible for the exposure. The values can vary. They are related to the utilization of a base station, other radio applications, the terrain and other factors.

What are the costs of exposure measurements?

A1 uses the same instruments for exposure measurements as state-certified institutions. These measurements and evaluations are very expensive. A1 undertakes these measurements free of charge as a service provision. After every measurement, the EMF-Team hands over a payment slip as a voluntary donation to Doctors Without Borders.

The EMF-Team is happy to answer your questions:

Email: emf@A1.net
Phone.: 050 664-0

Further information can be found at:

A1.net/gesundheit
A1.net

TAG-EMF:
www.telekomaustria.com/en/csr/emf

World Health Organisation:
www.who.int/peh-emf/en

International Commission on
Non-Ionizing Radiation Protection:
www.icnirp.de

Register of all public broadcast- and mobile base stations in Austria:
www.senderkataster.at

Forum Mobilkommunikation:
www.fmk.at/en

Federal Ministry for the Transport, Innovation and Technology:
www.bmvit.gv.at

EMF portal (of the) Research center for Bioelectromagnetic Interaction:
www.emf-portal.de

Accredited Testing Institutes:
www.seibersdorf-laboratories.at/home/emc-optics.html
www.tgm.ac.at
www.tuev.or.at

Scientific Radio Advisory:
www.wbf.or.at

Saferinternet.at:
www.saferinternet.at

Mobile communication test series:
www.messwerte.fmk.at

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