



SAR Compliance

The SAR value¹ is a measure of the amount of RF power absorbed by the body when using a mobile phone. Exposure limits have been set by expert scientists and provide for substantial margins of safety.

For regulatory compliance testing, SAR is measured under laboratory conditions according to measurement standards which prescribe the testing positions and all operational characteristics of the mobile phone including the maximum transmit power. Current devices often utilize proximity sensors that must be properly engaged during the testing. Suitable test modes and testing methodology generally require codes or information provided by the device manufacturer. In the United States, compliance testing is undertaken according to the requirements enforced by the Federal Communications Commission.

The SAR values reported for each model of mobile phone significantly overstate real-life exposure levels because the applicable test standards are very conservative². In reality, devices operate at significantly lower power levels, adapting constantly to use the minimum power required to make and receive a call, in order to maximize battery life.

Several studies^{3,4} of mobile phones in everyday use, have shown that when talking on a mobile phone while walking around a major city or inside city buildings, smartphones typically operate at a small fraction of the phones maximum power output. In a study by Wiart et. al. the researchers observed that 90% of all the collected measurements, including those taken indoors and outdoors, were less than 4dBm (0.0025 watt) which is about 1% of the maximum transmit power. As a result, they concluded:

The real exposure due to mobile phones in terms of Specific Absorption rate (SAR) is well below (100 times below) the normative values given at the maximum powers.

Similar results have also been found in a study looking at typical power levels of 4G devices⁵.

Current science-based RF exposure standards specify the SAR limits for wireless communication devices such as mobile phones, which incorporate safety factors to ensure that all users, including for example children, pregnant women and seniors, can safely use these devices.

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¹ SAR stands for Specific Absorption Rate. Detailed information on SAR can be found at <http://www.sartick.com>

² www.mmfa.info/docs/eng/111025_MMF_Viewpoint_SARSAMconservativeness_final.pdf

³ See for example, Persson et al., Output power distributions of terminals in a 3G mobile communication network *Bioelectromagnetics.*, Vol. 33, Pg. 320 - 325, 2012

⁴ Wiart et.al. Exposure induced by WCDMA Mobile Phones in Operating Networks, *IEEE Trans on wireless communications* vol 8 No 12 2009

⁵ P. Joshi, D. Colombi, B. Thors, L. E. Larsson and C. Törnevik, "Output Power Levels of 4G User Equipment and Implications on Realistic RF EMF Exposure Assessments," in *IEEE Access*, vol. 5, no., pp. 4545-4550, 2017. doi: 10.1109/ACCESS.2017.2682422