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## **Adaptive 5G antennas lead to threshold violations**

It is repeatedly claimed that 5G does not differ significantly from previous mobile phone generations apart from the higher capacities. This is not correct. **With the introduction of the 5th generation of mobile communications (5G), a new type of antenna will additionally be used: adaptive antennas or antennas with beamforming (“beam bundling”).** Conventional antennas radiate the mobile radio signal evenly in a wide angle of e.g. 120° (circular sector). Therefore, three antenna segments offset by 120° from each other are often found on mobile radio masts in order to achieve a circular and uniform radiation of the signal in all directions.

Adaptive antennas, on the other hand, have a strongly bundled radiation characteristic, comparable to a sharp laser beam. The beam is mobile and can change its direction within milliseconds and follow the mobile user. The background to this new technology is the higher frequencies used in 5G: These have a much shorter range, which is why technical tricks must be used to counteract this physical law. The crucial point, however, is that at the same time the transmission power must be markedly increased so that this elaborate new technology is of any use at all. But the threshold values are already exhausted with conventional antennas. So what can be done?

The mobile communications industry and the authorities are being inventive; instead of maximum values, average values shall apply from now on. In Switzerland, for example, the Federal Council confirmed a maximum correction factor of 10 in a media release<sup>1)</sup> dated December 17, 2021. **Thus, adaptive antennas may radiate up to 10 times stronger than the limit values would actually allow.** In the future, the limit value only has to be complied with by the 6-minute average value. This is as if, in a 30 km/h zone, only the average speed, not the maximum speed, were to apply. Accelerating briefly to 300 km/h

would therefore be tolerated, provided that the average speed of 30 km/h was maintained for 6 minutes. **What are the authorities thinking of, irresponsibly loosening the level of protection during the Corona pandemic of all times? Especially when innumerable studies already clearly show the adverse health effects of mobile phone radiation? And this is even far below the official limits ...** (See e.g. the contributions of The World Foundation for Natural Science Clear correlation between 5G and Covid-19<sup>2</sup>); *Animals and plants under stress from radiation*<sup>3</sup>); *How the fifth generation wireless standard 5G contributes to the corona pandemic*<sup>4</sup>); *Is mobile communication unhealthy?*<sup>5</sup>)

This hidden increase of thresholds is all the more questionable because in the past years, requests for an increase of thresholds have been rejected twice by the Swiss Council of States and, according to a survey from last year, more than 60 percent of the population do not feel sufficiently protected even with today's limits.<sup>6</sup>)



To make matters worse, **the radiation from adaptive antennas cannot be measured at all.** The extremely short-term variability of transmission power and radiation angle prevents acceptance measurements as well as independent control measurements during operation. Although mobile network operators and authorities assure that such measurements are possible, the actual radio signal with which the data is transmitted is not measured, only the uniformly transmitting auxiliary signal that is needed, for example, to establish a connection. Using information from the antenna operator on the current operating state, the radiation strength of the radio signal is afterwards extrapolated. This is an extremely imprecise procedure, which completely disregards

reflections, for example on house walls, or the overlapping of different data beams. Of course, it is also highly problematic that the “measurement results” always depend on information provided by the antenna operator, so **independent measurements are impossible**. The resulting measurements are neither objective nor complete. They are based on various assumptions (one could also speak of estimates) and are a de facto **theoretical calculation rather than a reliable and accurate measurement**. An analogy for this would be at a speed check, the policeman would have to ask the driver how fast he actually was going. It is therefore not surprising that measurement experiments at the Technical University of Aachen (RWTH Aachen), for example, showed **enormous deviations between the actual radiation of adaptive antennas and the projection forecasts**. The real radiation values were in some cases four times higher than the calculated value! For this reason, the university came to the conclusion **that previous measurement methods were not suitable for the new adaptive 5G antennas**.<sup>7)</sup>

To appease the public, the Swiss authorities cite the existing quality assurance system (QA). In principle, this system compares the current operating parameters of an antenna with the specifications in the corresponding building permit once a day, which is supposed to immediately detect limit value violations. However, the system has already never really worked for conventional antennas, as stated in a 2019 Swiss Federal Court ruling.<sup>8)</sup> Indeed, 8 out of 14 antennas inspected were found to have defects that had not been detected by the quality assurance system.

It gives the impression that the authorities to a large extent do not (want to) yet realize the seriousness of the situation. However, all avoidance tactics and fighting- **in the end, there is no way around getting to the source of the real causes for the constant increase in chronic diseases**. The fact that electromagnetic radiation from mobile phone antennas, smartphones or WLAN routers plays a major role in this will at some point no longer be able to be ignored.

# References

- 1 Media release available only in German, Italian or French language under link <https://www.admin.ch/gov/de/start/dokumentation/medienmitteilungen.msg-id-86469.html>
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- 3 <https://www.naturalscience.org/publications/animals-and-plants-under-stress-from-radiation/>
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- 5 <https://www.naturalscience.org/publications/is-mobile-communication-unhealthy/>
- 6 ETH Zurich: Swiss Environmental Panel. Fifth survey wave: 5G (survey period: May – July 2020), Link: <https://www.research-collection.ethz.ch/handle/20.500.11850/478738>
- 7 Massive MIMO antennas – Impact on Compliance Distances and Challenges for Human Exposure Assessment, RWTH Aachen, Thomas Kopacz, 2019
- 8 Ruling of Swiss Federal Court No. 1C\_97/2018 of September 3rd, 2019. Available only in German, Italian or French language under link [https://www.bger.ch/ext/eurospider/live/de/php/aza/http/index.php?lang=de&type=highlight\\_simple\\_query&page=1&from\\_date=&to\\_date=&sort=relevance&insertion\\_date=&top\\_subcollection\\_aza=all&query\\_words=1C\\_97%2F2018&rank=1&azaclir=aza&highlight\\_docid=aza%3A%2F%2F03-09-2019-1C\\_97-2018&number\\_of\\_ranks=2](https://www.bger.ch/ext/eurospider/live/de/php/aza/http/index.php?lang=de&type=highlight_simple_query&page=1&from_date=&to_date=&sort=relevance&insertion_date=&top_subcollection_aza=all&query_words=1C_97%2F2018&rank=1&azaclir=aza&highlight_docid=aza%3A%2F%2F03-09-2019-1C_97-2018&number_of_ranks=2)

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