Tree Damage
Caused by Radiofrequency Radiation

Key Observations from 2005 to 2025 in Germany

Cornelia Waldmann-Selsam

This book is dedicated to those harmed by radiofrequency radiation.

Title image: Forchheim, train station, maple tree 2015

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Contents

Preface to the Expanded Second Edition

Since its publication in May 2022, the rate of tree damage has continued to increase rapidly. Because tree damage also occurs near bodies of water, drought cannot be the sole reason of this increase. To ensure traffic safety, continuous tree maintenance and felling are necessary. Nevertheless, branches have broken off and trees have fallen in countless places, not only during storms and heavy rain but also in calm weather (p. 237). Some fallen oak and beech trees had almost no roots. People were injured. In Würzburg, the Steiger Forest, the Rhön Mountains, Neuruppin, and at Behler Lake, people have died from falling trees. Individual hiking trails and bike paths have been temporarily or permanently closed (p. 248). On February 9, 2024, a ban on traveling on the Franconian Saale River was issued in the district of Bad Kissingen for a distance of 62 km (38.5 mi) because the many damaged riparian trees posed a hazard.

A large number of antennas were added to many mobile phone base stations. The six base stations listed below are an example of this (for examples from Kassel and Lübeck, see p. 9):

Bamberg, Schildstraße 81, police station, No. 670448:	from **6** antennas (2010) to **63** antennas (2025)
Berlin, Carillon, south of the Federal Chancellery, No. 012134:	from **11** antennas (2012) to **76** antennas (2022)
Neuherberg, east of the Federal Office for Radiation Protection, No. 530459:	from **30** antennas (2019) to **63** antennas (2024)
Kassel, botanical garden, No. 240723:	from **15** antennas (2017) to **36** antennas (2024)
Kälberberg near Bamberg, No. 671168:	from **16** antennas (2020) to **48** antennas + others (2024)
Rosengarten-Uttenhofen, No. 770306:	from **6** antennas (2006) to **42** antennas (2025)

Tree damage around these mobile phone base stations had been occurring for years. For example, damage to trees near the Federal Office for Radiation Protection in Neuherberg was documented as early as 2006.

In 2015, as part of our study, "Radiofrequency Radiation Injures Trees Around Mobile Phone Base Stations," we measured an average of **2,000 µW/m²** on the damaged sides of the crowns of 60 trees**.**

Since 2021, radiofrequency (RF) radiation levels have dramatically increased due to the expansion and retrofitting of mobile phone base stations in many cities. Currently, power density measurements often range **from 5,000 to 100,000 µW/m².** In some places, values between 100,000 and 500,000 µW/m² have been recorded (see Kassel on p. 10). In Hamburg, on Steintordamm, the value was over 2,500,000 µW/m².

The six examples below illustrate the increase in measured values:

Scheibenberg (Erzgebirge Mountains), Pfarrstraße:	from **300 µW/m²** in 2007 to **34,100 µW/m²** in 2024
Hallstadt, Lichtenfelser Straße:	from **7,500 µW/m²** in 2008 to **500,000 µW/m²** in 2024
Würzburg, court garden, northern part:	from **1,730 µW/m²** in 2011 to **38,900 µW/m²** in 2025
Bamberg, Hain playground:	from **1,000 µW/m²** in 2014 to **9,000 µW/m²** in 2024
Garmisch-Partenkirchen, train station:	from **8,150** µW/m² in 2015 to **77,300** µW/m² in 2022
Kassel, botanical garden:	from **13,580 µW/m²** in 2017 to **320,000 µW/m²** in 2024

Extremely dry and hot weather occurred during the same years that new signal types, such as LTE, LTE Advanced, 5G, DVB-T2, and DAB+, were introduced, along with denser networks of base stations. These developments made it difficult to recognize the harmful effects of RF radiation. Scientists and specialist authorities attributed tree and forest damage solely to water shortages and high temperatures. **Thus far, the possible influence of RF radiation exposure has not been considered.**

However, **strong evidence** of the effects of radio frequency (RF) radiation on trees has been documented since 2005. These effects include crown damage starting on one side of the tree and differences between the upper and lower crown areas (p. 93); growing horizontally rather than upward (p. 101); differences within a row of trees (p. 109); damage to climate-resilient species (p. 197); forest damage in the Alpine foothills, despite no decrease in precipitation; and damage to shore areas exposed to RF radiation (p. 118). The damage to the eastern shore of the Mettnau Peninsula in Radolfzell, for example, can be seen in a series of photos of the district of Konstanz on Google Street View. Tree damage in historic parks occurred long before hot, dry periods (p. 138).

However, healthy trees can still be found in areas with low levels of RF radiation (p. 135).

Premature reddening of wild vines under RF radiation exposure is a visible sign of its influence on leaf metabolism (p. 221). Since 2004, various research groups have demonstrated effects on plant germination, growth, and cell metabolism in numerous laboratory studies (see www.emfdata.org/en for examples). Knowing the locations of mobile phone base stations is important for recognizing the connection between RF radiation exposure and tree damage. For this reason, the documentation includes several maps showing the locations and main beam directions of the sector antennas.

A new chapter has been added about base stations that have been expanded despite the occurrence of illnesses in humans and animals, as well as tree damage, since 1997. These locations include Schnaitsee, Gaildorf-Kieselberg, Weilersbach, Steinbach-Hallenberg, Oettingen in Bavaria, Rosengarten, Burgheim, and Memmelsdorf, among others. For 30 years, the relevant authorities have claimed that people cannot become ill from base station radiation below current exposure limits. They argue that people develop symptoms out of concern and fear.
However, the damage caused by radiofrequency electromagnetic fields is visible on the trees.

In 2024, a new mobile phone base station began operating in Uffing am Staffelsee, among other locations. An aerial photograph taken before the base station began operating shows the area's original condition. Investigations of the tree population should start immediately here, as well as at other new base stations.

The "Nordische Baumtage" [Nordic Tree Days], an annual conference for tree experts from government agencies, specialty firms, planning offices, and tree nurseries, included the topic "A Suspicious Observation: Damage to Trees Caused by Radiofrequency Radiation" in its June 2025 program. The response to my presentation was encouraging, showing great interest and shock. "We had a lot of damage to trees that we couldn't explain. However, we had not considered the possibility of an influence from mobile phone base stations. Your presentation was a real eye-opener for me." Since experts from many cities and districts participated in this conference, the information can now be widely shared.
Extensive documentation on tree damage, including beech trees, is available for several cities and districts. These documents are available upon request.

We cannot live without trees.

Fuldatal, October 2025, Cornelia Waldmann-Selsam

Observations of trees in the vicinity of over 1,500 mobile phone base stations from 2005 to 2025 suggest a causal relationship between radiofrequency (RF) radiation exposure and tree damage. Damage was also found in the radiofrequency fields of transmitters for digital television, digital radio, and BOS digital radio.
This collection shows examples of the documented changes and damage.

Below is a brief history of the observations made by the Bamberg Appeal, a doctors' initiative. After the appeal was published in 2004 – in which 130 doctors warned against expanding mobile phone networks – many residents living near mobile phone base stations contacted the initiative for help with health issues. We visited affected individuals at home, documented their symptoms, and took RF radiation measurements.
During these visits, the affected individuals showed us that the changes and damage to the trees usually started around the same time as their symptoms appeared. Conifers, deciduous trees, and shrubs were all affected.

Of particular concern was the unilateral crown damage that began on the side of the tree facing the mobile phone base station. There was also a contrast between the damaged trees in front of the house, which had a direct line of sight to the base station, and the healthy trees behind the house, which did not.

The health of trees can be affected by heat, drought, frost, soil composition, sealing, salt spreading, air and soil pollutants, and pests. However, these factors do not explain crown damage that starts on one side of a tree or damage found near bodies of water.
We asked various tree experts for advice. We asked, “What causes should be considered for crown damage starting on one side?”
The experts cited root damage caused by civil engineering work on one side. Based on their experience, they were unaware of any other potential causes. Only industrial emissions could be considered a possible influence in the vicinity of industrial facilities.
In May 2006, the head of a city parks department said the following during a conversation: "For the past two to three years, vitality disorders have occurred that I cannot explain." This prompted us to investigate.

Dr. H. Eger, Dipl.-Ing. F. Mayerhofer, Dr.-Ing. Dipl.-Phys. V. Schorpp, Dipl.-Met. W. Sönning (certified meteorologist), and I compiled references on the effects of electromagnetic fields on plants. We were overwhelmed by the amount of existing knowledge on the subject. In 1916, Professor Dr. J. Zenneck, a physicist at the Technical University of Munich, described how a water jet can act as an antenna that receives and transmits radiofrequency electromagnetic waves. About 1920, communications engineers discovered that trees act as receiving antennas for radio waves. For example, a tall poplar tree enabled radio reception from the Eiffel Tower, despite being located 300 km (186 mi) away.

About 1950, researchers Brauer, Harte, and Kiepenheuer from the Institute for Forest Botany at the University of Freiburg studied the biological effects of ultrashort waves (with a wavelength of 1.5 m / 4.9 ft) on plant growth. They discovered that the division growth of horse beans increased significantly with extremely weak field strengths and decreased with stronger ones. Since there was no heating, the researchers concluded that a non-thermal, physiological effect occurred in cells at the weakest radiation intensities. Studies on the effects of ultrashort waves on meiosis in evening primrose pollen mother cells revealed that low field strengths (1.5 V/m) and brief exposure periods (15 min) act as potent mutagenic agents. These effects occurred well below current exposure limits.

In the 1980s, Dr.-Ing. W. Volkrodt, an electrical engineer and physicist, documented forest damage caused by microwave, radio, and television transmitters at 32 locations. These sites ranged from Feldberg Mountain in the Black Forest to Würmberg and Brocken mountains in the Harz Mountains.

In 1985, Dr. A. Bernatzky, a renowned expert in tree preservation, nature conservation, and garden architecture, first observed crown damage on the transmitter side in areas influenced by television repeater stations. Dr. Bernatzky worked for the city administration of Frankfurt and the regional councils of Wiesbaden and Darmstadt. In 1994, he published information on electromagnetic field spectra and microwave radio in the textbook *Baumkunde und Baumpflege* [Tree Ecology and Preservation]. The book included research reports and illustrations of engineer Ermer's observations and shielding experiments.

In 2000, a summary of the study "Studies on the Effects of Radiofrequency Fields on Conifers" was published. Scientists from the universities of Wuppertal and Karlsruhe examined 451 one-year-old seedlings from three conifer species. From October 1999 to May 2000, the plants were exposed to a pulsed 383 MHz frequency corresponding to the TETRA signal. The plants were watered as needed. Accelerated growth was observed in Pinus pumila, as well as a reduction in the chlorophyll a/b ratio. There were significantly more dead plants among the exposed groups of all three species of conifers. Neither this study nor a second study from 2001, which also found effects on conifer seedlings, has been published to date. Nevertheless, a comprehensive network of TETRA base stations has been set up for the BOS digital radio network (for authorities and organizations with safety- and security-related tasks).

Since 2004, various research groups have conducted over 200 laboratory experiments investigating the effects of radiofrequency electromagnetic fields, such as those used in mobile phone networks, on plants. These experiments revealed that germination, root and shoot growth, morphology, cell membranes, and cell metabolism were affected.

Our study was prompted by research results and observations dating back to 1930 as well as observed tree damage. We spent years documenting trees and taking RF radiation measurements.
We found evidence of RF radiation-related tree damage near every mobile phone base station we visited.
This collection shows a few examples.

EMF Database of the German Federal Network Agency (BNetzA)

In Germany, site certificates for mobile phone base stations are available on the Federal Network Agency's EMF database. These certificates provide information on the installation height of antennas, the number and main beam directions of sector antennas, the number of omnidirectional antennas, and the number of other transmitters, including those for radio, television, BOS digital radio, and private mobile radio. A site certificate also specifies the safety distance in the main beam direction and the vertical safety distance. The date of issue reflects the most recent status of a base station's expansion. https://www.bundesnetzagentur.de/DE/Vportal/TK/Funktechnik/EMF/start.html

EMF database: map of the city center of Bamberg (accessed in November 2024). Two locations marked in yellow were added:
Left: Mußstraße 1 (concert hall of the Bamberg Symphony Orchestra)
Right: Heinrichsdamm 1

Mußstraße 1, Concert Hall

Site Certificate No.: 671468 **Date of Issue:** 16 JUL 2010

Antenna	Installation height above ground (m)	Main beam direction in °	Safety distance in m	Vertical safety distance in m
Mobile network	24.5	10.000	5.80	1.20
Mobile network	24.5	10.000	4.92	0.98
Mobile network	24.5	130.000	5.80	1.20
Mobile network	24.5	130.000	4.92	0.98
Mobile network	24.5	250.000	4.92	0.98
Mobile network	24.5	250.000	5.80	1.20

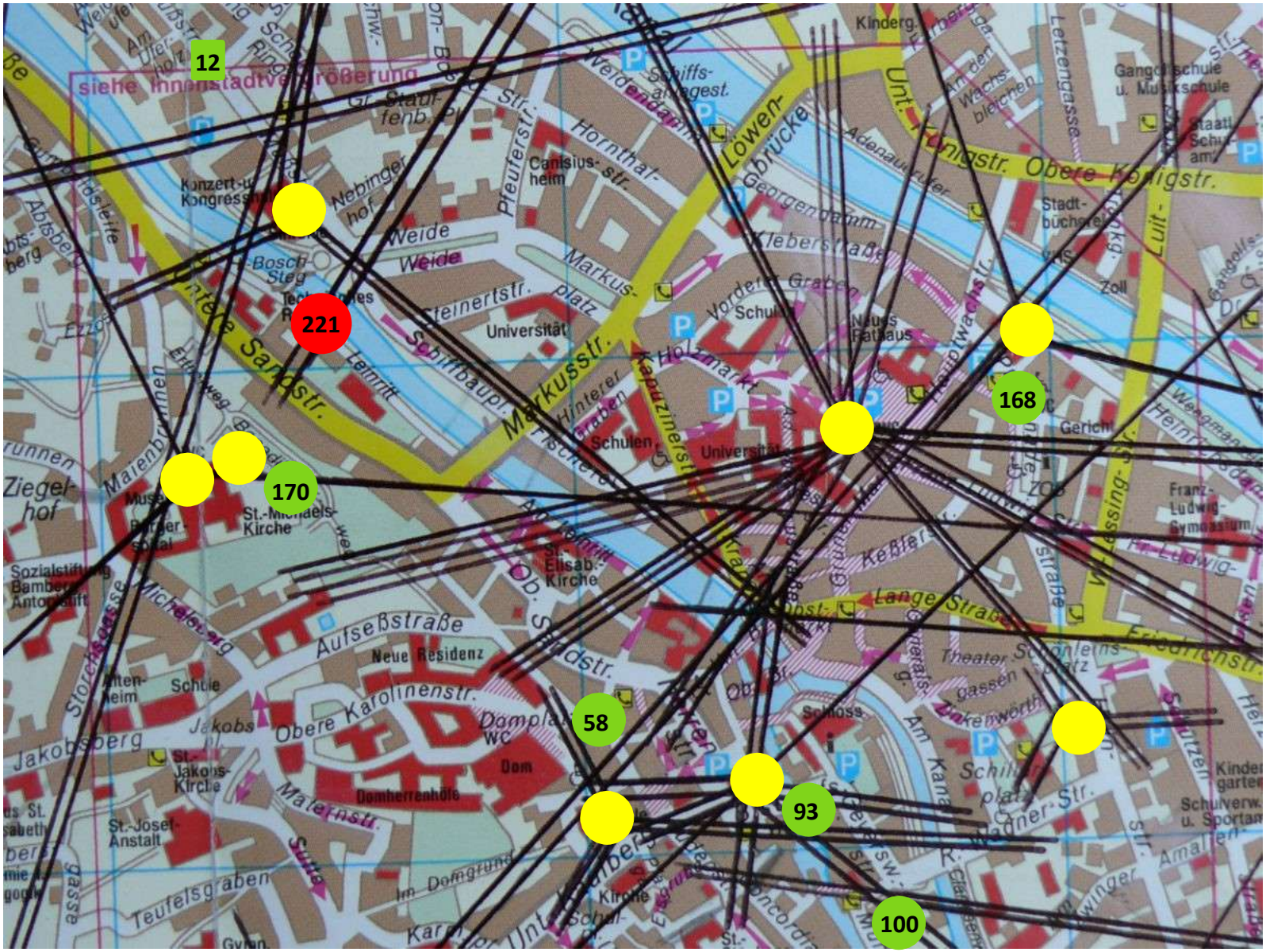
Heinrichsdamm 1

Site Certificate No.: 670394 **Date of Issue:** 14 JAN 2005

Antenna	Installation height above ground (m)	Main beam direction in °	Safety distance in m	Vertical safety distance in m
Mobile network	23.7	105	4.73	0.28
Mobile network	23.7	225	4.73	0.28
Mobile network	23.7	345	4.73	0.28

Two examples of site certificates from a search of the EMF Database in March 2011: Mußstraße 1 (concert hall) and Heinrichsdamm 1

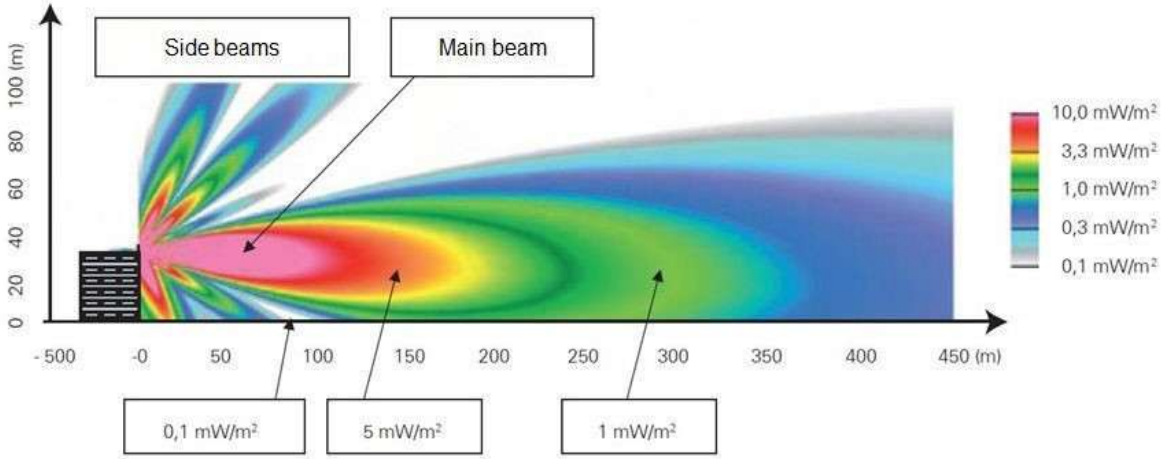
Bamberg



Section of the Bamberg city map by Städte-Verlag. Added items: location of mobile phone base stations (yellow) with the main beam directions of the sector antennas **(as of 2011)**, location of listed trees (green) with page numbers.

Vertical and horizontal beam patterns of mobile phone sector antennas include a main beam and side lobes.

Typical mobile phone base station with three sector antennas and a microwave radio



The simulation shows the radiated power distribution of a mobile phone antenna. In addition to the main beam, which covers the far range, side lobes appear at specific angles.
Source: LfU

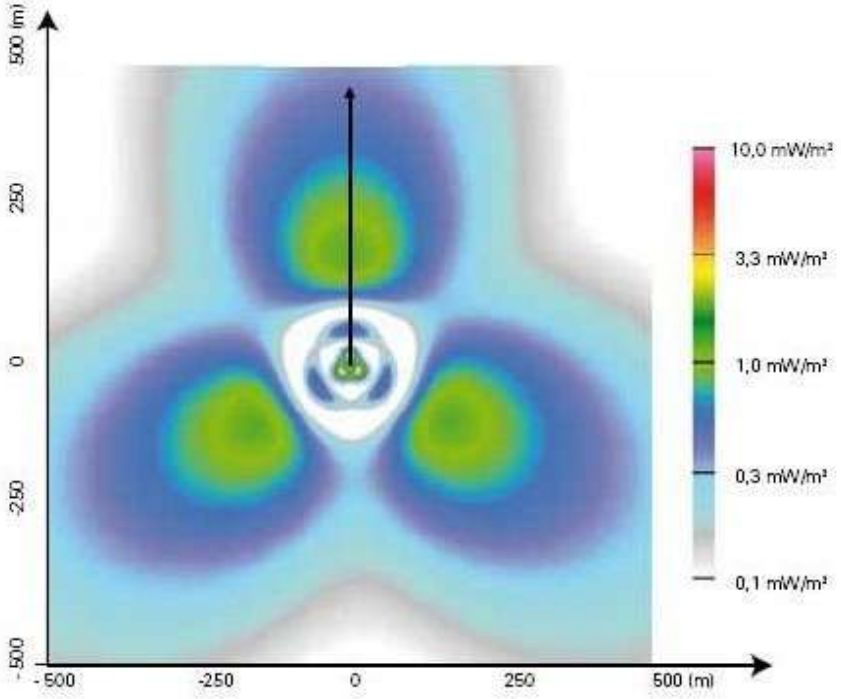
Vertical beam pattern of a sector antenna

This illustration is from “Elektromagnetische Felder im Alltag” [Electromagnetic Fields in Daily Life], a 2009 publication by the Bavarian and Baden-Württemberg ministries of the environment (Bayerisches Landesamt für Umwelt and Landesanstalt für Umwelt Baden-Würrtemberg).

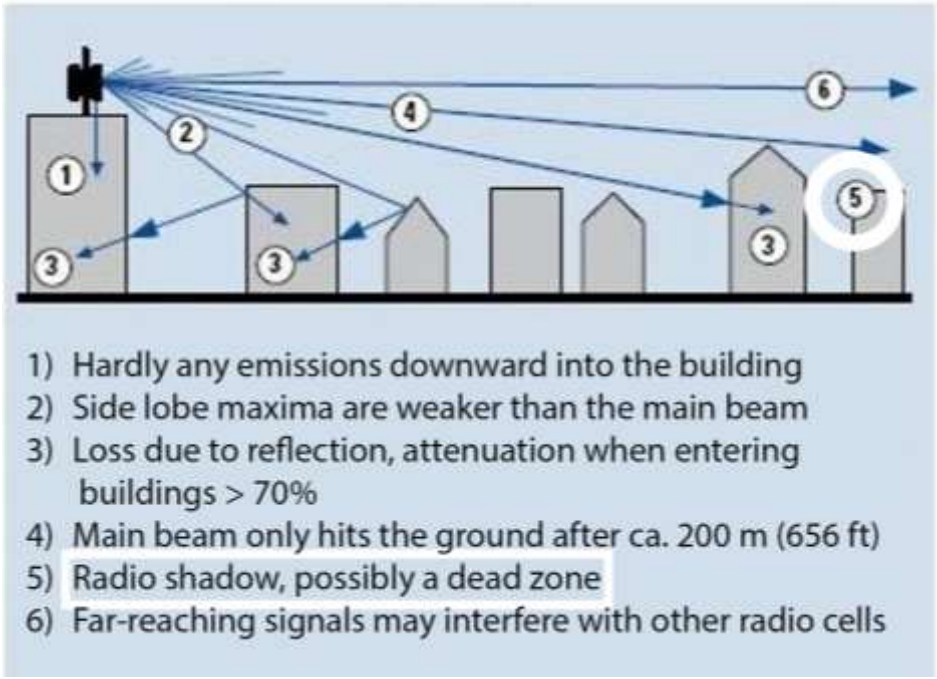
There are areas of low RF radiation exposure below the main beam and between the side lobes.

A sector antenna typically covers an area of 120 degrees. Most antennas for the BOS digital radio network radiate in all directions. **The uneven distribution of radiated power in the radiofrequency field is caused by focused beams, as well as by the reflection, diffraction, scattering, interference, and attenuation of buildings and trees.** This may explain why trees near mobile phone base stations are damaged to varying degrees.

The 5G mobile communications standard, introduced in 2019, is more complex. For more detailed information, see: https://baubiologie.de/wissen/baubiologie-magazin/elektrosmog-radioaktivitaet-licht/5g-in-fuenf-kapiteln-2/ (as of February 29, 2024) or https://baubiologie.de/wissen/baubiologie-magazin/english-articles/5g-a-building-biology-perspective/ (as of December 4, 2019).
Experience has shown that exposure to RF radiation has increased significantly since the installation of 5G antennas.



Horizontal beam pattern of a sector antenna



Radio wave propagation paths, Figure 4 from "Mobilfunk," published by the Bavarian State Ministry of the Environment, Health and Consumer Protection, January 2007. The white markings have been added.

After 3G UMTS (Universal Mobile Telecommunications System) base stations were introduced in 2003, a new type of tree damage spread quickly across Europe, even at low field strengths. This shows that field strength alone does not determine the effects on plants. Laboratory experiments have shown that plant reactions vary according to frequency, bandwidth, pulse sequence, modulation, polarization, field strength, and exposure duration. Since every molecule contains charges, it can be influenced by electromagnetic fields, which can alter its function.

Life on Earth has evolved in the presence of naturally occurring electromagnetic fields and waves. Technically generated electromagnetic fields can disrupt genetic, biochemical, and physiological processes in humans, animals, and plants.

Testing equipment

Until 2021, the broadband RF Analyzer HF59B (27 MHz – 3.3 GHz) from Gigahertz Solutions was used. Since then, the Safe and Sound Pro II RF Meter (200 MHz – 8 GHz) from Safe Living Technologies has been used instead. The measured values given are peak or maximum values. Measurements taken between 2006 and 2012 showed that damage often occurred at values below 500 µW/m².

Expansion of mobile phone base stations in Kassel

In 2017, site certificates for 80 mobile phone base stations were retrieved from the Federal Network Agency's EMF database after observing damage to trees in Kassel. The locations were marked on a city map according to the main beam directions of the sector antennas. Later, the site certificates for the districts of Marbachshöhe, Brasselsberg, Kirchditmold, Harleshausen, and Philippinenhof were retrieved. A renewed search in June 2025 revealed that several base station sites had expanded significantly.

Sixteen Examples

Number	Address	Year	**Number Antennas**	Year	**Number Antennas**
240611	Obere Königstr. 8, city hall	2016	**21**	2023	**42**
240636	Obere Königstr. 3	2012	**17**	2023	**52**
241668	Murhardstr. 16	2016	**5**	2021	**21**
240719	Tannenwäldchen	2017	**27**	2025	**39**
240723	Stadtgärtnerei (municipal parks department)	2015	**9**	2018	**36**
241547	Bosestr. 1	2014	**3**	2018	**18**
240592	TÜV, Knorrstr.	2016	**18**	2024	**27**
240646	Wilhelmshöhe train station, West	2017	**3**	2019	**15**
241229	Im Druseltal 1	2015	**7**	2024	**58**
240633	Hunrodstr. 1	2015	**20**	2025	**36**
240044	Wilhelmshöher Allee, Hessischer Rundfunk	2014	**21**	2025	**45**
240972	Marbachshöhe, Wilhelmine-Halberstadt-Str. 1	2022	**24**	2025	**30**
241251	Brasselsberg, Wald, Höhe Schwarzer Weg	2020	**24**	2025	**30**
241372	A 7/ Eichwald	2013	**12**	2023	**39**
240629	Mönchebergstr. 50	2017	**21**	2020	**33**
240105	Habichtswald Radio Tower	2018	**10**	2022	**27**
	Total number of antennas		**242**		**548**

Expansion of mobile phone base stations in Lübeck between September 2022 and June 2025

In preparation for a visit with a lecture and tour in Lübeck from September 6 to 8, 2022, 51 site certificates for Lübeck were retrieved from the Federal Network Agency's EMF database. Then, they were marked on a city map according to the main beam directions of the sector antennas. A renewed search in June 2025 revealed that several base station sites had expanded significantly.

Thirteen Examples

Number	Address	**Accessed 2022**	**Number Antennas**	**Accessed 2025**	**Number Antennas**
320677	Konrad-Adenauer-Str. 6	03/15/21	**21**	08/27/24	**36**
320548	Fackenburger Allee 2	02/04/19	**15**	04/15/24	**36**
320047	Schüsselbuden/Braunstr.	05/04/21	**24**	06/18/24	**36**
320400	Possehlstr. 4	03/24/22	**No data**	11/06/24	**36**
320729	Hüxstraße, parking garage	11/15/21	**36**	11/05/24	**48**
320127	Schevenborg 1, near Marlistr.	03/23/22	**No data**	06/30/23	**78**
320385	Travemünder Allee	07/12/22	**48**	07/03/23	**63**
320530	Schlutup, Palinger Weg	11/09/21	**30**	11/15/24	**48**
320691	Hagebuttenweg	09/07/18	**18**	04/22/25	**54**
320290	Kirschallee	02/15/19	**8**	21.10.24	**18**
320264	Siedlung Wulfseck, Sternenring	12/19/22	**66**	05/29/24	**75**
320245	St. Jakobi Church	05/24/22	**12**	06/08/23	**21**
87012114	Hospital, near Ratzeburger Allee	06/14/19	**12**	06/26/25	**21**
	Total number of antennas		**311 + x**		**570**

In 2015, the average measurement on the damaged sides of 60 trees in Bamberg and Hallstadt was about **2,000 µW/m².** These measurements were taken using a telescopic rod as part of a study titled "Radiofrequency Radiation Injures Trees Around Mobile Phone Base Stations.“
Since 2021, **measured power density levels have increased significantly due to the expansion and retrofitting of mobile phone base stations** in many cities. Values **between 5,000 and 300,000 µW/m²** are now being measured in areas with numerous base stations.

The following table lists measurement examples of high levels of power density, above 10,000 µW/m², and low levels of power density, below 50 µW/m², which were taken in Kassel between 2021 and 2025.

Measurement location	Measurement	Measurement location	Measurement
Friedrichsplatz, Fridericianum	163,000 µW/m²	Kurhessentherme, entrance	96,500 µW/m²
Brüder-Grimm-Platz, near state museum	114,000 µW/m²	Habichtswaldklinik	10,700 µW/m²
Murhardpark, beach trees	11,000 µW/m²	Schlosspark 8, Schlosshotel	145,000 µW/m²
Wilhelmshöher Allee 5	123,000 µW/m²	Kurhausstraße/Brabanter Straße	19,900 µW/m²
Frankfurter Straße, Justice Center	145,000 µW/m²	Vogelsbergstraße	106,000 µW/m²
Königstor 2	104,000 µW/m²	Hunrodstraße, Höhe Schulgarten	55,000 µW/m²
Königstorschule, schoolyard	18,800 µW/m²	Ringaustraße	13,700 µW/m²
Luisenschule, schoolyard	55,000 µW/m²	Baunsbergstraße	25,400 µW/m²
Friedrich-Ebert-Straße/Goethestraße	145,000 µW/m²	Konrad-Adenauer-Straße, hospice	12,000 µW/m²
Goethestraße 16	96,500 µW/m²	Konrad-Adenauer-Straße/Kuhbergstraße	20,000 µW/m²
Orangerie, Küchenpavillon	24,000 µW/m²	Brasselsbergstraße	10,000 µW/m²
Weserstraße/Kurt-Wolters-Straße	60,000 µW/m²	Blindenheim, Eschebergstraße	46,000 µW/m²
Mönchebergstraße 48	47,700 µW/m²	Marbachshöhe, Ludwigstraße	183,000 µW/m²
Mönchebergstr., playground, south of hospital	61,800 µW/m²	Forstfeld, Windhukstraße/Steinigkstraße	22,300 µW/m²
Ihringshäuser Straße 204	280,000 µW/m²	Eschenstruther Weg, nursing home, green space	60,700 µW/m²
Schlehenweg 17	98,000 µW/m²	Eschenstruther Weg/ Steinbruchweg	366,000 µW/m²
Höheweg 5, north, with line of sight	40,000 µW/m²	Heidenkopfstraße, north, with line of sight	145,000 µW/m²
Philippinenhöfer Weg/Schwedenweg	36,800 µW/m²	Waldau, Vautswiesenweg	70,000 µW/m²
Wiener Straße/ Struthbachweg	33,500 µW/m²	TÜV, Knorrstraße	264,000 µW/m²
Botanical Garden, entrance	94,000 µW/m²	Forstfeld, Wißmannstraße	30 µW/m²
Botanical garden, redwood	320,000 µW/m²	Art College, southeast side	13 µW/m²
Raiffeisenstraße, parking lot	26,000 µW/m²	Rückertraße, community gardens	5 µW/m²
Frankfurter Straße, Leuschnerstraße bus stop	286,000 µW/m²	Courtyard between Arnimstr. and Brentanostr.	40 µW/m²
Vitosklinik, Psychiatry and Psychotherapy, yard	15,100 µW/m²	Hafenstraße 12	29 µW/m²

For these exploratory measurements, the Safe and Sound Pro II RF Meter (200 MHz – 8 GHz) was used. In the above table, the power density values are maximum (peak hold) values, expressed in microwatts per square meter (µW/m²).

Contrast between Radio Shadow and Radiofrequency (RF) Radiation Exposure

Figure 172: Tree damage caused by electromagnetic waves. The trees in front of the building are dying because they are exposed to electromagnetic waves emitted by the transmitter (right). Those in the shade of the building remain undisturbed (left). However, the branches above the roofline are dying because the building does not shield them. (Illustration: Bernatzky)

This illustration is from the expanded fifth edition of the 1994 textbook *Baumkunde und Baumpflege* [Tree Ecology and Preservation], published by Bernhard Thalacker Verlag.

Dipl. hort. Dr. phil. nat. Aloys Bernatzky – a garden architect, an expert in tree preservation and nature conservation, and a pioneer in urban ecology – made these observations within the radiofrequency field of radio and television transmitters.
Since 2005, we have observed this phenomenon in areas surrounding every mobile phone base station we have visited.

06 OCT 2010 Intersection of Schlüsselstraße and Mußstraße. Hornbeam trees (view from the northwest). The mobile phone base station on the concert hall emits RF radiation from the south, which is 190–230 m (630–755 ft) away. The measured values were **300 µW/m²** on the right (Mußstraße), where there was a line of sight to the base station, and **10 µW/m²** on the left (Schlüsselstraße), where there was no line of sight to the base station due to buildings.

Bamberg 2015

28 OCT 2015 Intersection of Schlüsselstraße and Mußstraße. Hornbeam trees (view from the northwest). The hornbeam trees on Mußstraße were removed due to growth abnormalities. Many trees near the base station of the concert hall were damaged, including those by the Regnitz River. Nevertheless, the number of antennas was increased from 6 to 21 in January 2015.

Erlangen, 2010–2013

RF radiation exposure

14 OCT 2010 Hindenburgstraße. Birch tree (view from the west)

Radio shadow

13 OCT 2010 Östliche Stadtmauer-straße. Birch tree (view from the north). The building provides shielding.

RF radiation exposure

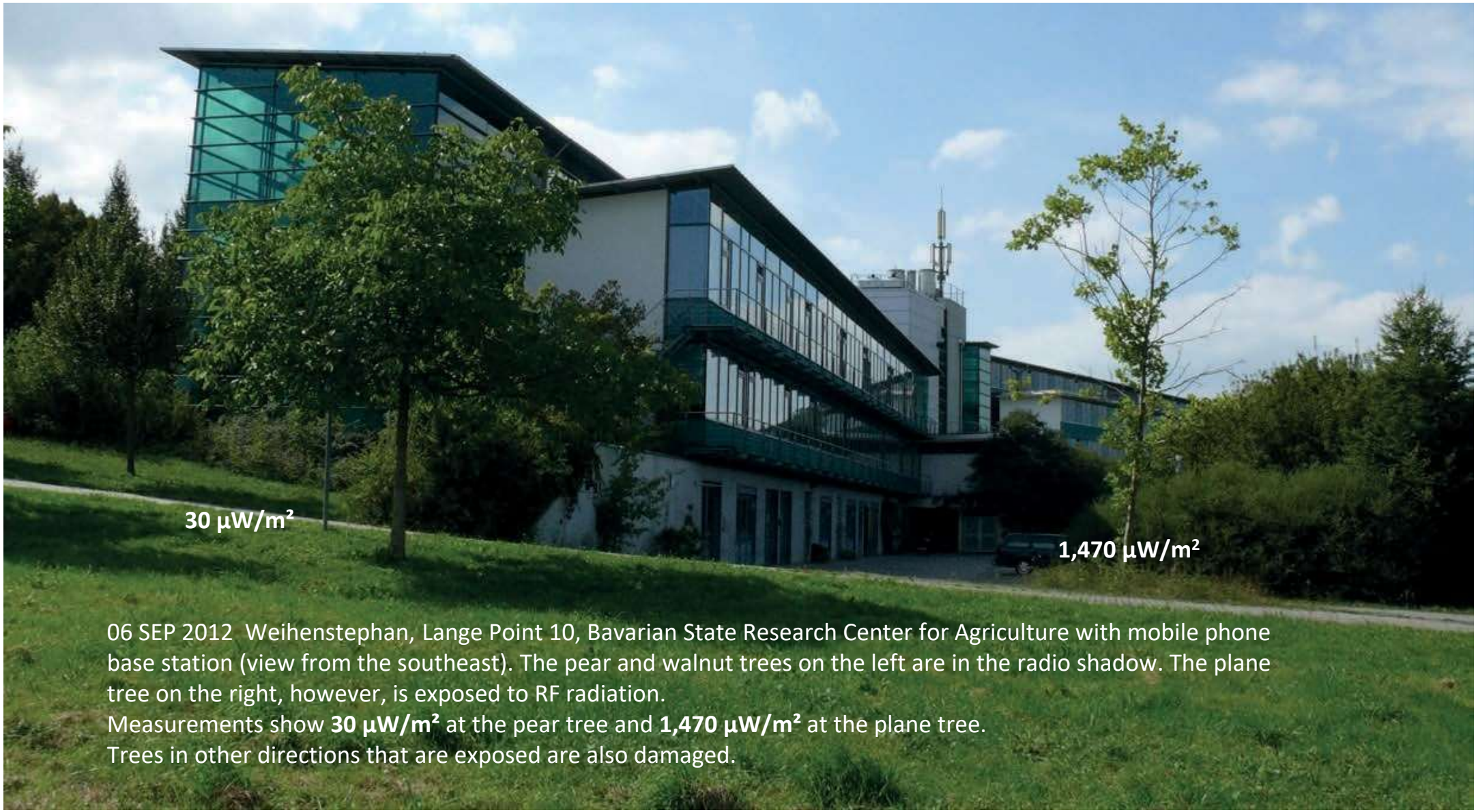
05 AUG 2013 Hindenburgstraße. Birch tree (view from the west). The top part of the tree is dead. **The birch tree was cut down in 2015**.

Radio shadow

05 AUG 2013 Östliche Stadtmauer-straße. Birch tree (view from the north). The birch tree stands in the radio shadow of buildings and is thriving.

The birch trees were photographed at the intersection of Hindenburgstraße and Östliche Stadtmauerstraße. Both trees were located in front gardens. The difference was very noticeable.

Weihenstephan, 2012



06 SEP 2012 Weihenstephan, Lange Point 10, Bavarian State Research Center for Agriculture with mobile phone base station (view from the southeast). The pear and walnut trees on the left are in the radio shadow. The plane tree on the right, however, is exposed to RF radiation.
Measurements show **30 µW/m²** at the pear tree and **1,470 µW/m²** at the plane tree.
Trees in other directions that are exposed are also damaged.

Iggingen, District of Ostalbkreis, 2012

24 JUL 2012 Iggingen. Two cherry trees (view from the west). The cherry tree on the right is shielded from RF radiation by the tree on the left and the hut. The distance to the base station is about 1 km (0.6 mi). Measurement at the tree on the left: **48 µW/m²**

Göttingen, 2023

13 JUN 2023 St. Johannis Church. Linden trees (view from the north). Measurement with line of sight to the base station: **10,000 µW/m²**

Freiburg, 2023

25 JUL 2023 Eisenbahnstraße. Row of chestnut trees (view from the north).
The chestnut trees on the left and right are in the radio shadow of buildings. They have dense and green foliage. There is a direct line of sight from the middle chestnut tree to mobile phone base station No. 260214 at Bertoldstr. 43. This chestnut tree has already been pruned. Its leaves turned brown in July.

Kassel, Forstfeld District, 2024

Radio shadow

15 AUG 2024 Ochshäuser Straße. Maple tree in the radio shadow of buildings (view from the north). Measurement: **30 µW/m²**

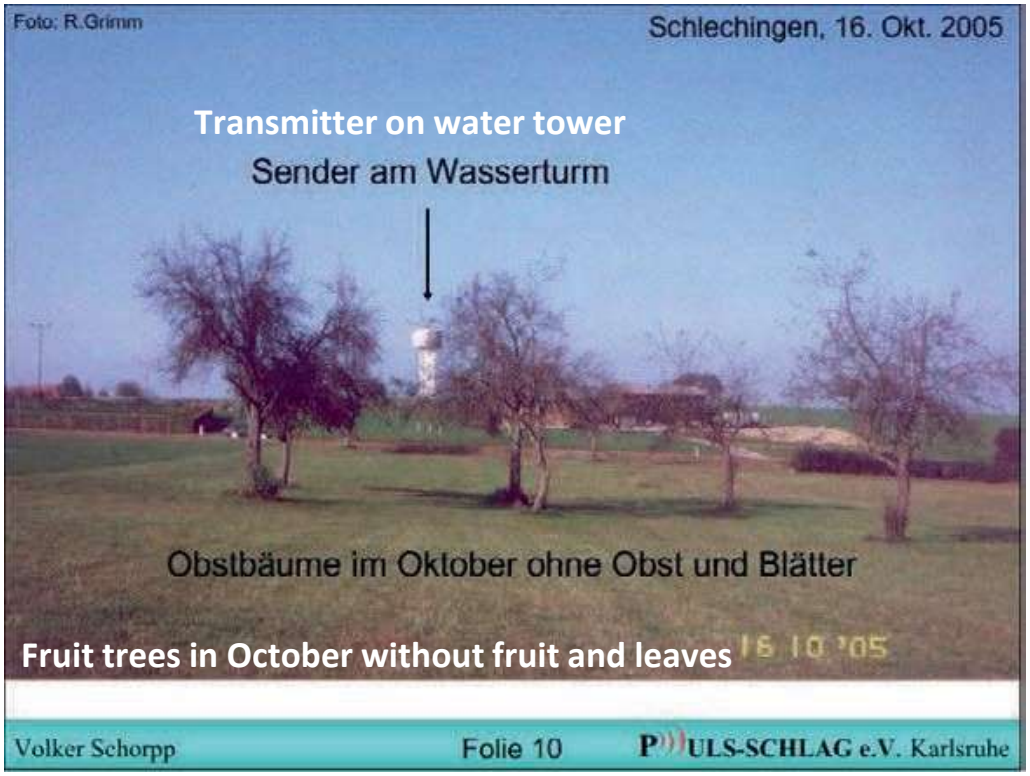
RF radiation exposure

15 AUG 2024 Heinrich-Steul-Straße. Exposed maple tree (view from the east), planted in 1984 as part of the documenta Project "7000 OAKS.“ Measurement: **3,600 µW/m²**

These two maple trees are in the same residential area.

Schechingen and Laubach in the Ostalbkreis District, 2005

Area with high RF radiation levels



Fruit trees **with** a direct line of sight to a mobile phone base station

Area with low RF radiation levels

Fruit trees **without** a direct line of sight to a mobile phone base station

In a given case, late frost, trunk and root damage, site conditions, and pests must all be considered. Starting in 2000, Rolf and Rosa Grimm systematically visited and photographed the condition of trees near all mobile phone base stations in their area. They found damaged trees or forests near every base station. Conversely, they found healthy trees in areas with low ambient RF radiation levels and no direct line of sight to a base station.
Dr.-Ing. Dipl.-Phys. Volker Schorpp presented these images at the Federal Office for Radiation Protection workshop on August 2, 2006 (see p. 22).

Syke, 2023

Area with high RF radiation levels

05 SEP 2023 Heiligenfelde district. Katsura tree (view from the southwest). Site certificate from December 20, 2022: installation height 29–37 m (95–121 ft), 45 sector antennas, BOS digital radio, 3 other transmitters.
Measurement on the east side of the street: **7,520 µW/m²**

Area with low RF radiation levels

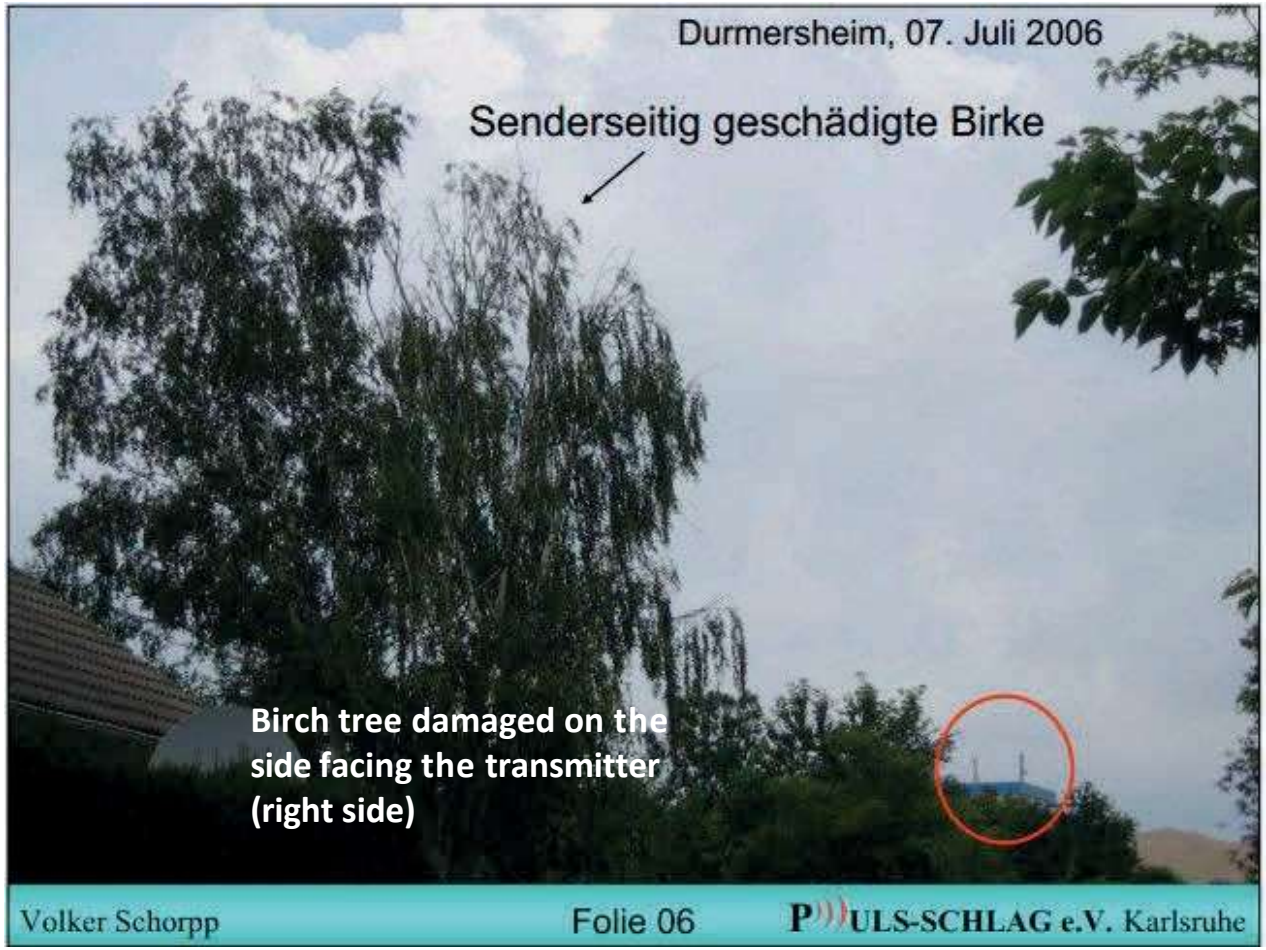
29 OCT 2023 1.9 km (1.2 mi) east of Heiligenfelde (view from the northwest). The beech trees are slightly lower than the mobile phone base station. This means there is no line of sight.
Measurement: **10 µW/m²**

Crown Damage That Starts on One Side in Individual Trees and Pairs of Trees

We found crown damage on all four sides of the trees: the north, south, east, and west. On the side facing the transmitters, the leaves turned yellow or brown prematurely and began falling off as early as June. In subsequent years, the crowns became increasingly sparse on the side facing the transmitter. The outer branches died off. The damage progressed from the outside to the inside. The opposite side, facing away from the transmitter, often remained intact for many years because incident radiation is attenuated by leaves or needles. RF radiation is absorbed and scattered. Depending on the transmitter's distance and height, initially, either parts of a tree's crown or entire sides are damaged. We documented the development of many trees over several years, often until they were cut down. Nowadays, I usually only show one picture from each time series.

04 JUN 2015 Bamberg, Berliner Ring. Maple tree No. 3 in Group 1 from the study “Radiofrequency Radiation Injures Trees Around Mobile Phone Base Stations.” Measurements were carried out using the broadband RF Analyzer HF59B with the omnidirectional antenna UBB27_G3 (27–3300 MHz) from Gigahertz Solutions. In 2021, we also began using the Safe and Sound Pro II RF Meter (200 MHz – 8 GHz) from Safe Living Technologies. For this study, we often took measurements at a height of 6 m (20 ft) using a telescopic rod.

2006



On August 2, 2006, **Volker Schorpp, a physicist and electrical engineering PhD**, presented this image in a short talk at the "Gesundheitliche Auswirkungen der elektromagnetischen Felder des Mobilfunk – Befundberichte" **[Health Effects of Radiofrequency Electromagnetic Fields From Mobile Phone Base Stations – Case Reports] workshop of the German Federal Office for Radiation Protection** in Oberschleissheim/ Neuherberg. Schorpp provided evidence of a causal link between tree and forest damage and chronic exposure to RF radiation from sources such as mobile phone base stations, radar, microwave radio systems, and terrestrial radio and television transmitters.

His 2006 and 2011 presentations, as well as his research, are available at: http://www.puls-schlag.org/dr-volker-schorpp.htm

Six doctors submitted documents detailing their observations of the adverse effects of RF radiation on a large number of people.
https://www.emf-forschungsprogramm.de/veranstaltungen/protokoll_fallbeispiele_111206.html

The first three examples were documented by people affected by RF radiation.

Munich, 2006

Photo: E. Weber

Munich, mobile phone base station at Von-Kahr-Straße 61.
Conifer (view from the west) at the intersection of Zwiedineckstraße and August-Horch-Straße

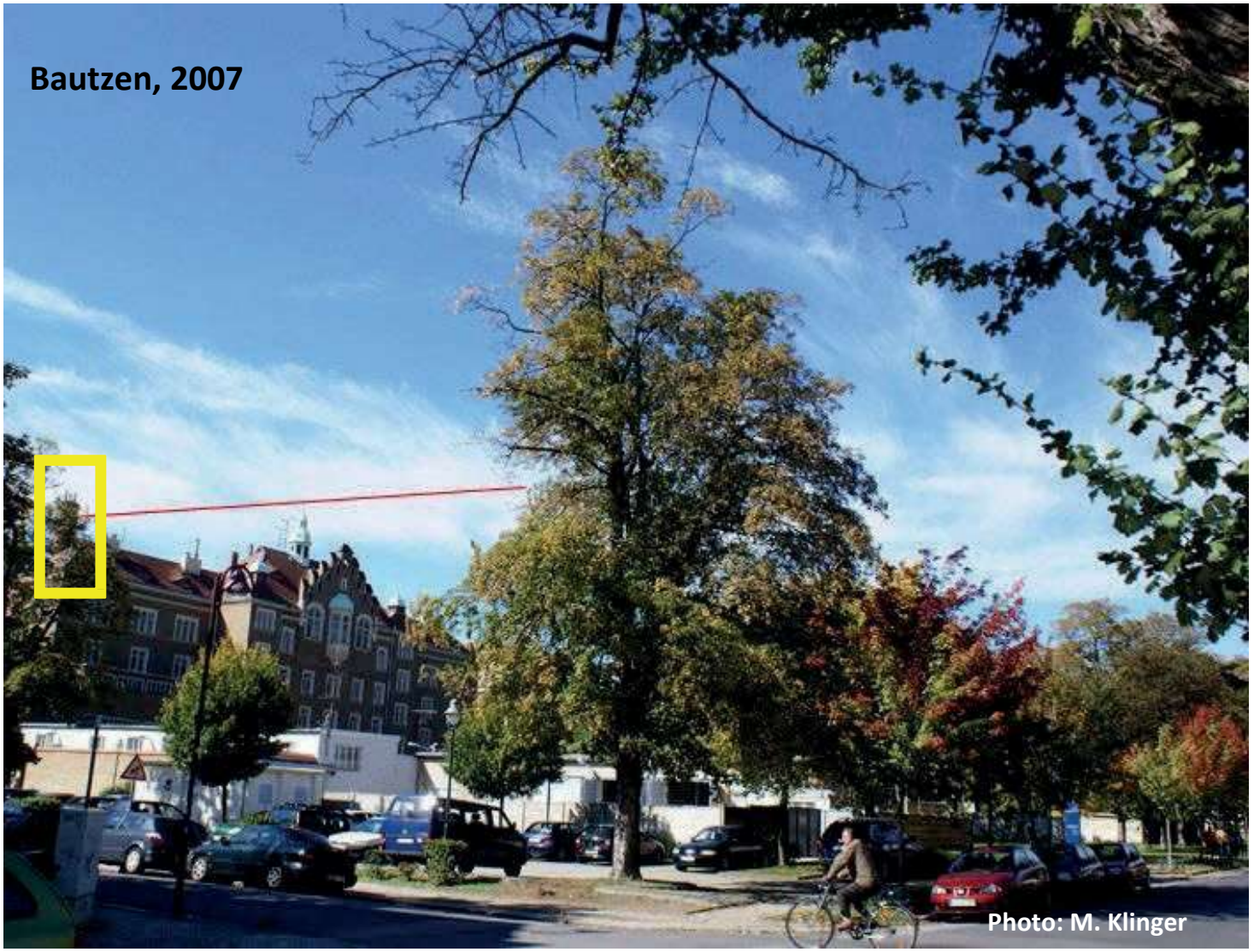
Distance to transmitter:
95 m / 312 ft

2001 Start of operation of the mobile phone base station

2004 SEP Addition of 3G UMTS antennas

2005 JUN The apple tree in the garden of local resident E. Weber started losing a lot of leaves. Soon, other trees in her neighborhood began to look the same. She documented the numerous trees showing noticeable damage with photos (see p. 167).

A mobile phone base station is mounted at the courthouse chimney.



The IT administrator at the office of the Bautzen district attorney took a photo of the linden tree located in the line of sight of the chimney at the Bautzen courthouse.

Schwarzenbach am Wald-Straßdorf, Nailaer Straße. Two sycamore trees (view from the south)

Two sycamore trees (view from the southeast), after the trees were cut back

In June 2006, Monika Schuberth-Brehm, the owner of a forest in the Franconian Forest, became suspicious when two sycamore trees began to turn brown on one side only. In 2004, a new mobile phone base station began operating 750 m (2,460 ft) away. From 2006 to 2013, she documented how these trees changed and informed the forestry office, mayor, parliamentarians, and ministries. In 2008, she showed me the site. Additional photos of these trees can be found in the observation guide by Dipl.-Forstw. Breunig, a forestry expert.

Reports from Schorpp and Weber, as well as a letter to Bavarian Prime Minister Horst Seehofer regarding Schuberth-Brehm, are available at www.funkfrei.net (Report 3,21).

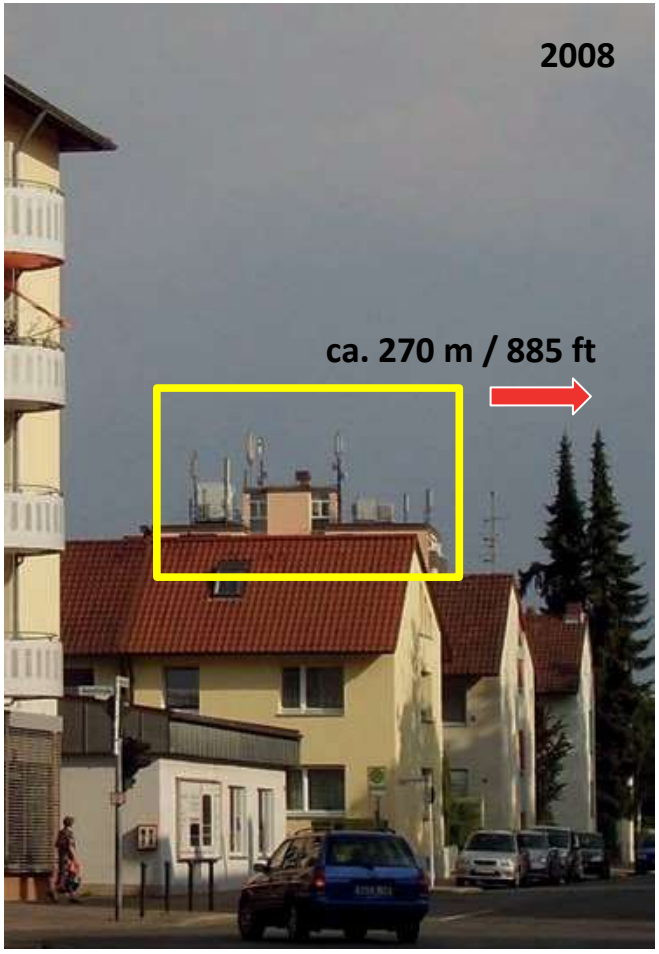
St. Ingbert, 2007

15 SEP 2007 St. Ingbert, Am Mühlental, mobile phone base station, Exit "St. Ingbert West" and beech tree damaged only on one side (distance ca. 200 m / 656 ft).

The site certificate from December 5, 2019 shows 33 base station antennas and one other transmitter, likely a TETRA base station.

Near the mobile phone base station, I saw several damaged beech trees, some of which had already been cut down. Professor Karl Richter showed me the damaged trees.

Bamberg, Market Gardeners' District, 2008–2010



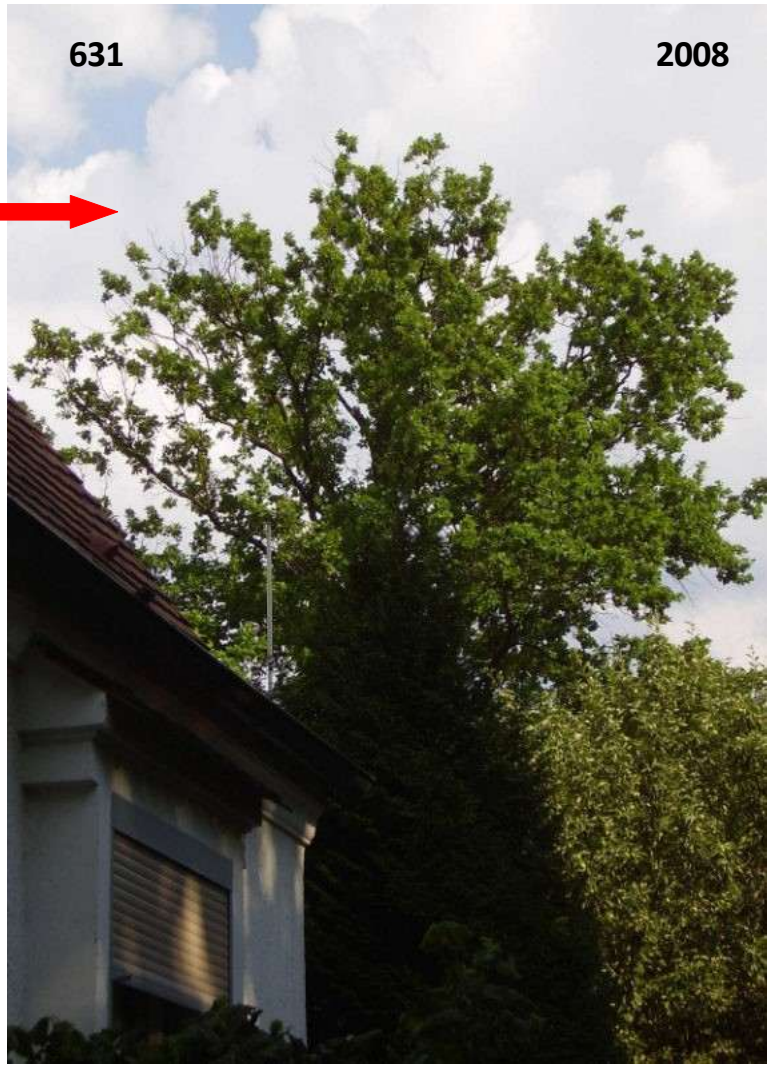
Bamberg, mobile phone base station at Hauptsmoorstr. 26 a: installation height 26.6–31.1 m (87.3–102 ft), 18 sector antennas

08 JUL 2008 Maple tree (view from the northeast), damaged only on one side. It had already been cut back.

07 AUG 10 The damage worsened, so the tree was cut back again. It was cut down in winter 2010/2011.

Bamberg, Market Gardeners' District, 2008

185 m / 607 ft



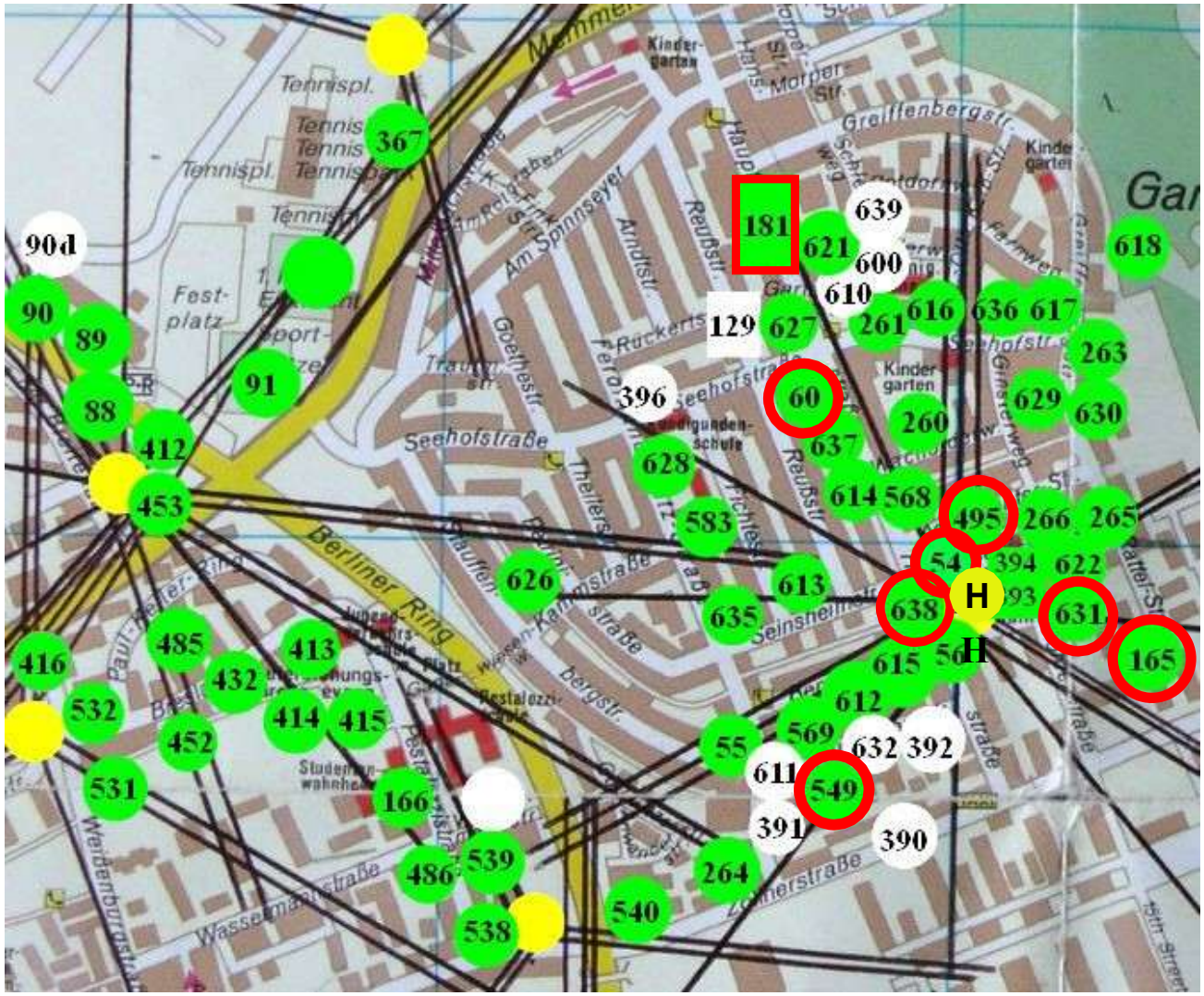
08 JUL 2008 Föhrenstraße 233 c. Conifer (view from the northeast)

Mobile phone base station at Hauptsmoorstraße 26 a

08 JUN 2008 Heimfriedweg. Oak tree (view from the south)

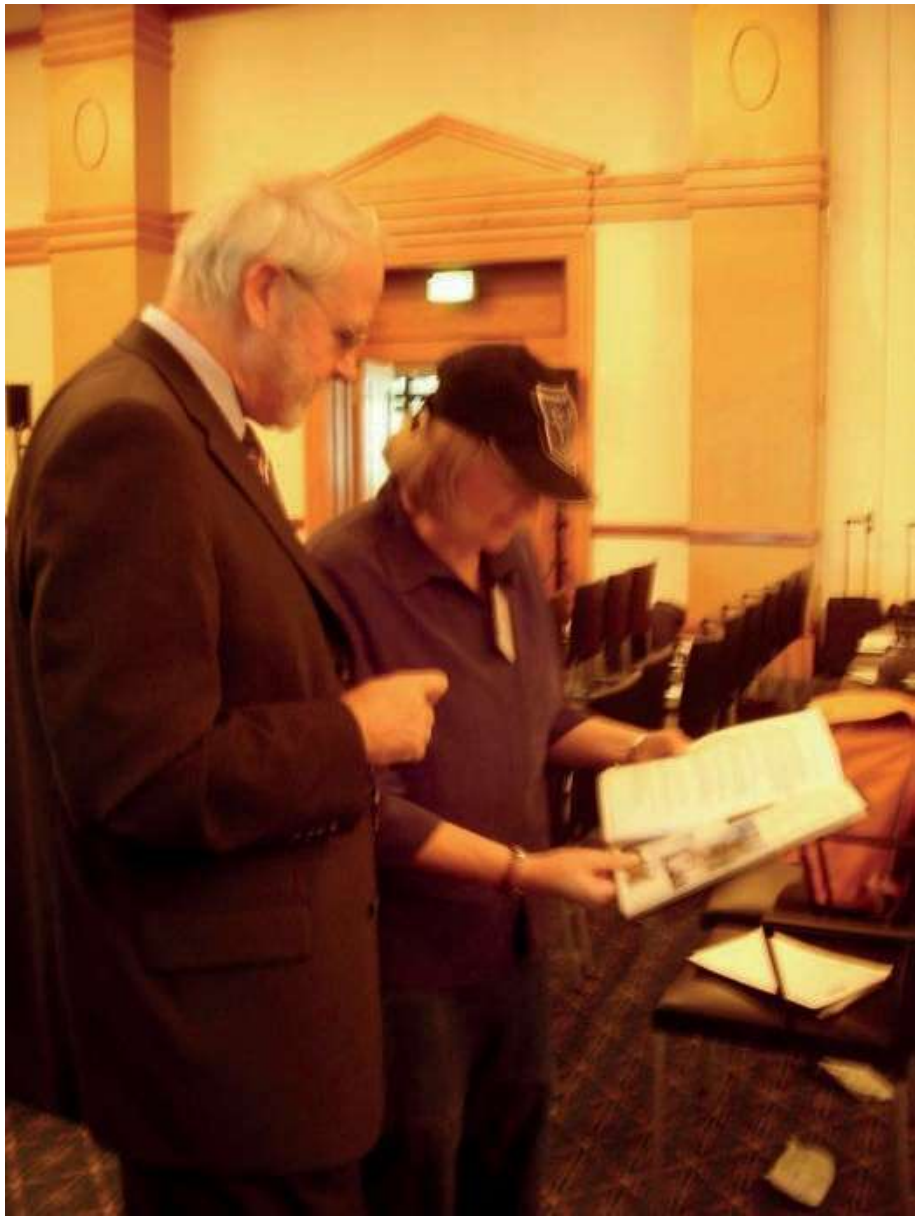
Numerous trees were damaged in the vicinity of this mobile phone base station. In addition to the crowns being damaged on one side, the upper and lower parts of the crowns were different. As depicted in Bernatzky's drawing, the trees were healthy in the shadow of buildings.

Bamberg, Market Gardeners' District



08 JUL 2008
Start of operation of the mobile phone base station at Hauptsmoorstraße 26 a in the 1990s.
Site certificate from September 2, 2010:
18 sector antennas (3 x 0°, 2 x 60°, 95°, 3 x 120°, 140°, 180°, 215°, 3 x 240°, 270°, 300°, 335°),
several microwave radio transmitters.
In July 2008, it was discovered that trees had already been cut down.

Section of the Bamberg city map by Städte-Verlag. Added items:
- Location of mobile phone base stations (yellow; **H**: Hauptsmoorstraße 26 a)
- Main beam directions of the sector antennas, as of 2010 (black)
- Location of documented exposed trees (green; red: see pp. 27, 94, and 112; the assigned numbers correspond to the comprehensive Bamberg documentation)
- Location of documented trees in the radio shadow of buildings (white)



Berlin, 2008

Ms. E. Weber of Munich showed her documentation of damaged trees near the mobile phone base station at Von-Kahr-Straße 61 in Munich to Prof. Dr. W. Weiss of the German Federal Office for Radiation Protection (BfS).

As a Munich resident affected by mobile phone base station radiation, Ms. Weber attended the public event in Berlin on June 17 to 18, 2008, where the results of the German Mobile Telecommunication Research Programme (DMF) were presented. During a break, she showed Prof. Dr. W. Weiss and Prof. Dr. A. Lerchl – a member of the German Commission on Radiological Protection since 2009 – her photos of the damaged trees near the mobile phone base station at Von-Kahr-Straße 61 in Munich.

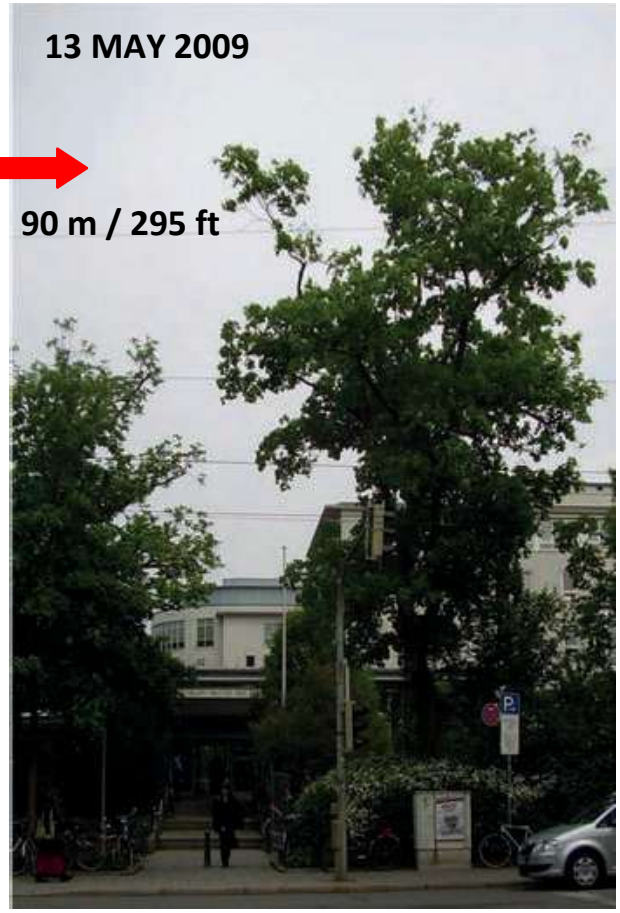
17 AUG 2008 Memmelsdorf, Seehof Palace, gardener's house.
Linden tree (view from the east)

24 JUN 2008

The linden tree stands on the sidewalk in front of the castle gardener's house. Many of its leaves had already fallen off. The leaves had brown edges. Further damage was evident in the castle park. Nevertheless, the number of sector antennas at mobile phone base station No. 671442 increased from **15** in 2009 to **36** in 2023.

Munich, Rechts der Isar Hospital (MRI), 2009–2013

Base station on Ismaninger Straße: 6 antennas



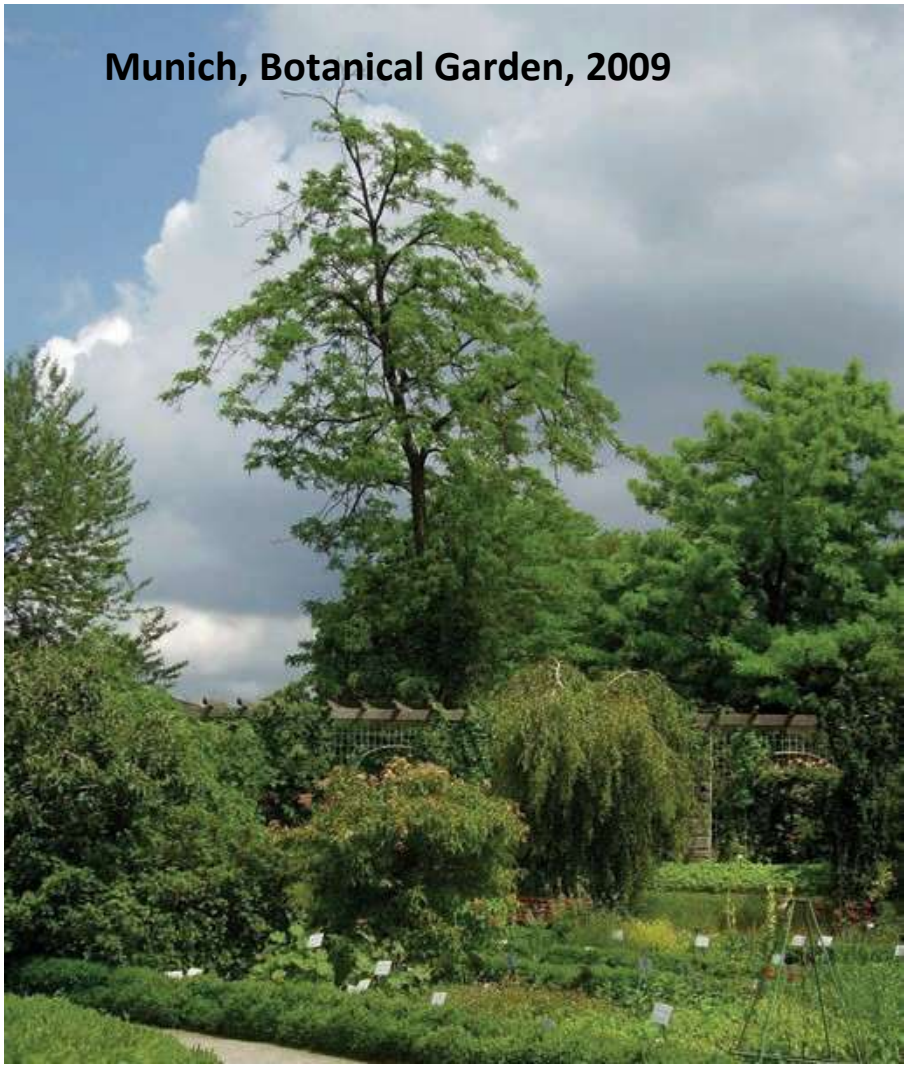
Munich, university hospital TUM-MRI. Norway maple (view from the west)

Increase in crown damage

Maple tree cut down.
Measurement: **3,800 µW/m²**

Munich, Rechts der Isar Hospital (MRI), Technical University of Munich (TUM) School of Medicine and Health, Ismaninger Straße, main entrance. On June 29, 2011, three members of the Bavarian Landtag participated in a walk to the damaged trees near the hospital. The following month, on July 29, 2011, they contacted the Bavarian State Ministry of the Environment and Health to request an investigation. No investigation was launched. The damaged maple tree was cut down. In 2021, the mobile phone base station was upgraded to **24** antennas.
Measurement on September 21, 2021: **88,000 µW/m²**

ca. 330 m / 1,080 ft



26 JUN 2009 View from the Botanical Institute of the University of Munich (LMU) toward the mobile phone base station at the Bureau of Standards. This photo was taken during a visit at Prof. Dr. S. Renner's office.

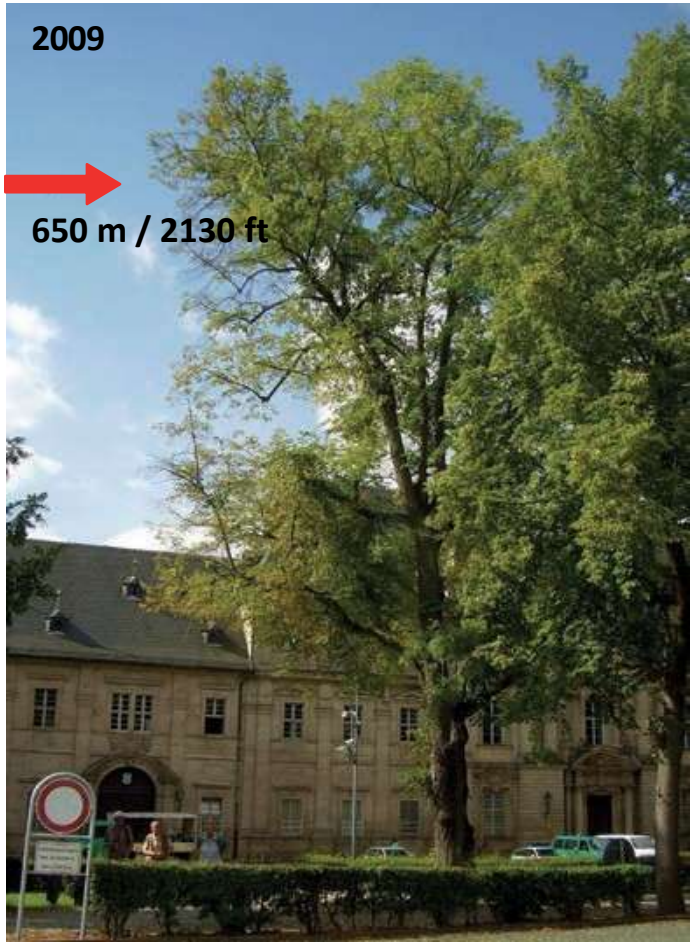
26 JUN 2009 Botanical garden. Honey locust (view from the west)

Munich, Botanical Garden, 2012

03 AUG 2012 This is the view of the botanical garden from the west. The tall trees – the tulip and honey locust trees – show clear signs of damage, primarily on the left side. The trees on the left side (north) are exposed to RF radiation from four sector antennas located at the Bureau of Standards.

Measurement at the café: **4,580 µW/m²**

Ebrach, Linden Tree (2009–2014)



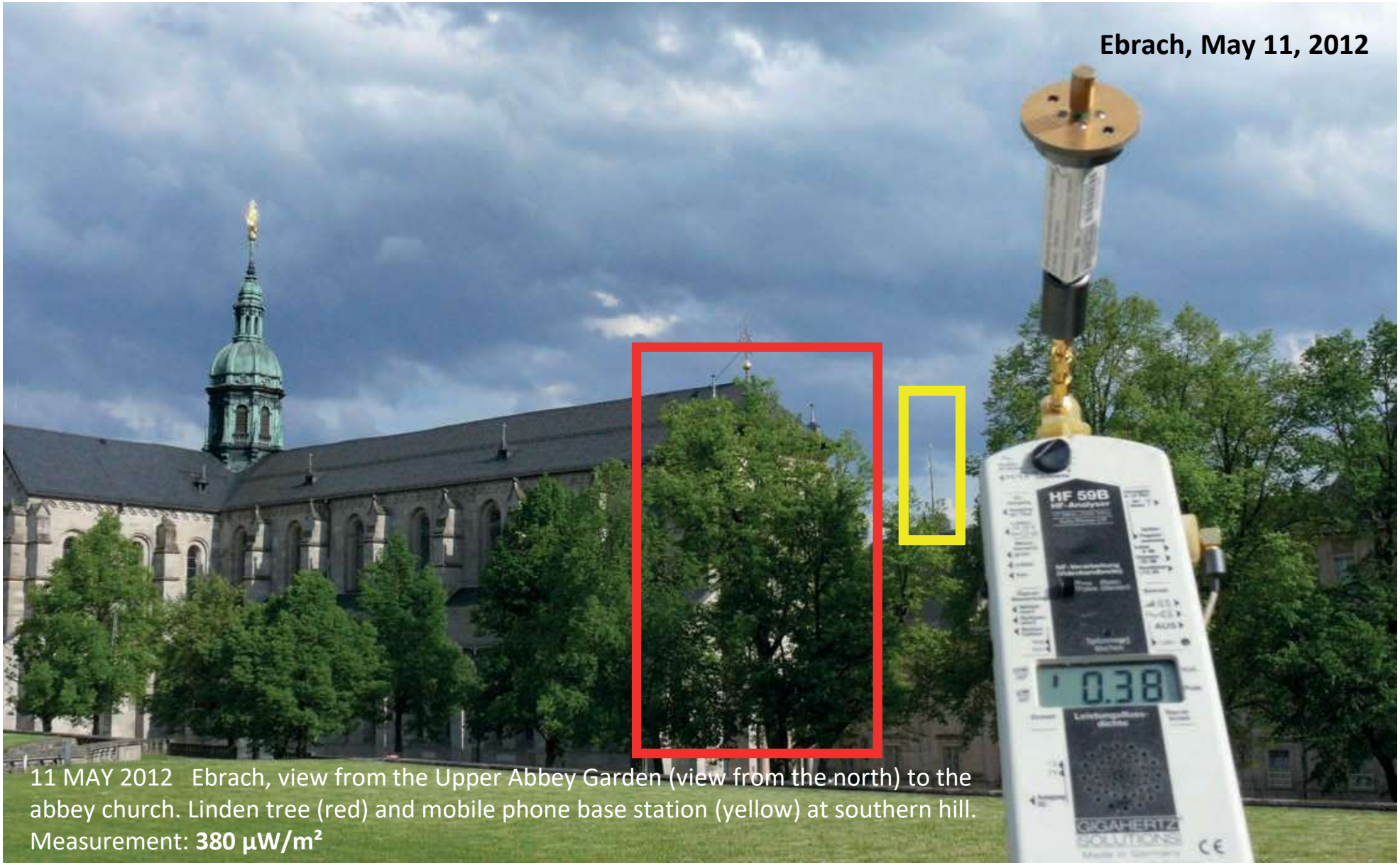
30 JUL 2009 Ebrach. Linden tree (view from the northeast)

2012

06 AUG 2012 The damage to the crown is increasing.

2014

05 SEP 2014 The linden tree was cut down.



11 MAY 2012 Ebrach, view from the Upper Abbey Garden (view from the north) to the abbey church. Linden tree (red) and mobile phone base station (yellow) at southern hill. Measurement: **380 µW/m²**

St. Blasien, District of Waldshut, 2009–2022

09 SEP 2009 St. Blasien, near the cathedral.
Beech and sycamore trees by the stream (view from the north) show premature leaf drop on the side facing the transmitters.

ca. 1 km / 3,280 ft

09 MAY 2022 The sycamore tree had to be cut back on the side facing the transmitters.

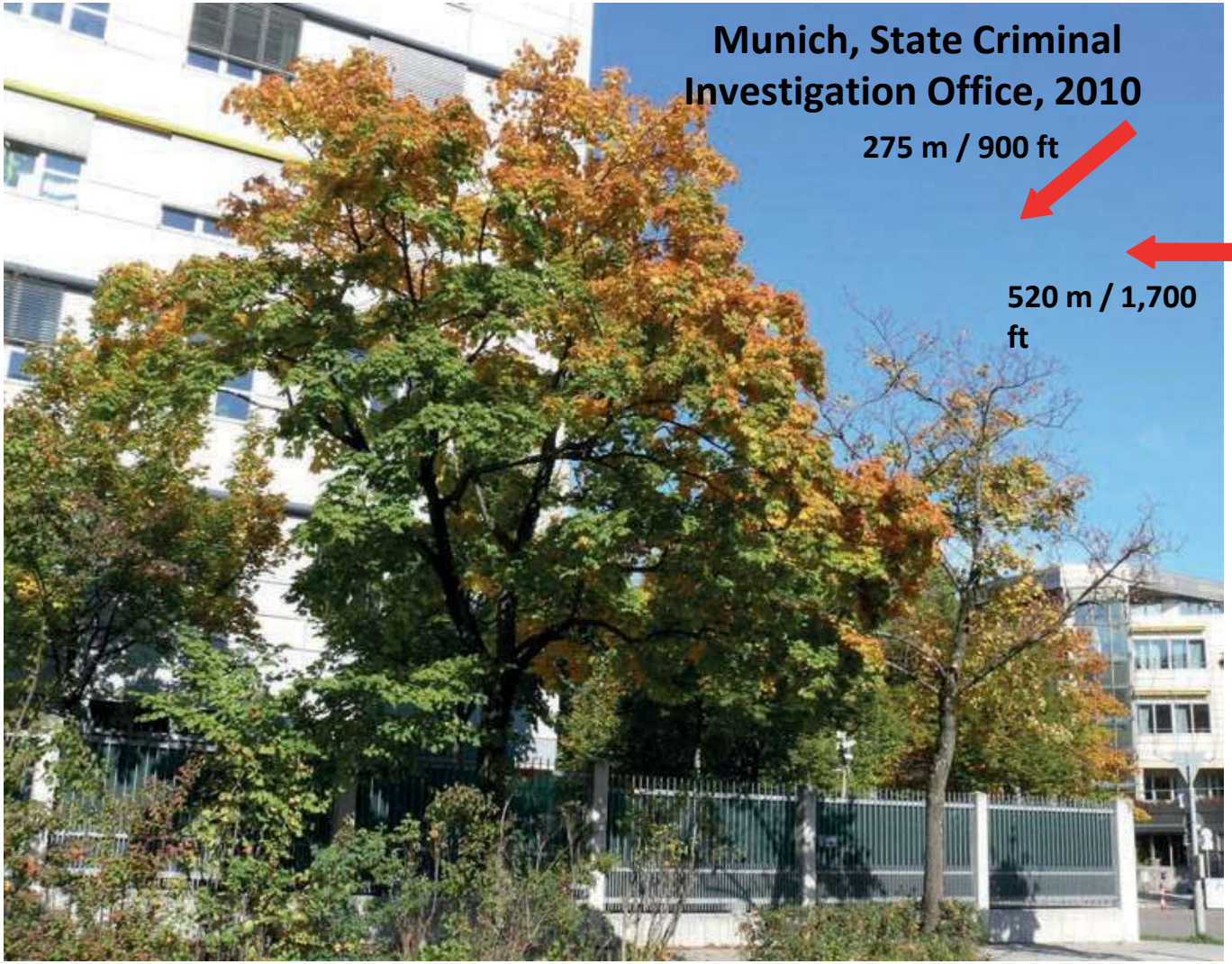
12 OCT 2021
Mobile phone base station and BOS digital radio above St. Blasien

Schaufling, Bavarian Forest, 2009

9 SEP 2009 Access road to Asklepios Clinic Schaufling (644 m / 2,113 ft above sea level). Two beech trees

From the east, the beech trees are exposed to RF radiation from radio and television transmitters, microwave radio relay links, and mobile phone base station antennas on Brotjacklriegel Mountain (1,011 m / 3,317 ft above sea level). Total transmitter height: 125 m (410 ft).
Conversion to digital audio broadcasting (DAB) began in 2001, with further additions in 2009 and 2011. DAB+ was added in July 2016. Digital video broadcasting (DVB-T) began operating in October 2006, and DVB-T2 began operating in March 2019.

09 NOV 2008
Photo from Wikipedia, see photo credits



09 OCT 2010 Munich, State Criminal Investigation Office, Marsstraße.
Two maple trees in a green strip. There is a direct line of sight to two mobile phone base stations: Spatenbrauerei (520 m / 1700 ft) and Telekom Blutenburgstraße (275 m / 900 ft).

21 OCT 2010
Measurement: **1,050 µW/m²**

28 SEP 11 Garmisch-Partenkirchen, train station. Two Norway maple trees (view from the east), direct line of sight to a mobile phone base station. The trees have similar site conditions. The northern (right) maple tree has already lost its leaves. The few remaining leaves are brown. The southern (left) tree still has dense foliage. It is shielded by the maple tree to its right. Its shape is striking. It has stopped growing upward.

Mobile phone base station Bahnhofstraße

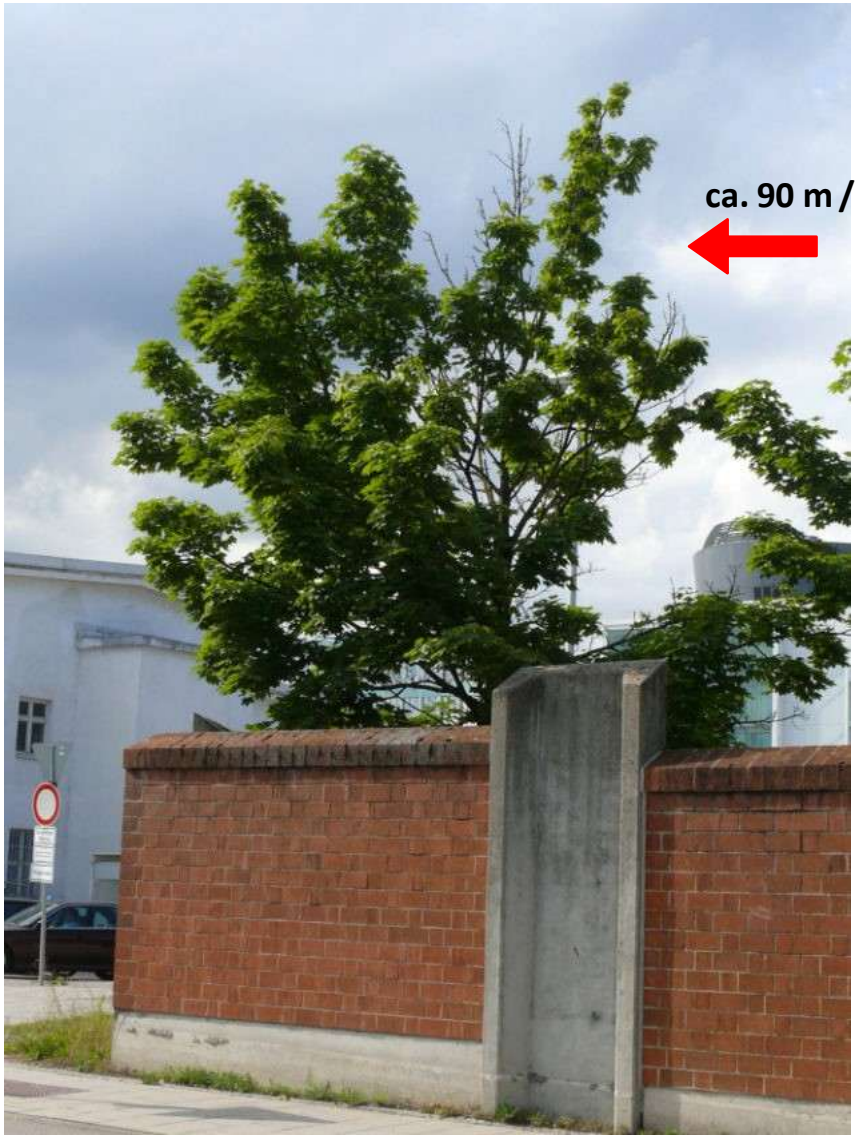
16 SEP 11 Ringberg mobile phone base station (1,045 m / 3,428 ft above sea level) with 17 sector antennas (2x 20°, 21°, 4 x 70°, 2 x 80°, 170°, 2 x 180°, 210°, 280°, 337°, 340°, 350°, as of 21 SEP 2009)

Lake Tegernsee, 2011

14 SEP 2011 Lake Tegernsee, marina, castle/Bräustüberl
(727 m / 2,385 ft above sea level)
The Ringberg mobile phone base station is 3 km (1.9 mi) from the marina.
Measurement on September 26, 2014:
60 µW/m²

The number of antennas at the base station increased from
17 antennas in **2011** to
48 antennas in **2023**.
BOS digital radio was also added.

Munich, Bavarian State Office for the Protection of the Constitution and Police Station 47, 2012



03 AUG 2012 Police Station 47 at Milbertshofen, southwest corner. Maple tree (view from the southeast)

03 AUG 2012 Gate at the State Office for the Protection of the Constitution, Knorrstraße 139, Mobile Phone Base Station 1. Maple tree (view from the east)

Munich, Bavarian State Office for the Protection of the Constitution and Police Station 47, 2012

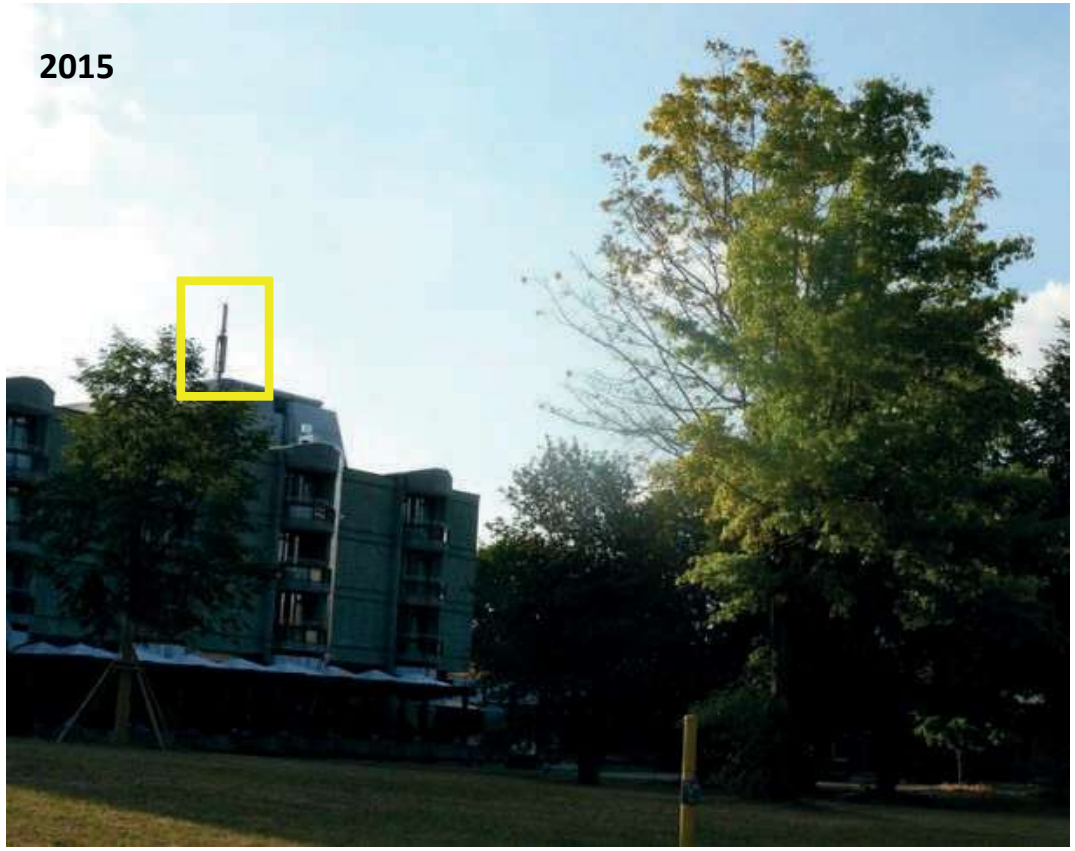
03 AUG 2012 Max-Diamand-Straße, mobile phone base station at the State Office for the Protection of the Constitution. Two plane trees (view from the southwest)

03 AUG 2012 Oak tree (view from the southwest). Distance to the base station: ca. 190 m / 620 ft
Measurement: **2,390 µW/m²**

Additional trees showed signs of damage near the Bavarian State Office for the Protection of the Constitution.

Nuremberg, Luitpoldhain, 2013–2015

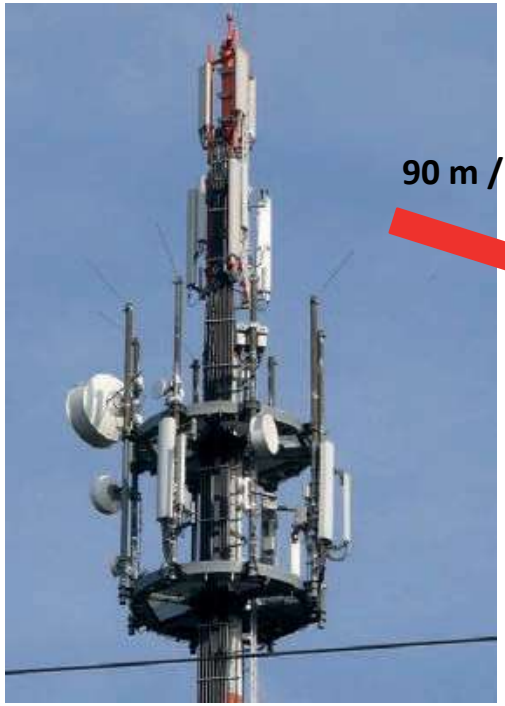
30 AUG 2013 Luitpoldhain. Red oak tree (view from the south-southeast) with a direct line of sight to the mobile phone base station

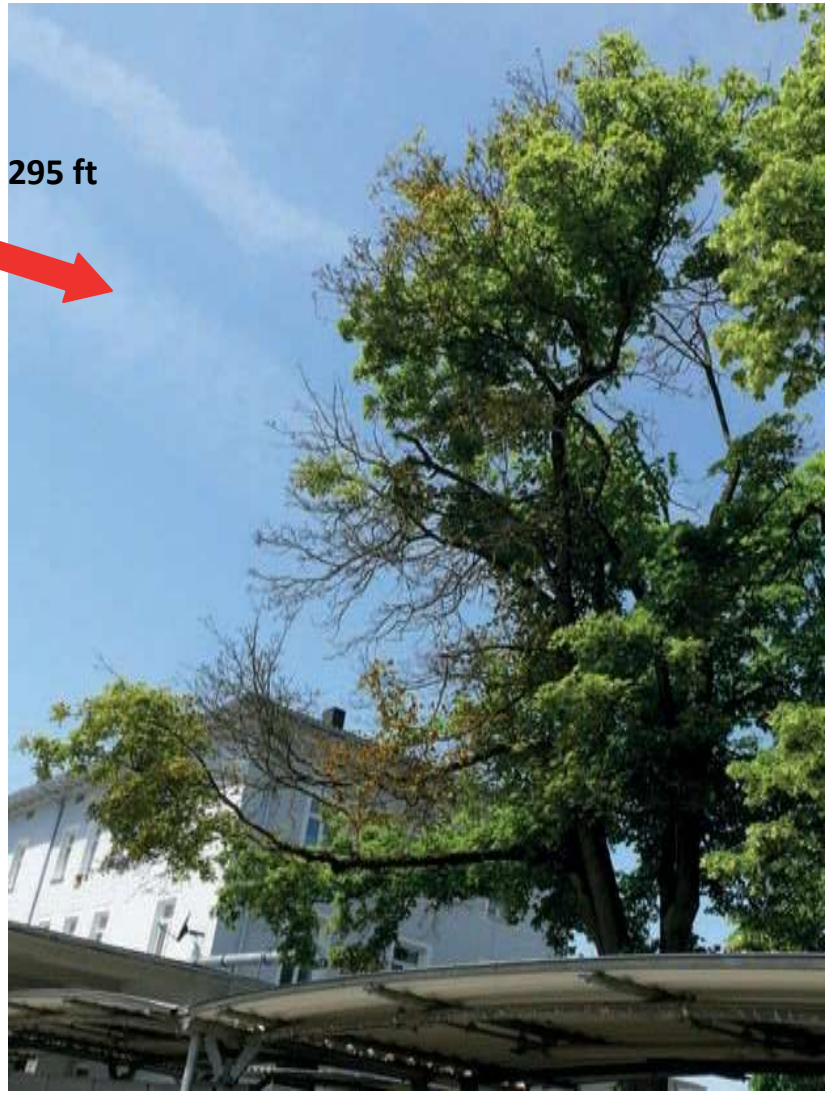


03 AUG 2015 The crown damage on one side progressed rapidly. Two years later, the red oak tree was cut down.

Site certificate No. 620798, accessed in August 2013: installation height 18.99–21.09 m (62.3–69.2 ft), **6 sector antennas** (2 x 90˚, 2 x 210˚, 2 x 330˚)
Site certificate No. 620798, accessed on April 26, 2017: installation height 18.5–20.9 m (60.7–68.6 ft), **15 sector antennas** (5 x 90˚, 5 x 210˚, 5 x 330˚)

Neuburg an der Donau, 2014





11 JUN 2014 Train station. Maple tree (view from the east)

The leaves have brown edges on the side that faces the mobile phone base station.

Burgheim, 2014

11 JUN 2014 Burgheim, Georgistraße.
Maple tree (view from the south)

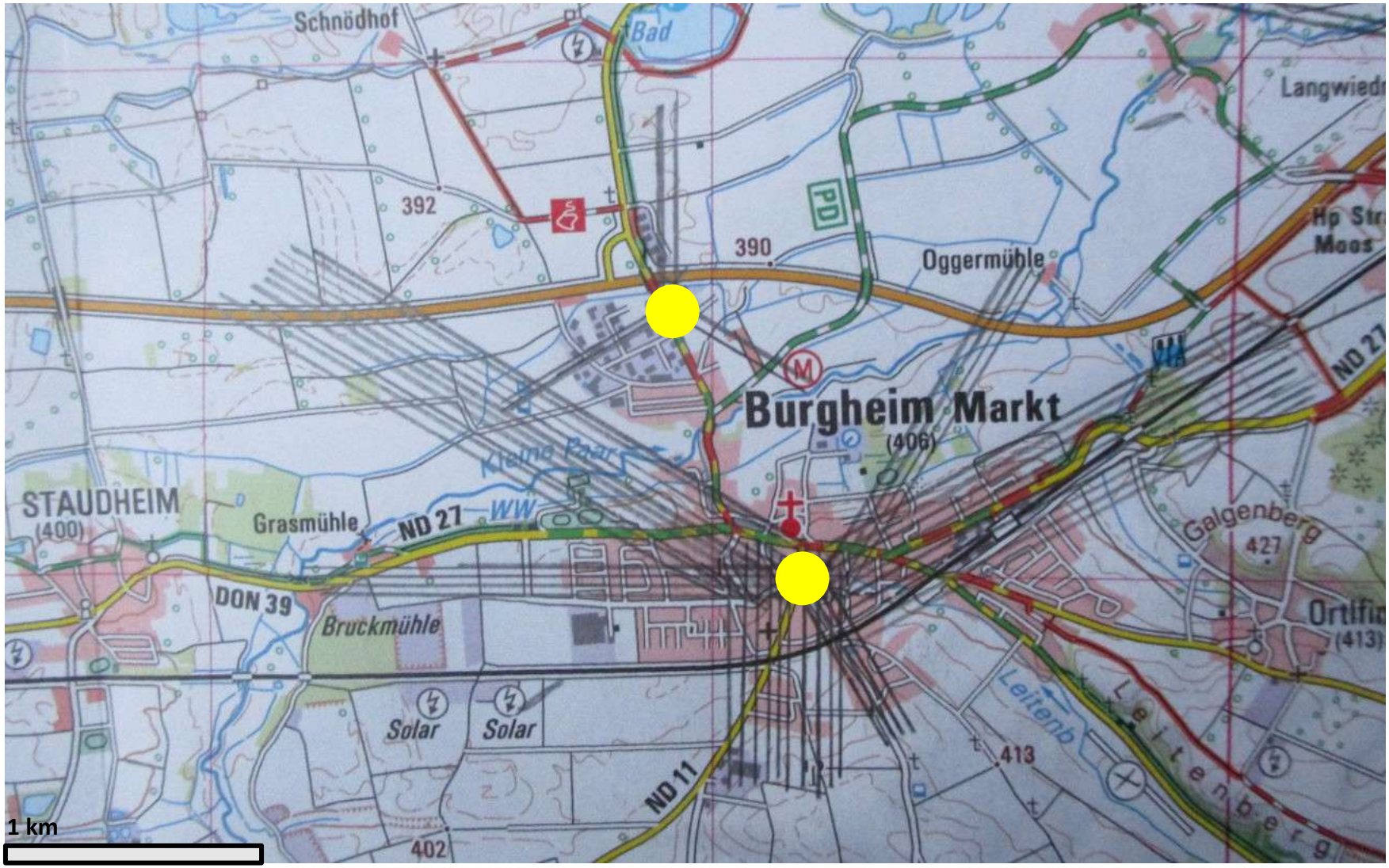
Looking east toward the maple tree, there is a direct line of sight to the mobile phone base station located in the center of the municipality, about 145 m (475 ft) away.
Measurement: **5,040 µW/m²**

Since 2003, residents of Burgheim have expressed concern over the increased incidence of cardiovascular and tumor diseases, as well as the increased number of deaths, near this mobile phone base station.

Despite requests by medical professionals for an official investigation, none was carried out. In fact, the base station has been upgraded over time.

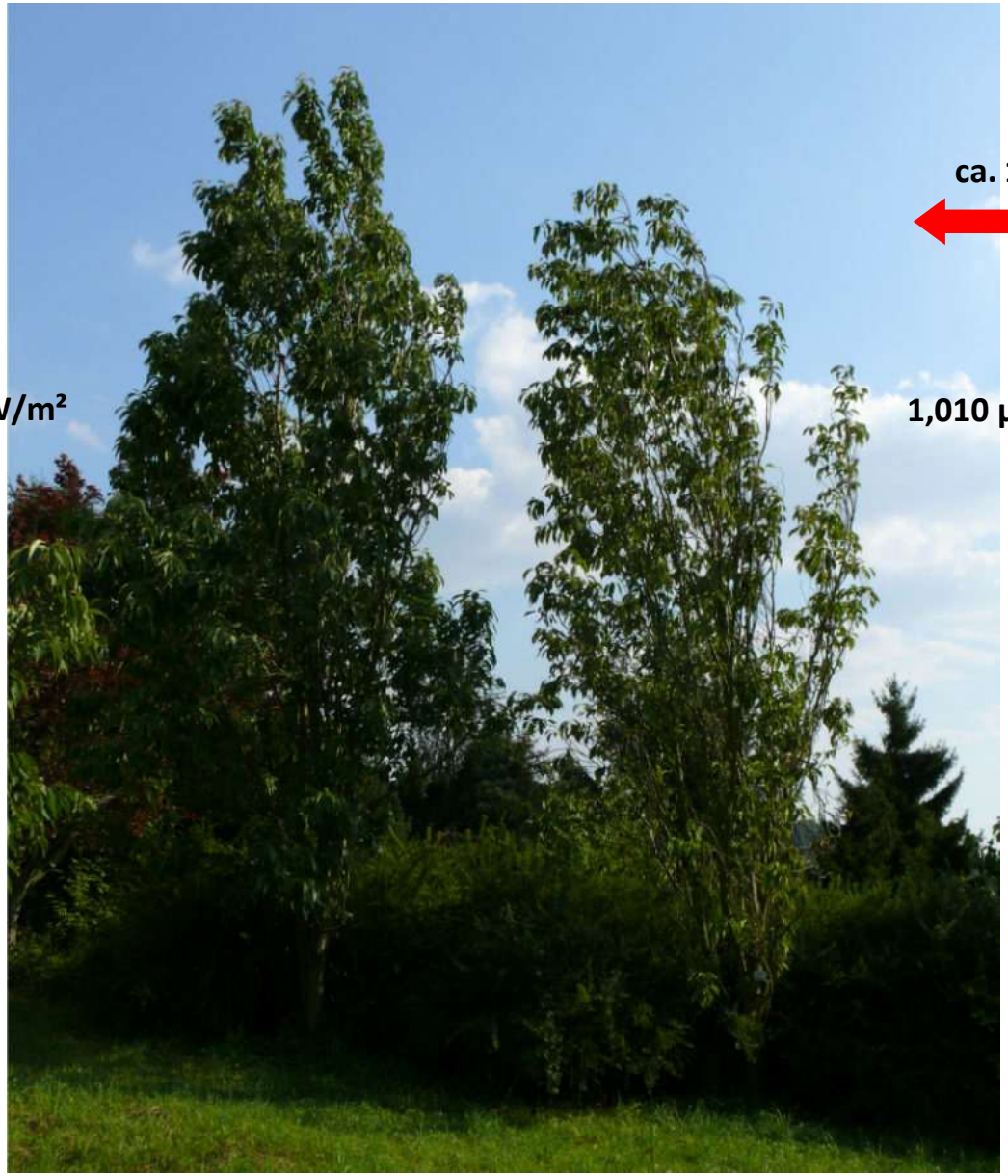
2005: ca. 8 sector antennas
2013: 18 sector antennas
2022: 42 sector antennas

Two Mobile Phone Base Stations in Burgheim with a Total of 48 Sector Antennas



Map section UK 50-34, Bavarian State Office for Surveying (LDBV).
Added items: location of mobile phone base stations (yellow) with the main beam directions of the sector antennas (as of 2022)

Göttingen, Forest Botanical Garden, 2015



70 µW/m²

ca. 180 m / 590 ft

1,010 µW/m²

21 AUG 2015 Göttingen, Forest Botanical Garden, Beech Quarter. Two Japanese cherry trees (view from the north). There is a direct line of sight between the trees and the high-rise building of the Institute of Forest Sciences, which is about 180 m (590 ft) away.

Measurements were taken at a height of 6 m (20 ft) using a telescopic rod on the east and west sides of this pair of trees.

Göttingen, Forest Botanical Garden, 2016–2023

The Japanese cherry tree on the right has lost its leaves prematurely.

Part of the Japanese cherry tree on the right is dead.

The Japanese cherry tree on the right was cut down in 2021.

Beech Quarter, two Japanese cherry trees (Prunus serrulata 'Amanogawa‘), (view from the north). Mobile phone base station on the high-rise building of the Institute of Forest Sciences: installation height 36–42 m (118–138 ft), 20 antennas (3 x 60°, 2 x 90°, 5 x 180°, 2 x 210°, 6 x 300°, 2 x 310°)

Kassel, 2016–2025

Mobile phone base station No. 240217

220 m / 722 ft

30 MAY 2016 Ihringshäuser Straße. Norway maple tree No. 6 (view from the northwest) with a striking difference between its left and right sides.

17 AUG 2020 The crown damage is worsening on the north side.
Measurement 2020: 1,100 µW/m²

14 JUL 2025 The northern half is bare. Pruning has been carried out. Since **2023**, the measured RF radiation levels have risen significantly. Measurements fluctuate between **20,000** and **100,000 µW/m²**.

Site certificate from February 5, 2015: height 17.8–22.3 m, 28 antennas (4 x 0°, 6 x 60°, 3 x 120°, 6 x 180°, 3 x 240°, 6 x 300°)
The entire row of maple trees between the base station and Wielandstraße has sustained significant damage.

2016

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journal homepage: www.elsevier.com/locate/scitotenv

Radiofrequency radiation injures trees around mobile phone base stations

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Abstract

In the last two decades, the deployment of phone masts around the world has taken place and, for many years, there has been a discussion in the scientific community about the possible environmental impact from mobile phone base stations. Trees have several advantages over animals as experimental subjects and the aim of this study was to verify whether there is a connection between unusual (generally unilateral) tree damage and radiofrequency exposure. To achieve this, a detailed long-term (2006–2015) field monitoring study was performed in the cities of Bamberg and Hallstadt (Germany). During monitoring, observations and photographic recordings of unusual or unexplainable tree damage were taken, alongside the measurement of electromagnetic radiation. In 2015 measurements of RF-EMF (Radiofrequency Electromagnetic Fields) were carried out. A polygon spanning both cities was chosen as the study site, where 144 measurements of the radiofrequency of electromagnetic fields were taken at a height of 1.5m in streets and parks at different locations. By interpolation of the 144 measurement points, we were able to compile an electromagnetic map of the power flux density in Bamberg and Hallstadt. We selected 60 damaged trees, in addition to 30 randomly selected trees and 30 trees in low radiation areas (n=120) in this polygon. The measurements of all trees revealed significant differences between the damaged side facing a phone mast and the opposite side, as well as differences between the exposed side of damaged trees and all other groups of trees in both sides. Thus, we found that side differences in measured values of power flux density corresponded to side differences in damage. The 30 selected trees in low radiation areas (no visual contact to any phone mast and power flux density under 50 µW/m²) showed no damage. Statistical analysis demonstrated that electromagnetic radiation from mobile phone masts is harmful for trees. These results are consistent with the fact that damage afflicted on trees by mobile phone towers usually start on one side, extending to the whole tree over time.

https://www.diagnose-funk.org/download.php?field=filename&id=1336&class=NewsDownload

Summary of the Study Titled “Radiofrequency Radiation Injures Trees Around Mobile Phone Base Stations”

The study began with repeated observations of crown damage starting on one side of a tree for which there was no plausible explanation. However, we noticed that the damaged side of a tree faced one or more mobile phone base stations in a direct line of sight.

Group 1 of the study included 60 trees with damage on one side only. These trees were selected from Bamberg and Hallstadt, Germany. On-site visits revealed that the damaged parts of the trees' crowns were always within a line of sight of a mobile phone base station.

Broadband power density measurements averaged 2,000 µW/m² on the damaged side and 200 µW/m² on the undamaged side. There was a significant difference in all 60 cases. The crown of a tree attenuates incident RF radiation. Some radiofrequency electromagnetic fields are absorbed by the leaves and needles, while others are reflected and scattered.

For **Group 2** of the study, 30 trees were randomly selected. Thirteen of these trees had damaged crowns. Six of those trees had crown damage on only one side that was in a direct line of sight with a transmitter. Five trees had damage on more than one side and had direct lines of sight to several transmitters. In addition, a spruce tree had a direct line of sight, and its crown growth was impaired. Another tree had parts of its dead crown removed. On average, we measured power density levels of 1,600 µW/m² on sides facing transmitters and 600 µW/m² on opposite sides.

Seventeen trees in the group were undamaged and had no line of sight to any transmitter. Power density measurements ranged from 8 to 50 µW/m². The maximum difference in measurements between opposite sides of a given tree was 20 µW/m².

For **Group 3** of the study, we selected 30 trees in areas with low ambient RF radiation levels, such as in the shadows of buildings, hills, or other trees. No damage was found in the crowns of those trees. There was also no line of sight to any transmitter. RF radiation levels were measured on two opposite sides of each tree. RF radiation levels ranged from 3 to 40 µW/m². The maximum difference in measurements between the two sides of a given tree was 10 µW/m².

The following characteristics of damaged trees could not be explained by heat, frost, drought, soil composition, compaction, sealing, salt spreading, air pollutants, soil pollutants, or pests:

1. The damage always started on one side of the tree. The direction of the sky did not play a role.
2. The damage occurred on previously healthy trees at a certain point in time.
3. The damage increased from the outside to the inside over several years.
4. The damage occurred in both favorable and unfavorable locations.
5. Leaf margin necrosis, similar to that caused by salt spreading, was observed in meadow locations where no salt was present.
6. Neighboring trees of different species were also damaged.
7. The damage occurred without any visible signs of infestation by insects, fungi, worms, or viruses.

All trees with unilateral crown damage had a line of sight to a transmitter on the damaged side (Group 1 and one part of Group 2).
None of the undamaged crowns had a line of sight to a transmitter (Group 3 and the remainder of Group 2).

Statistical analysis supports the hypothesis that radiofrequency electromagnetic fields emitted by mobile phone base stations caused the damage to the trees.

However, the tree damage occurred well below current exposure limits for radiofrequency electromagnetic fields from mobile phone base stations. Further scientific studies are needed to verify this suspicion.

Quote from Conclusions: “The occurrence of unilateral damage is the most important fact in our study and an important argument for a causal relationship with RF-EMF, as it supplies evidence for non-thermal RF-EMF effects. This constitutes a danger for trees worldwide. The further deployment of phone masts has to be stopped. Scientific research on trees under real radiofrequency field conditions must continue.”

An Overview of the Study Data

Radiofrequency Radiation Injures Trees Around Mobile Phone Base Stations

Waldmann-Selsam, Balmori–de la Puente, Breunig, Balmori, 2016

https://www.researchgate.net/publication/306435017_Radiofrequency_radiation_injures_trees_around_mobile_phone_base_stations (free download)

The 120 trees studied were selected based on three criteria.

1. Selection of trees with unilateral crown damage in line of sight to a mobile phone mast				
60 crowns				
60 crowns in line of sight to mobile phone mast(s) on one side	**Side facing a phone mast Ø 2000 µW/m²**		**Opposite side Ø 200 µW/m²**	**60 Damage on one side**

2. Random selection of trees				
30 crowns				
13 crowns in line of sight to mobile phone mast(s) in one or more directions	**Side facing a phone mast Ø 1600 µW/m²**		**Opposite side Ø 600 µW/m²**	**6 Damage on one side** **5 Damage on more than one side** **1 No growth in height** **1 Partly trimmed down**
17 crowns without line of sight to a mobile phone mast	**Any side min. 8 µW/m²**	**Range of measurements* 0–20 µW/m²**	**Opposite side max. 50 µW/m²**	**No visible damage**

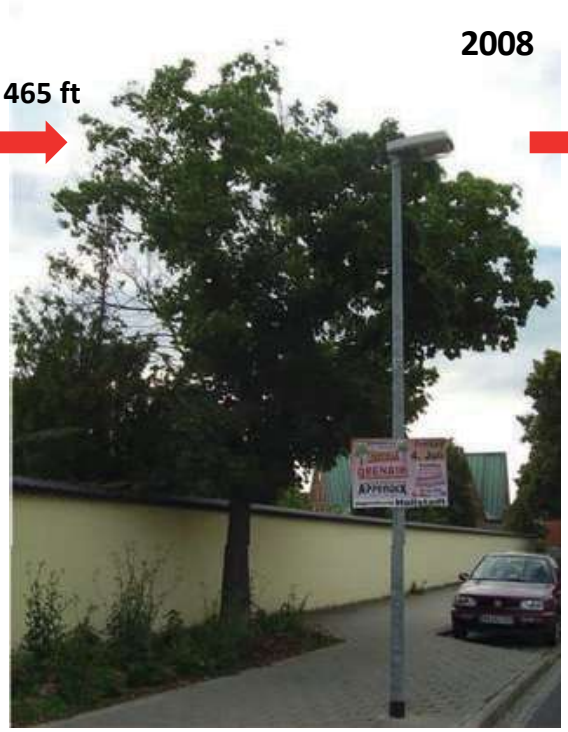
3. Selection of trees with low ambient RF radiation levels and without line of sight to a mobile phone mast				
30 crowns without line of sight to a mobile phone mast	**Any side min. 3 µW/m²**	**Range of measurements* 0–10 µW/m²**	**Opposite side max. 40 µW/m²**	**No visible damage**

* The difference between the measurements taken on two opposite sides of the same tree is referred to as the range of measurements.

No. 14 of Group 1 (Table 4), Norway Maple Tree (Acer platanoides), Hallstadt, Königshofstraße/Cemetery (2008–2019)

Mobile phone base station No. 671234

142 m / 465 ft



02 JUN 2008 Norway maple tree (view from the southeast). Line of sight to the mobile phone base station at Landsknecht-straße 23 a, which is 142 m (465 ft) away.

05 OCT 2015 Norway maple tree (view from the east).
Measured at a height of 6 m / 20 ft:

Left side of tree: 3,380 µW/m²
Right side of tree: 500 µW/m²

19 SEP 2019 Norway maple tree (view from the east), after dead branches were removed

No. 56 of Group 1 (Table 4): Douglas Fir (Pseudotsuga menziesii) Bamberg, B 22/Strullendorfer Straße (2007–2023)

2007

24 JUL 2007 Douglas fir (view from the south). Line of sight to the mobile phone base station with site certificate No. 671069 at Gutenbergstraße 20

2008

25 DEC 2008 Douglas fir (view from the southeast). Distance to the mobile phone base station: 356 m (1,170 ft)

2012

25 MAR 2012
Douglas fir (view from the southeast)

2023

13 MAR 2019
Douglas fir (view from the southeast)

On **September 26, 2015**, measurements were taken at a height of 6 m (20 ft).

Left: 60 µW/m²
Right: 1,720 µW/m²

No. 35 of Group 1 (Table 4), Chestnut Tree (*Aesculus hippocastanum*), Bamberg, Franz-Ludwig-Straße (2008–2025)

17 AUG 2008 Row of chestnut trees (view from the west). The front chestnut tree is brown and partly bare; the second chestnut tree is green.

14 AUG 2012 The crown was cut back between 2012 and 2023.

Mobile phone base station Grüner Markt (view from the east), which is 470 m (1,542 ft) away

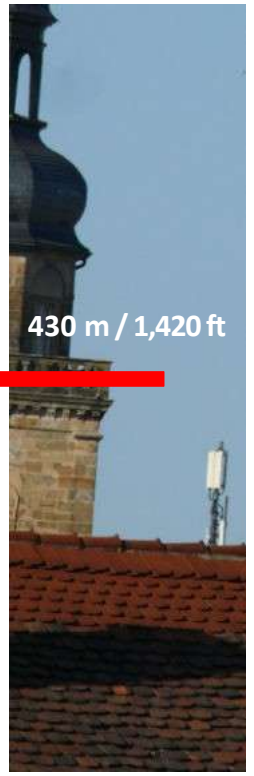
29 APR 2025 The chestnut tree was cut down in 2024.

The west side of the chestnut tree has a direct line of sight to the mobile phone base station No. 670921 on Grüner Markt: installation height 27–34 m (89–112 ft), 23 antennas.
On July 30, 2015, measurements were taken at a height of 6 m (20 ft): **400 µW/m² on the west side** and **20 µW/m² on the east side**

No. 4 of Group 1 (Table 4), Norway Maple Tree (*Acer platanoides*), Bamberg, Katzenberg/Karolinenstraße (2009–2021)

26 SEP 2009 Karolinenstraße.
Norway maple tree (view from the south)

09 OCT 2014 Karolinenstraße.
The crown is becoming more damaged.



Base station Grüner Markt (view from the southwest)

07 JUN 2021 The tree is being cut down (view from the east).

There is a direct line of sight from this maple tree to the mobile phone base stations on Grüner Markt (to the northeast, 430 m / 1,420 ft) and Unterer Kaulberg Mountain (to the south).
On September 3, 2015, measurements were taken at a height of 6 m (20 ft): **2,300 µW/m² on the south side** and **130 µW/m² on the north side**
This maple tree, among others, is listed in a letter dated June 17, 2012, to the city council.
https://www.bamberger-onlinezeitung.de/2012/06/28/zunahme-schwerer-baumschaden-im-strahlungsfeld-von-mobilfunksendeanlagen-2/

No. 2 of Group 3 (Table 6), Hornbeam Trees (*Carpinus betulus*), Bamberg, Schlüsselstraße (2010–2017)

2010

06 OCT 2010 Hornbeam trees (view from the northwest)

2012

27 AUG 2012 Hornbeam trees

2015

28 OCT 2015 **Measurements:**
Left: 10 µW/m²
Right: 8 µW/ m²
There is no line of sight to any mobile phone base station.

2017

11 OCT 2017 Hornbeam trees

On November 7, 2019, time series of cases from the 2016 tree damage study were presented at the International Workshop "Environmental Effects of Electric, Magnetic and Electromagnetic Fields: Flora and Fauna," which was organized by the German Federal Office for Radiation Protection. In addition, examples of crown damage on only one side of trees in Berlin, Darmstadt, Munich, Göttingen, Freiburg, and Brussels, as well as developmental disorders in young trees and forest clearings due to RF radiation exposure were shown.
https://kompetenzinitiative.de/wp-content/uploads/2026/03/2019_Vorstellung_Baumstudie_bei_Workshop_BfS_071119.pdf

Mittenwald, Lake Lautersee, 2016

ca. 70 m / 230 ft

15 OCT 2016 Mittenwald, chapel and mobile phone base station at Lake Lautersee. Site certificate No. 69016082 from July 4, 2018: installation height 8.5 m (28 ft), 6 antennas (3 x 20°, 3 x 200°)

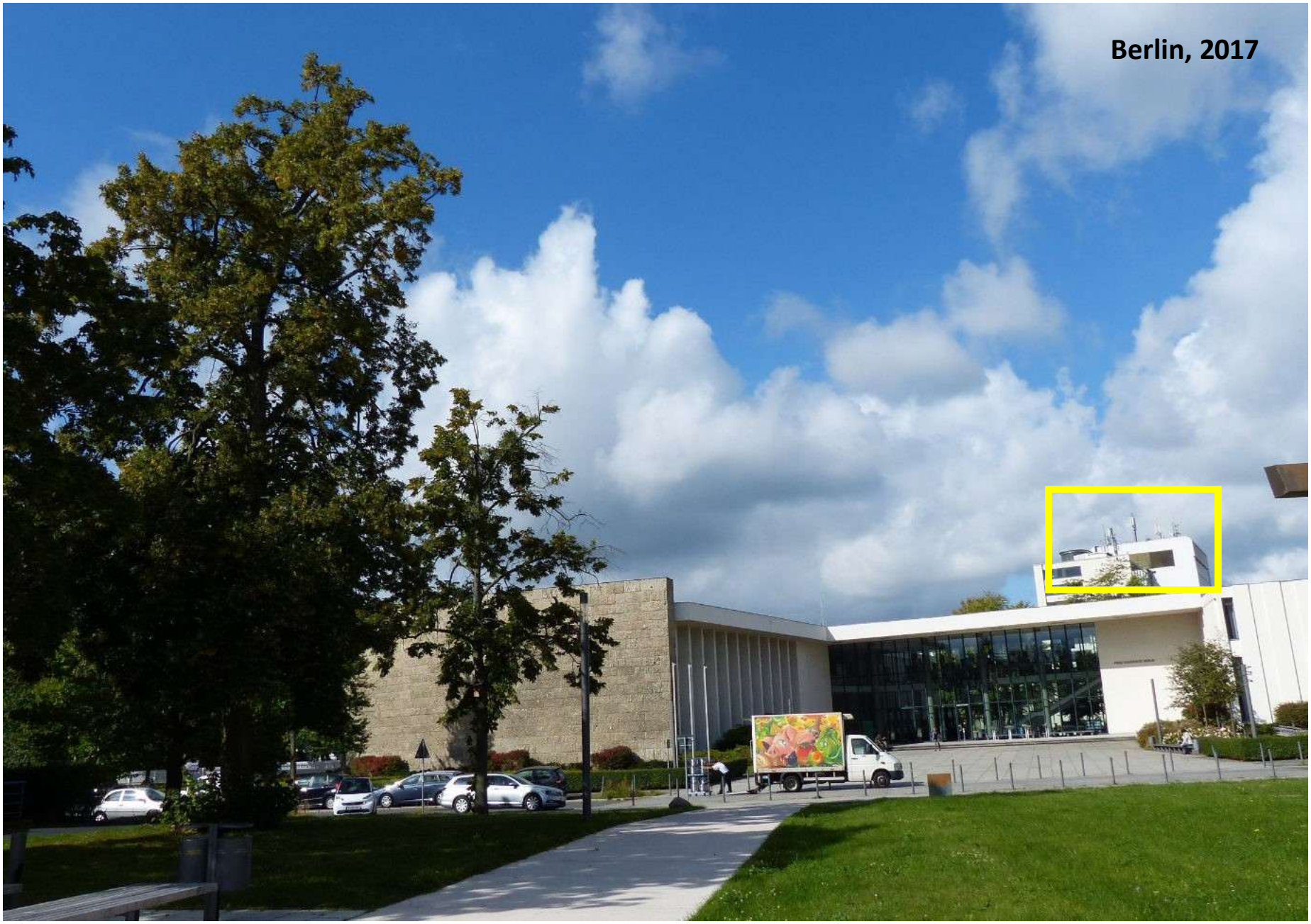
Lake Lautersee. Birch tree with sides that developed differently (view from the west).

Kassel, Parking Lot at the City Parks Department, 2017

Mobile phone base station at the city parks department

Oak tree (view from the south), parking lot, to the east of the city parks department; line of sight to the mobile phone base station, which is 250 m (820 ft) away.
The number of sector antennas at the base station increased from **15** in 2017 to **36** by 2024.

In October 2017, the oak tree was cut back.
Measurement at the parking lot in **2017: 2,830 µW/m²**
Measurement at the parking lot in **2024: 57,000 µW/m²**



15 SEP 2017 Free University Berlin, Bolzmannstraße, Henry-Ford-Bau. Two linden trees on a lawn (view from the southeast).
Measurement: 11,940 µW/m²
https://www.weisse-zone-rhoen.de/b%C3%A4ume-in-stadt-und-land/berlin-dokumentation-2017/

Jena 2017

14 OCT 2017 Jena, Jahnstraße. Beech tree near the Leutra stream (view from the south). The eastern and southeastern sides of the beech tree are exposed to RF radiation from mobile phone base stations.

Three mobile phone base stations: Leutragraben, Ernst- Abbe-Platz, and JenTower. Numerous trees along the Leutra stream have sustained major damage.

07 AUG 2018 Ringaustraße, Waldorf school. Sycamore tree (view from the southeast), advanced damage. The damage on the left and right side is still different.

07 AUG 2018 This is the same sycamore tree seen from the southwest. There is a direct line of sight to the Hunrodstraße mobile phone base station, which is 310 m (1,015 ft) away.

Mobile phone base station at Hunrodstraße

23 APR 2021 Intersection of Ringaustraße and Taunusstraße. Sycamore tree from the previous image (marked red). Birch tree heavily pruned due to crown damage (view from the southwest).
Distance to base station: ca. 340 m (1,115 ft)
Measurement: **7,570 µW/m²**

Darmstadt, 2019

25 JUL 2019 Darmstadt, St. Paul's Church (view from the west). Locust tree. The mobile phone base station in the church steeple radiates in all directions: north, east, south and west. We observed damaged trees in all directions. The measurement was taken in front of the administrative building of the Protestant Church of Hesse and Nassau: **3,370 µW/m².**

Site certificate from February 10, 2017: **28 sector antennas** (7 x 0°, 7 x 90°, 7 x 180°, 7 x 270°)
from September 29, 2020: **56 sector antennas** (14 x 0°, 14 x 90°, 14 x 180°, 14 x 270°)

26 JUL 2019 This is a view of Fränkisch-Crumbach on the Gersprenz River from the east. Mobile phone base station No. 200270 is located to the north. Mobile phone base station No. 200068, which has 20 antennas and a BOS digital radio, also emits RF radiation from the east. The impression of green trees from a distance is deceptive. Numerous cases of crown damage have been found. Several trees in the cemetery have already been pruned or cut down.

26 JUL 2019 This is a view from Erbacher Str. 30 of the damaged treetops facing Jahnstraße (view from the southwest). There is a direct line of sight to the base station in the north, which is 520 m (1,706 ft) away.
Nearby measurements were around **400 µW/m²**.

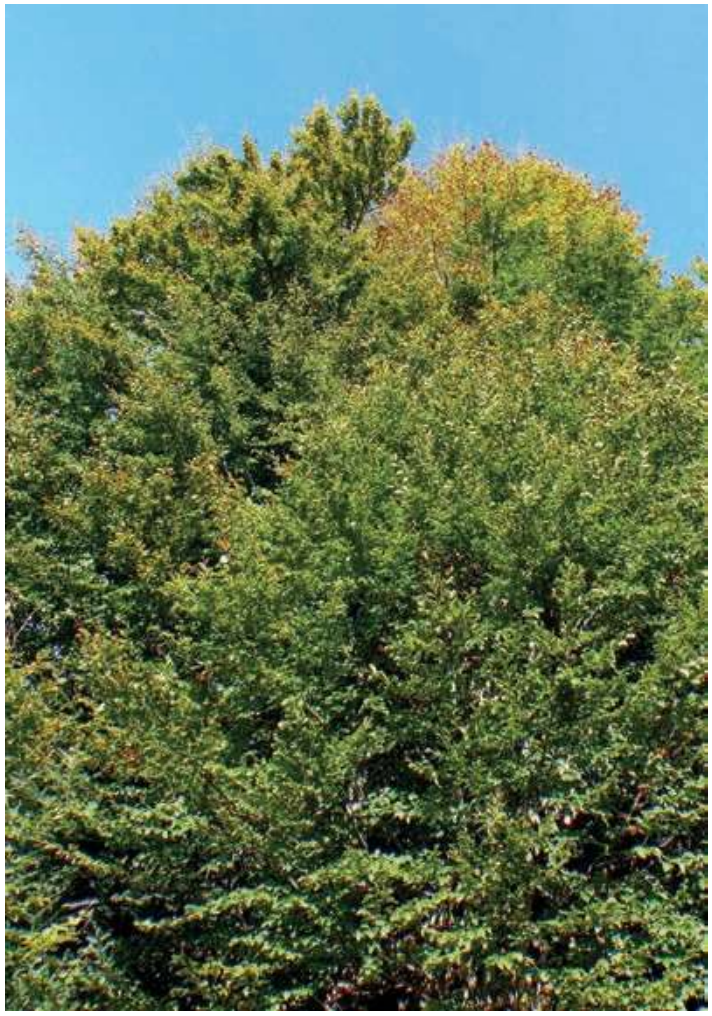
26 JUL 2019 This is a close-up of a group of conifers in the background of the photo on the left. RF radiation from mobile phone base stations strikes the trees from the east.

Mobile phone base stations:
North East

Trees with Dense Foliage at Locations with Low Ambient RF Radiation Levels in 2019

25 JUL 2019 Darmstadt, Soderstraße.
Sycamore, beech, and linden trees

10 SEP 2019 Frankfurt, Mendelsohnstraße 42.
Beech tree

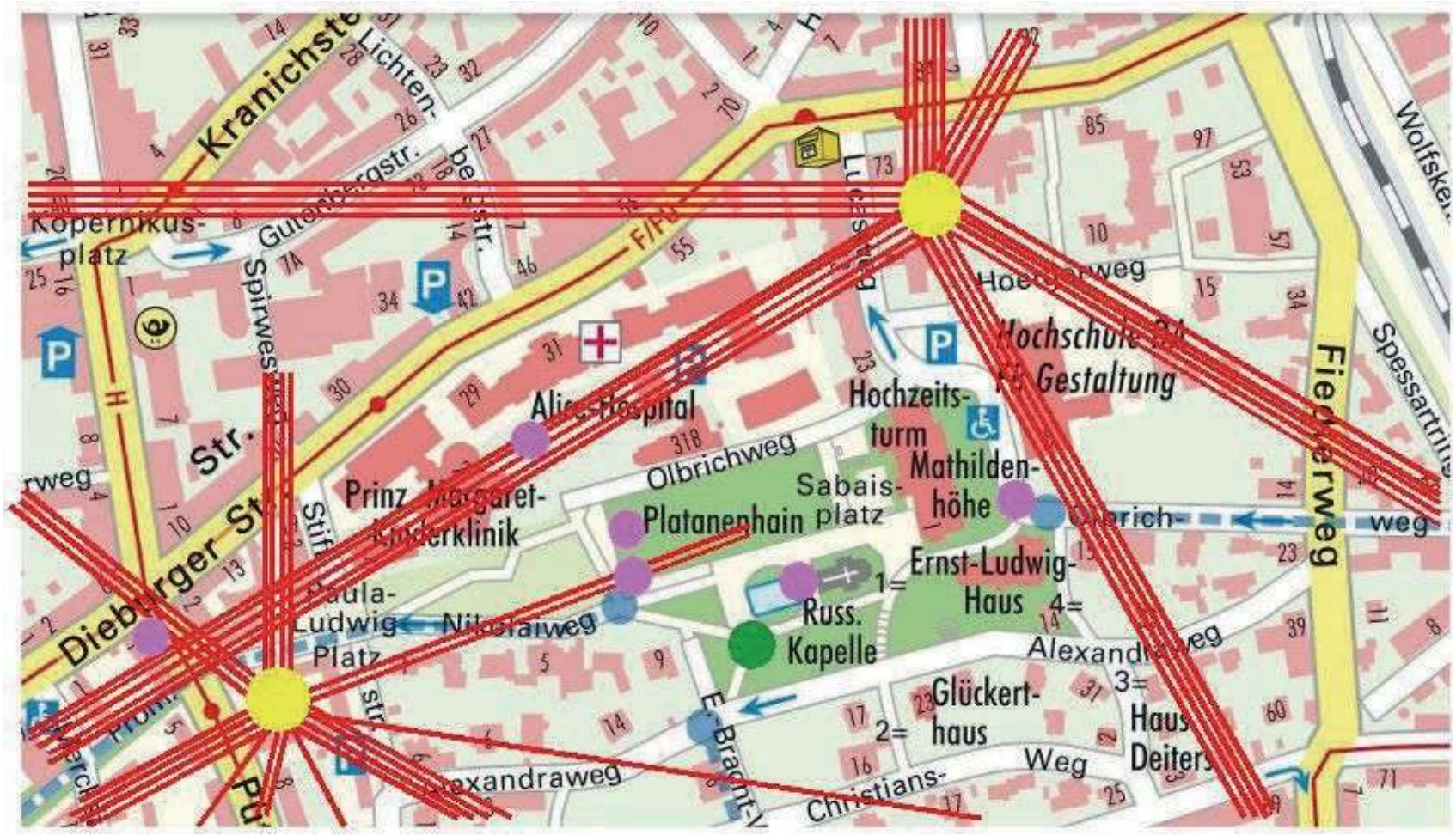


25 OCT 2019 Southeast of Freiburg-Günterstal.
Beech tree

During the second dry and hot summer, trees with dense foliage could be found in the shadow of buildings or mountains.

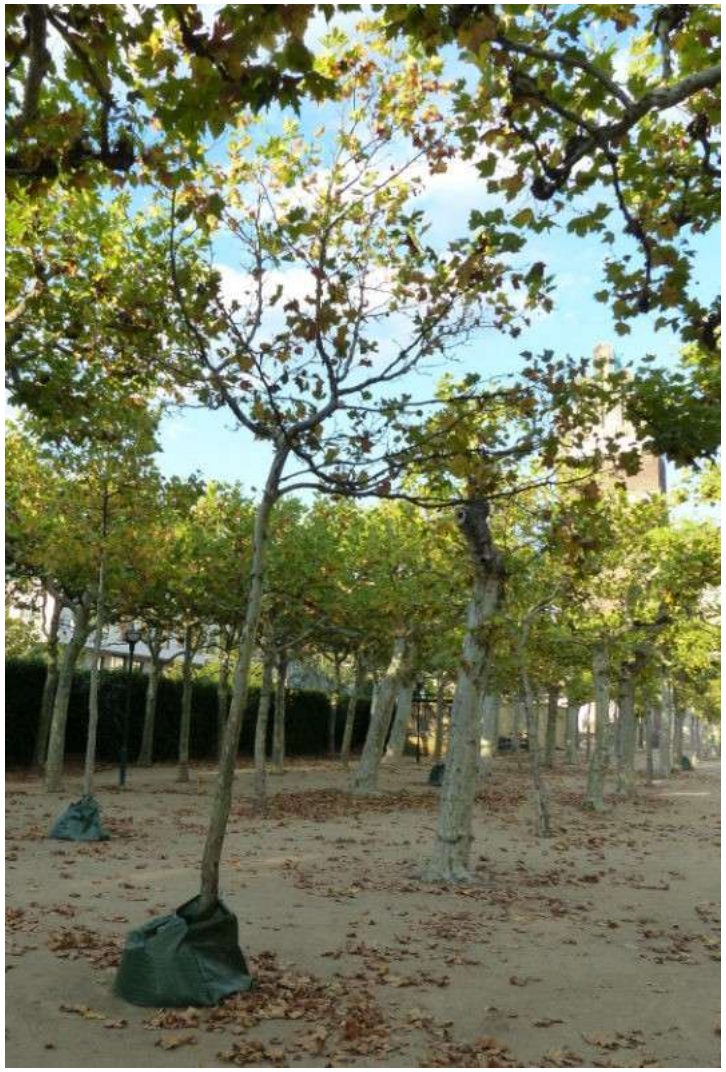
16 AUG 2020 Darmstadt, Mathildenhöhe. Oak tree (view from the southwest). There is a direct line of sight from the damaged north side of the oak tree to the mobile phone base station on Dieburger Straße, which is about 260 m (853 ft) away.
Measurement at the Russian Chapel: **620 µW/m²**. Many other trees in the park were also showing signs of damage.

Darmstadt: Mathildenhöhe Was Recognized as a World Heritage Site by the Unesco in July 2021



Section of the city map https://stadtatlas.darmstadt.de/. Added items: location of mobile phone base stations (yellow) with the main beam directions (red), measurement sites (purple), and the location of the oak tree (green).
Base station on Pützerstraße: installation height 29.9–32.8 m, **22 sector antennas** (4 x 0°, 2 x 70°, 4 x 120°, 150°, 2 x 190°, 210°, 4 x 240°, 3 x 310°)
Base station on Dieburger Straße: installation height 40.4–42.9 m, **27 sector antennas** (5 x 0°, 4 x 30°, 5 x 120°, 4 x 150°, 4 x 270°, 5 x 240°)

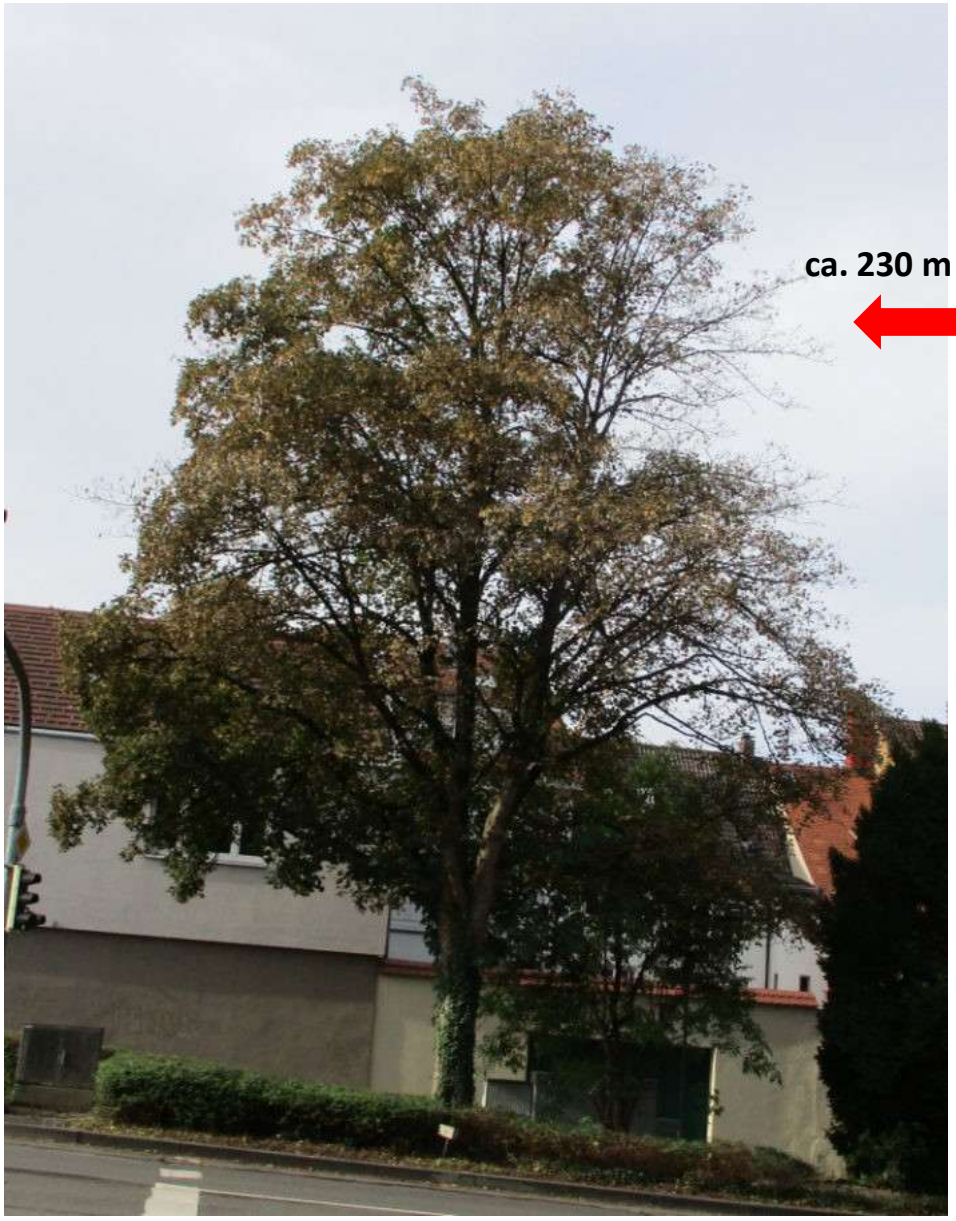
Darmstadt: Plane Tree Grove at the Intersection of Two Mobile Phone Base Stations



02 SEP 2019 Despite being irrigated, the replanted plane tree has already lost many leaves. Assuming soil compaction is the sole cause of the damage, trenches are being dug for aeration and irrigation as of January 2022. Unfortunately, it is feared that the plane trees will not thrive despite these efforts.

23 JAN 2020 The measurement was taken at the southwest corner of the plane tree grove: **6,240 µW/m².**

Ravensburg, 2020

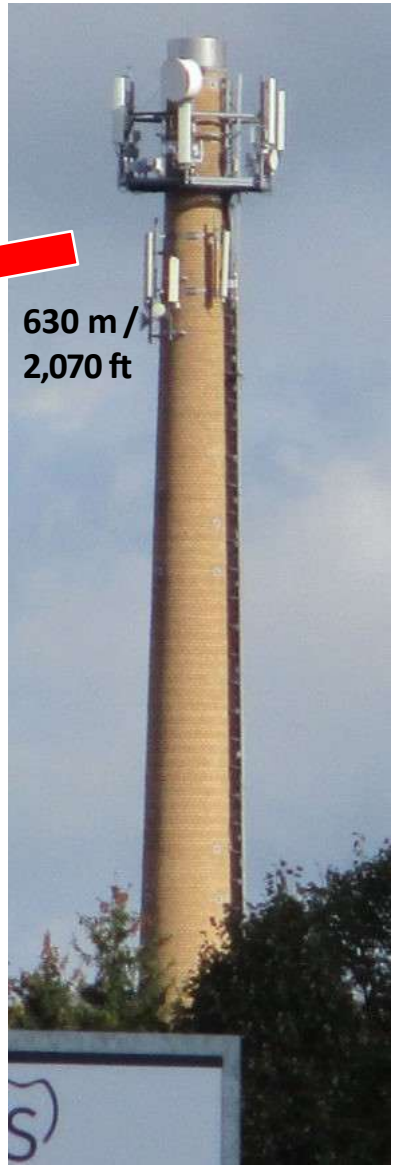


27 SEP 2020 Ravensburg, intersection of Wilhelmstraße and Frauenstraße. Sycamore tree (view from the northeast)

Mobile phone base station in the Blaserturm tower: installation height 47.3 m (155 ft), 12 sector antennas (2 x 5°, 2 x 80°, 2 x 140°, 2 x 180°, 2 x 230°, 2 x 320°)- The two 80° sector antennas sweep their two main beams across this section of Wilhelmstraße.

Bad Königshofen, 2020

11 OCT 2020 Bad Königshofen, Dr.-Ernst-Weber-Straße, high school / music school. Two sycamore trees (view from the southeast)



Mobile phone base station at Ottelmannshäuser Str. 3

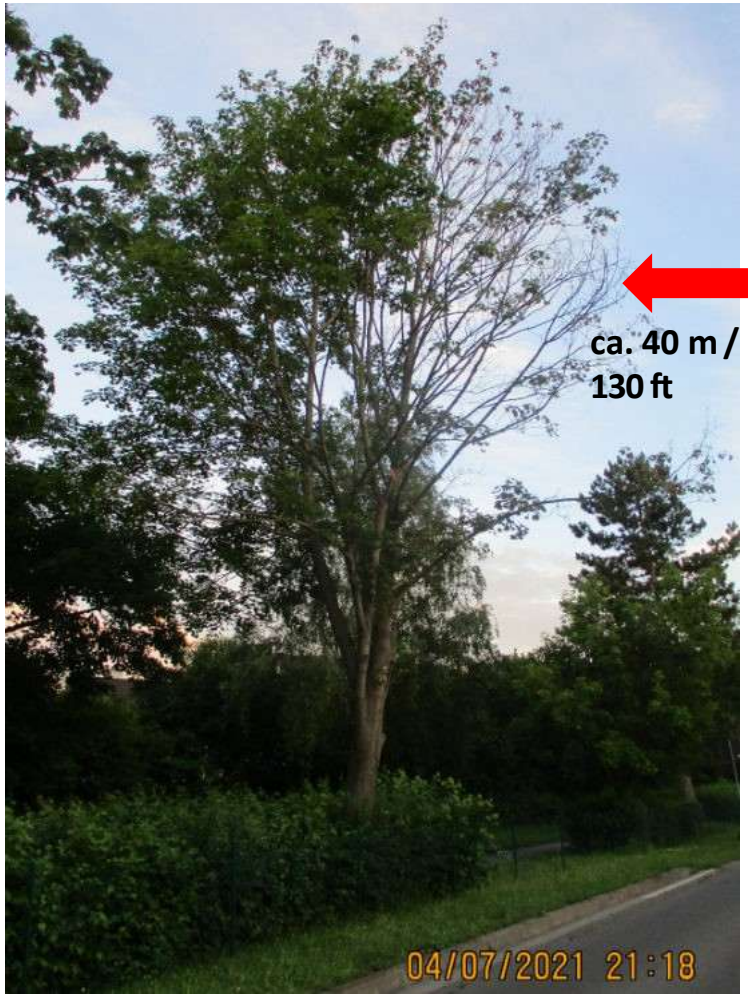
Mobile phone base station on the rooftop of the Institute of Chemistry.
Site certificate from December 23, 2019: installation height 31 m (100 ft), 9 sector antennas

15 JUN 21 Frankfurt, Riedberg Campus.
Two chestnut trees (view from the northwest).
Measurement: **16,900 µW/m²**

ca. 360 m / 1,180 ft

03 JUL 2021 Mobile phone base station above Nackenheim: installation height 22.9–43.6 m (75–143 ft), 33 sector antennas, 2 other transmitters

Lörzweiler Straße. Group of locust trees (view from the north)

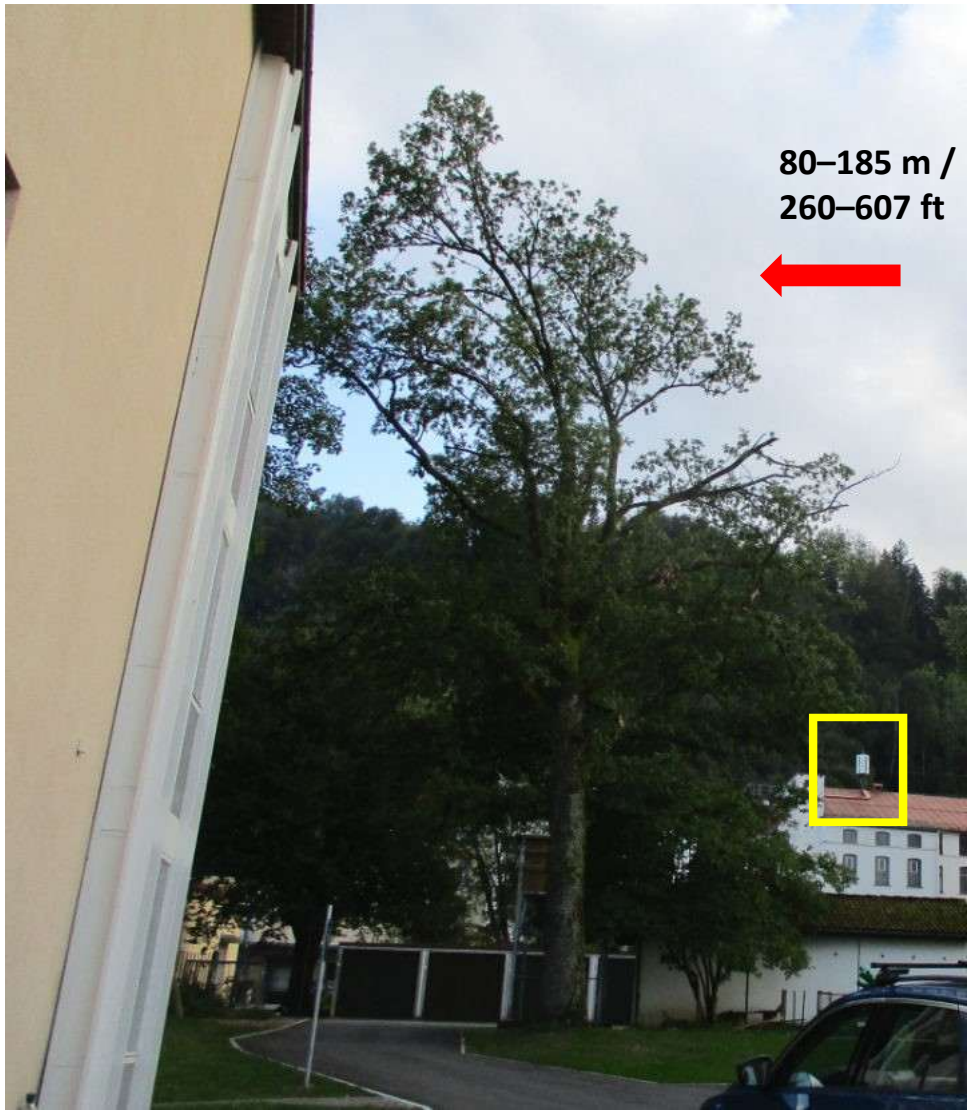


04 JUL 2021 Nierstein, Pestalozzistraße.
Maple tree (view from the north)

This is the same maple tree (view from the northeast) with the mobile phone base station at the intersection of Pestalozzistraße and Gutenbergstaße.
Installation height 25 m (82 ft), 24 sector antennas.
The foliage density of the birch tree differs from top to bottom.

07 JUL 2021 Nürtingen, Carl-Benz-Straße. Maple tree (view from the southwest)

Immenstadt, 2021



17 SEP 2021 Immenstadt, Obere Kolonie. Oak tree (view from the north).
Measurement: **9,250 µW/m²**
New residential houses were built on the right side of this street.
The residents are exposed to very high levels of RF radiation.

Thirty-three antennas from two mobile phone base stations are installed on the roof of a commercial building at Gottesackerstraße 2 (746 m / 2,448 ft above sea level). The base station numbers are No. 540274 and No. 541064.

Oberstdorf, Heini-Klopfer-Skiflugschanze (ski jump), 2021

Mobile phone base station transmitters divided between two lamp posts:
7 x 70°, 7 x 190°, 4 x 60°, 4 x 200°

16 SEP 2021 Sycamore avenue, east of the mobile phone base station (view from the southwest). Several trees had to be cut down in the last years.
The measurement was taken west of the base stations: **55,000 µW/m²**

Herrischried, District of Waldshut, Southern Black Forest, 2021

04 SEP 2021 Herrischried, intersection of Hummellochweg and Im Bündtenfeld. Birch tree (view from the south).
Measurement: **1,700 µW/m²**

1.5 km / 0.9 mi

Mobile phone base station with 37 sector antennas and TETRA

1 km / 0.6 mi

Kappellenstraße. Spruce stand (view from the northeast)

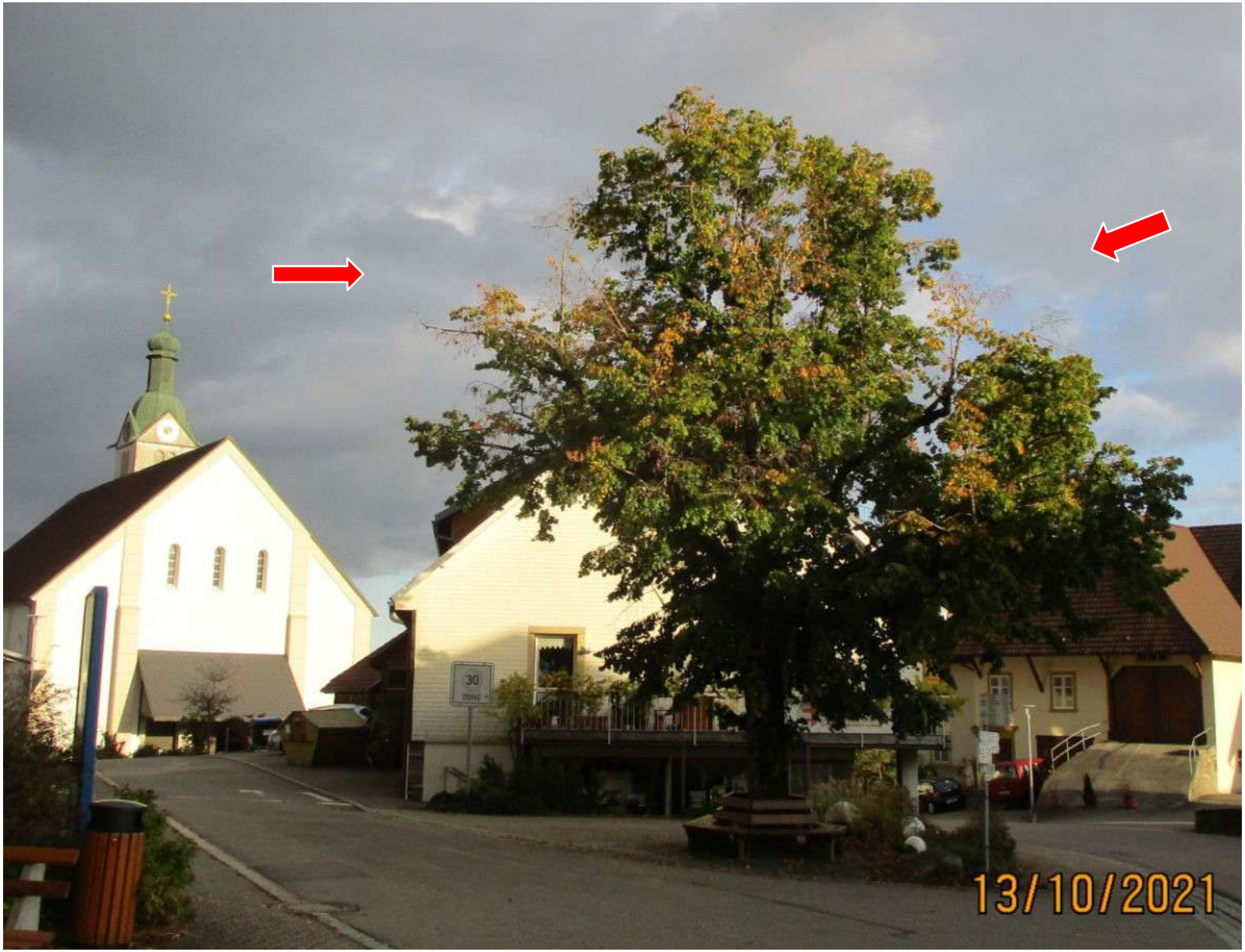
Ibach, District of Waldshut, Southern Black Forest, 2021

Measurement on the south side: **76.0 µW/m²**

13 OCT 2021 Ibach. Willow trees, south of the town hall, on the east side of the street (view from the east). The willow tree facing south has sparse foliage, while the one facing north has dense foliage. Quite a few conifers and deciduous trees between Unteribach and Oberibach showed signs of damage on one side of their crowns.

Measurement on the north side: **21.4 µW/m²**

Base Station Radiation from Two Directions Görwihl, District of Waldshut, 2021



13 OCT 2021 Görwihl, Kirchstraße and Hauptstraße. Linden tree (view from the west). There is crown damage on the north and south sides. The tree's canopy is exposed to RF radiation from base stations in Görwihl and Etzwihl.

20 SEP 2021 Munich, Hacker Bridge. Three hornbeam trees (view from the west)

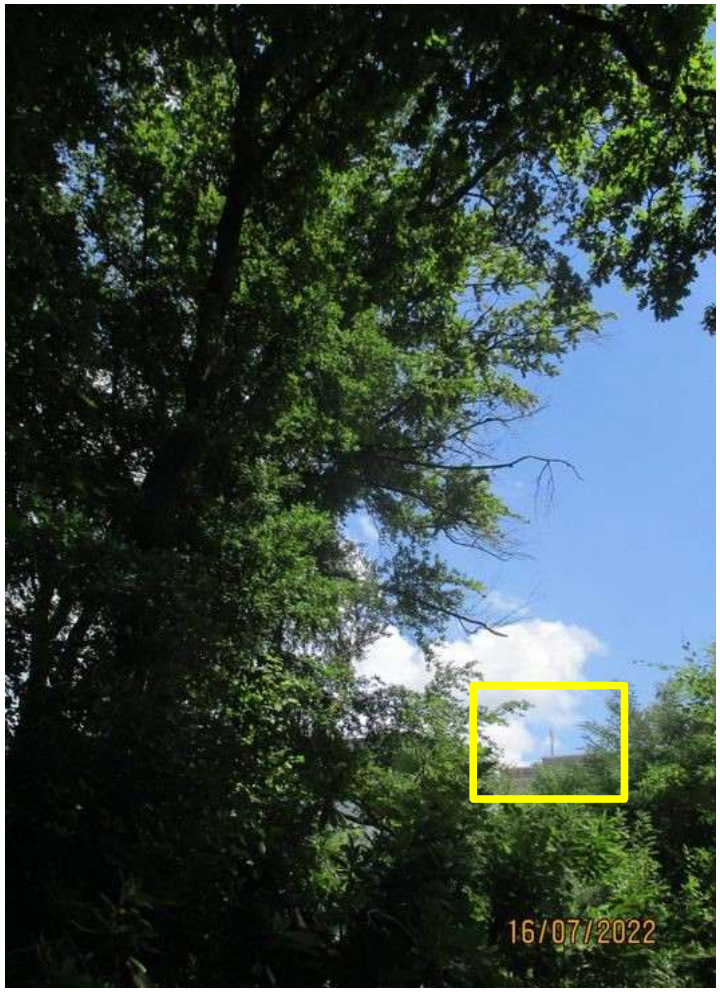
The beech tree in the front left is shielded by the beech trees standing farther back.

This beech tree is exposed to RF radiation from transmitters on Feldberg Mountain.

Grafenhausen, District of Waldshut, 2022

09 MAY 2022 Grafenhausen, intersection of state road L157 and Tannenmühlweg.
Fir tree (view from the north). The mobile phone base station is 590 m (1,935 ft) away.

Solingen, 2022



16 JUL 2022 Solingen, hospital.
Beech tree (view from the west).

22 JUN 2022 Intersection of Erich-Kuithan-Straße and Zitzmannstraße.
This red oak tree (view from the northwest) is 385 m (1,263 ft) away from the mobile phone base station.
The Google Street View above shows the red oak tree above in October 2022.

Mobile phone base station No. 890969 at Camberger Str. 68

Düsseldorf, 2022

17 JUL 2022 Röntgenring playground and park.
Oak tree, alder tree, and hazelnut tree (view from the southeast). The crowns of all three trees show damage on their northeast sides, which face the transmitter.
Measurement on May 23, 2023: 44,700 µW/m²

Potsdam, Sanssouci Park, 2022

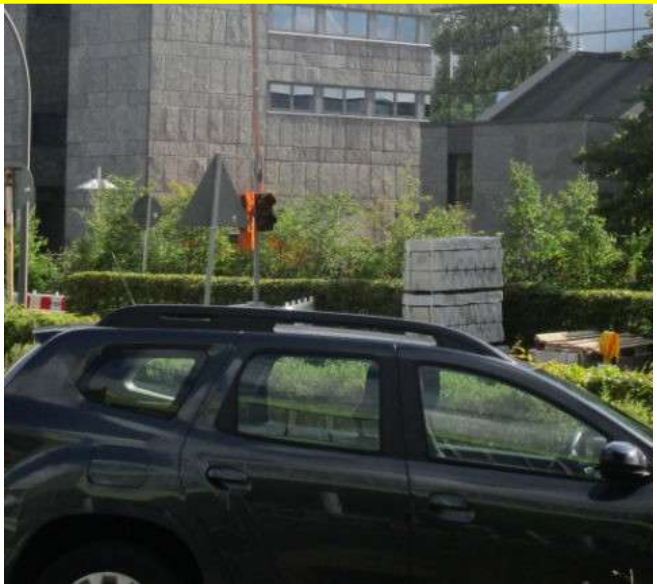
Photo: NN

24 SEP 2022 Group of beech trees with different sides. RF radiation from mobile phone base stations reaches the park from several directions. The 212-meter-high (695-foot-high) Schäferberg radio tower, which transmits DVB-T2, DAB+, FM, microwave radio, and mobile phone networks, is only 6 km (3.7 mi) away.

Fuldatal-Rothwesten, District of Kassel, 2022

11 OCT 2022 Reinhardswaldstraße. Two sycamore trees and two arborvitae trees (view from the south). Measurement: **1,200 µW/m²**. The Google Street View shows these trees in September 2023.

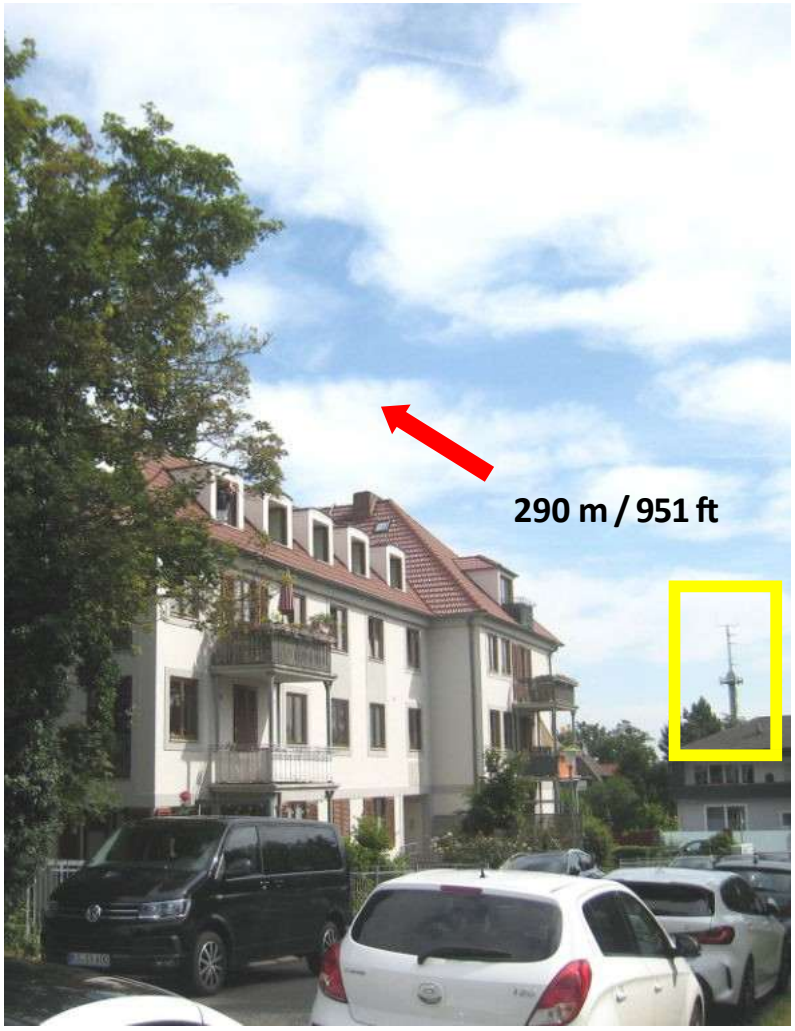
Mobile phone base station at Eichendorffstr. 5 (view from the east)



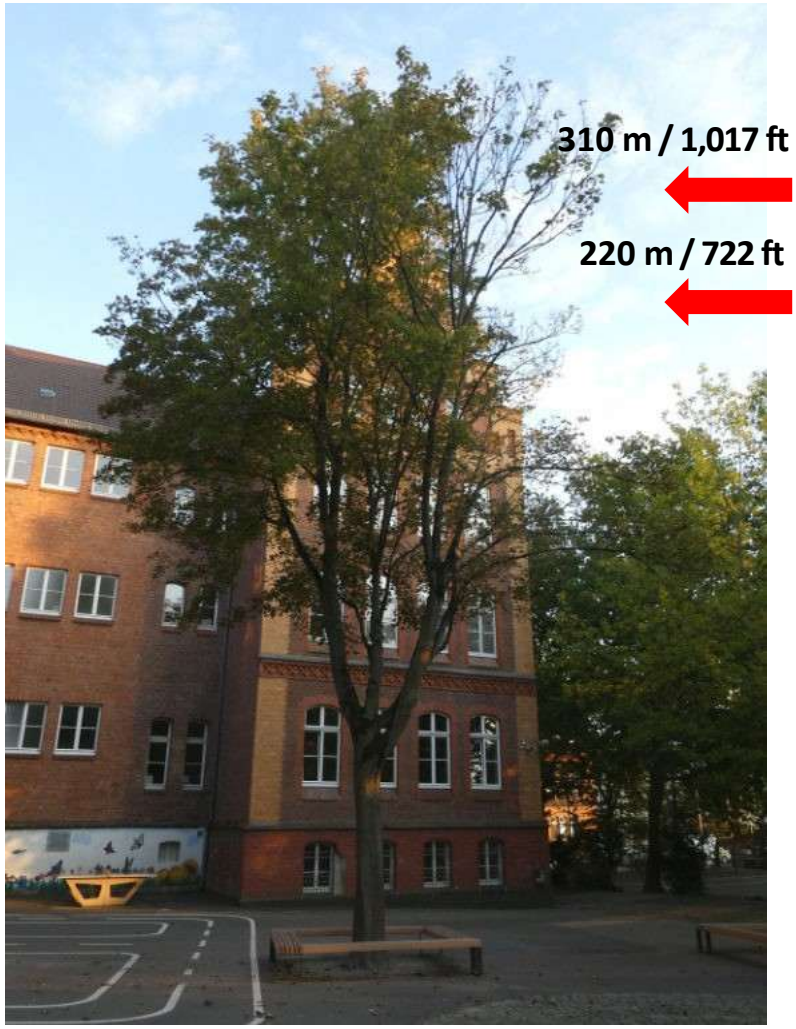
03 AUG 2023 Asklepios Clinic Altona, main entrance (view from the west).
Two linden trees: each is damaged on one side only.
There is a direct line of sight to the Helmbrook base station to the south.
Measurement on September 30, 2023: **77,300 µW/m²**

Site certificate No. 870124140, Helmbrook, with 36 sector antennas and 2 other transmitters.

Kassel, 2024

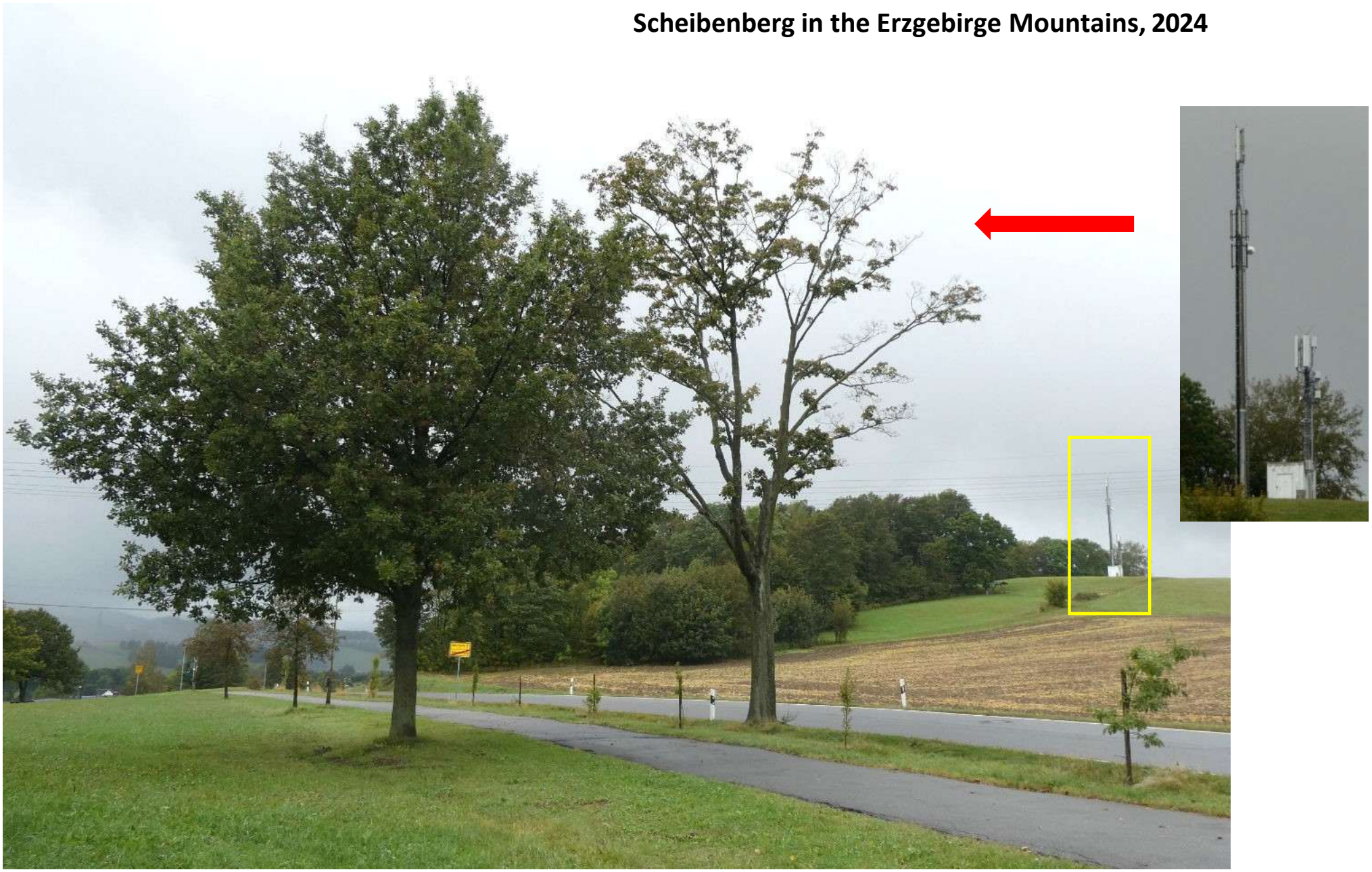


13 JUL 2023 Brabanter Straße.
Sycamore tree (view from the west).
Line of sight to the Hessischer Rundfunk (hr) radio tower.
Measurement: **8,460 µW/m²**



26 AUG 2024 Königstor School. Norway maple tree (view from the northeast).
Line of sight to the mobile phone base stations on Goethestraße and Murhardstraße.
Measurement at school building: **18,800 µW/m²**

Scheibenberg in the Erzgebirge Mountains, 2024



03 OCT 2024 Scheibenberg, western end of the municipality. Maple tree (view from the east).
Measurement: **95,000 µW/m²**

Hamburg, 2025

10 SEP 2025 Steintorplatz/Kirchenallee/Main Train Station South.
Oak tree (view from the east).
On the west side of the tree (right), the leaves are already yellow and have partially fallen. On the east side (left), the tree has dense, green foliage. Mobile phone base station radiation strikes the crown from the west.

Bad Malente-Gremsmühlen, District of Ostholstein, 2025

10 SEP 2025 Mobile phone base station at Diekseepromenade 2.
The maple tree on the right (red) has different sides (view from the southwest). The maple tree has already been pruned. The northern part of the crown (on the left) shows signs of damage again. Diekseepromenade and Plöner Straße run south from the base station. Many of the trees along the promenade and this street show crown damage on their northern side. Pruning has often already been carried out.
Measurements along the promenade: **2,000–21,000 µW/m²**

Mobile phone base station at Diekseepromenade 2, site certificate No. 320129 from September 01, 2023: installation height 47.2–49.6 m (154.9–162.7 ft), **36** sector antennas (4 x 0°, 3 x 35°, 5 x 40°, 3 x 105°, 4 x 120°, 5 x 160°, 3 x 200°, 4 x 240°, 5 x 280°)

Differences Between Upper and Lower Crown Areas

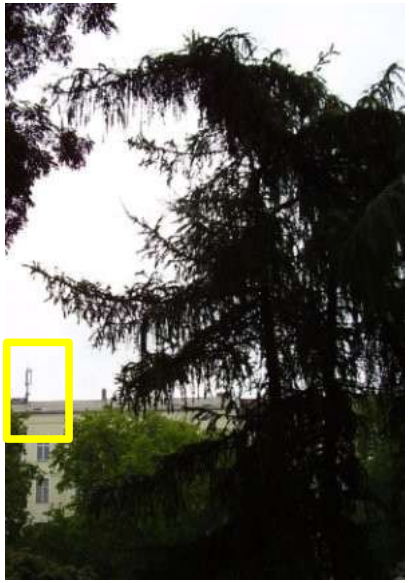
This difference is explained by the vertically focused radiation of the main beam and side lobes.

Bamberg, 2006

12 AUG 2006 Mobile phone base station at Schranne 3, Land Surveying Office.
Locust tree (view from the southeast). In addition, the tree was affected by RF radiation from the base station at Schützenstraße 23 in the southeast. The tree was cut down in 2011 due to a steady increase in damage over time.

Berlin, 2006

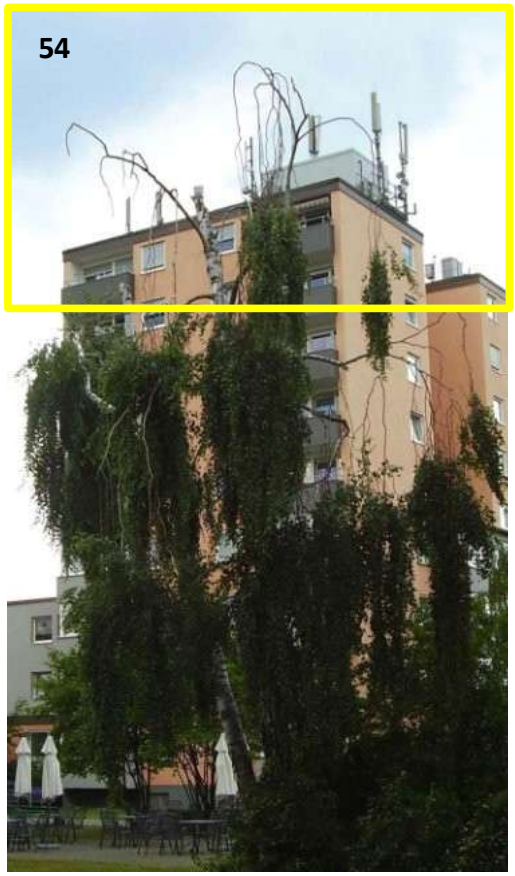
23 AUG 2006 Kollwitzplatz. The side lobes of the base station strike the upper crown area.



23 AUG 2006
Kollwitzplatz. The larch trees grew bent in order to remain below the main beams.

Mobile phone base station No. 671501, site certificate from July 9, 2010: installation height 18.4 m (60.4 ft), **12** sector antennas (2 x 10°, 2 x 100°, 2 x 130°, 2 x 190°, 2 x 250°, 2 x 270°)

Bamberg, Mobile Phone Base Station at Hauptsmoorstraße 26 a, 2008



08 JUL 2008 Mobile phone base station at Hauptsmoorstraße 26 a, courtyard. Birch tree (view from the northeast)

08 JUN 2008 Mobile phone base station at Hauptsmoorstraße 26 a (view from the northwest), AWO Retirement Home.

08 JUN 2008 Stauffenbergstraße. Spruce tree

A large number of trees were damaged in the area around this mobile phone base station (see pages 27 and 28).

Erlangen, 2008

02 JUL 2008 Werner-von-Siemens-Straße. Maple tree

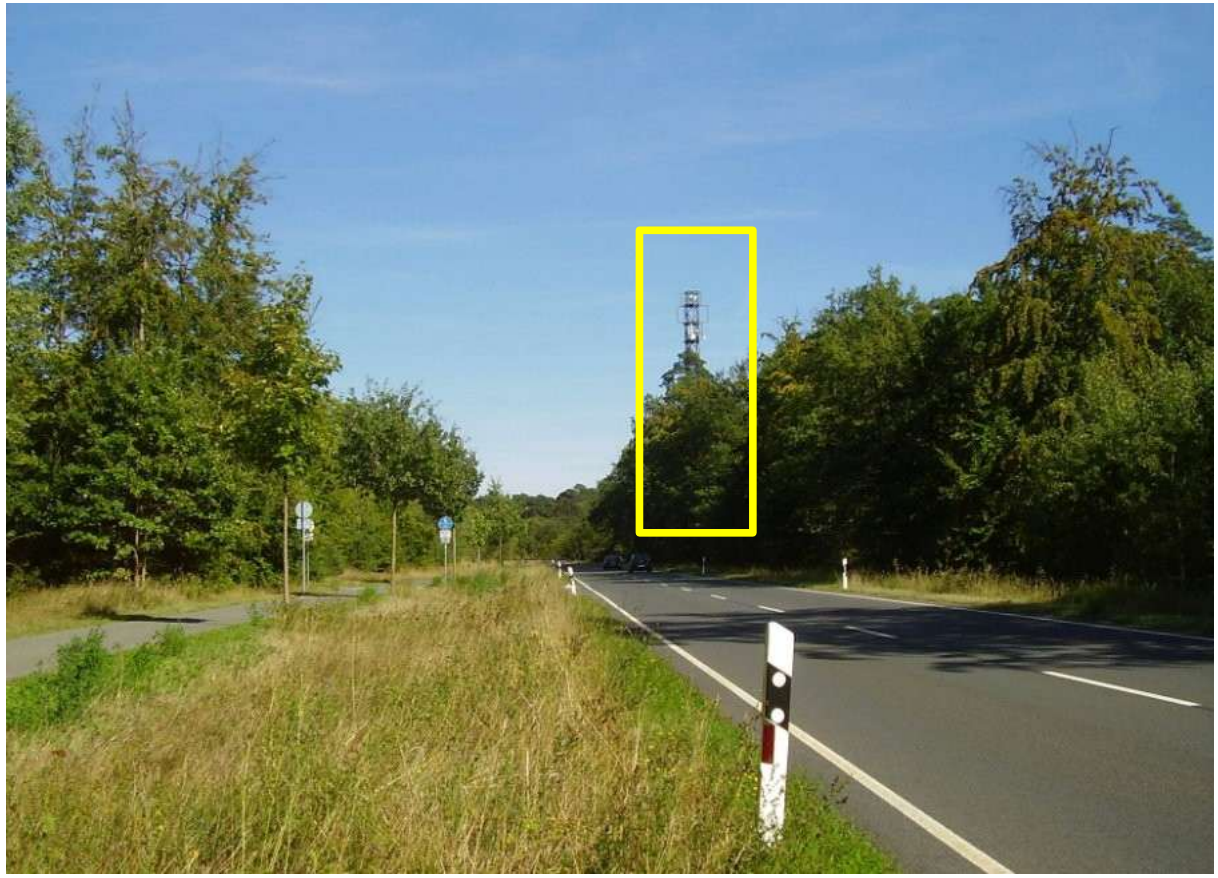
Aschaffenburg, 2008

10 SEP 2008 Intersection of Alexandrastraße and Schweinheimer Straße. Maple tree (view from the northwest)

Bayreuth, Maximilianstraße, 2009

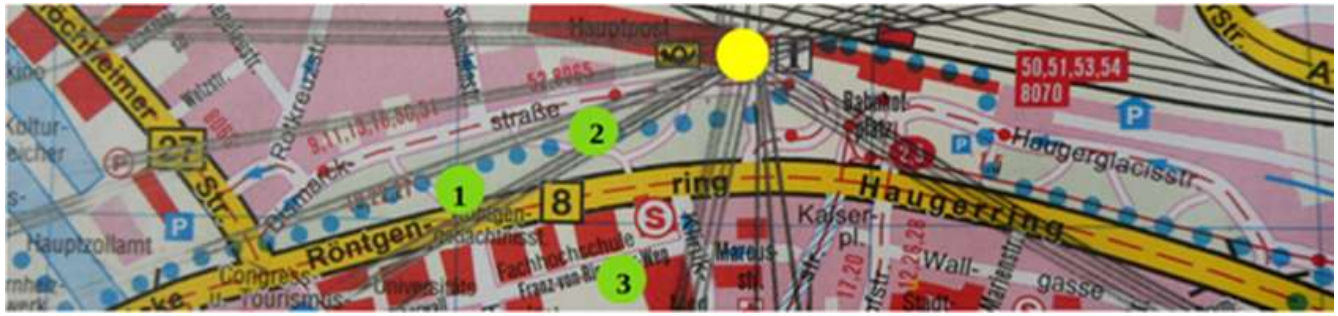
11 MAY 2009 Maximilianstraße (view from the southeast). The upper and lower parts of the tree are different.

District of Bamberg, Hauptsmoor Forest, 2009



31 AUG 2009 Geisfelder Straße, 1 km (0.6 mi) to the east of Bamberg, Hauptsmoor Forest. Beech trees (view from the west). There was visible evidence of crown damage in the upper thirds of the beech and oak trees on both sides of the road.

Würzburg, Ringpark and Julius Hospital, 2010



Section of the Cityplan, Falk. Added items: mobile phone base station (yellow) with the main beam directions of 36 sector antennas. The green dots represent the three trees below.

Near Röntgenring/Koellikerstraße

Impaired linear growth

Parking at Julius hospital. Sycamore

Base station at Bahnhofplatz 2

29 APR 2010 Ringpark, west of the train station. On the way from the train station to the conference center through the Ringpark, numerous instances of tree damage and growth abnormalities were noticed. Some trees had been pruned or cut down. From the base station on Bahnhofplatz, the beams of 15 antennas reach the Ringpark. **Meanwhile, in the shadow of buildings, the conifers and deciduous trees in Würzburg were unremarkable on the same day.**

Mobile phone base station on the high-rise building at Bahnhofplatz 2, No. 660076, site certificate from June 23, 2008: installation height 42.7–52 m (140–170.6 ft), 36 **sector antennas** (5 x 0°, 55°, 4 x 70°, 2 x 80°, 5 x 120°, 170°, 175°, 180°, 4 x 190°, 3 x 240°, 2 x 250°, 2 x 260°, 4 x 270°, 295°)

Regensburg, Green Space, 2010

28 MAY 2010 Intersection of Albertstraße and Maximilianstraße. Maple tree (view from the west)

Stuttgart, Urbanstraße, 2010

03 JUL 2010 Intersection of Urbanstraße and Ulrichstraße. Locust tree (view from the south). RF radiation exposure from the base station on the courthouse to the east and the base stations in the city center from the northwest, west, and southwest.

Nuremberg-Schweinau, 2013

08 JUL 2013 Nuremberg-Schweinau, Geisseestraße. Sycamore tree (view from the west)

Berlin, 2017

15 SEP 2017 Intersection of Stülerstraße and Corneliustraße. Linden tree, obvious difference between upper and lower halves. The measurements were taken at a height of 1.5 m (5 ft) and 6 m (20 ft) using a telescopic rod.

Mainz, 2019

10 SEP 2019 Rheinallee. Row of linden trees (view from the northeast), difference between upper and lower halves. The maple tree on the left shows browning only on its north side.

10 SEP 2019 Mobile phone base station at the intersection of Kaiserstraße and Rheinallee.
How is everyone doing here?

Bamberg, 2019

24 JUN 2019 Bischofsmühl Bridge, Regnitz River. Birch tree (view from the south). There is a direct line of sight from the top of the tree to the mobile phone base station at Schranne 3.

Bamberg, 2021

07 JUN 2021 Bürgerpark Hain, pond. Willow tree. The upper third of this tree is exposed to the RF radiation from the mobile phone base station on Gutenbergstraße.

Solingen, 2022

25 MAY 2022 Intersection of Wilhelmstraße and Zweibrücker Straße. Silver maple tree (view from the northwest).
Measurement: **1,530 µW/m²**

Trees Growing Horizontally to Stay Below the Main Beams

Bamberg, District Office, Red Oak, 2008–2021

From the glass stairwell of the district administration office, you can see over the red oak tree to the mobile phone base station on the opposite building.

2008

09 OCT 2008 The crown of the red oak tree is sparse and partially dry. There is a line of sight to the Atrium mobile phone base station.

2017

03 SEP 2017 The red oak tree grew horizontally.

2021

03 JUN 2021 The red oak has not grown in height in 13 years.

Göttingen, Georg August University, Pine Tree, 2010–2021

2010 **2015** **2021**

04 JUN 2010 Campus, east side of the multiuse building. Pine tree (view from the northeast)

10 JUL 2015

28 APR 2021

Mobile phone base station No. 241142, as of January 24, 2014: installation height 27.5 m (90 ft), 12 sector antennas (3 x 0°, 60°, 3 x 120°, 180°, 3 x 240°, 3 x 300°).

This tree's unusual growth pattern was first noticed in 2010. Instead of growing upward, it grew horizontally as it continued to grow. This suggests that the tree is avoiding growing into the main beams of the antennas.

Göttingen, Georg August University, Red Oak Tree, 2015

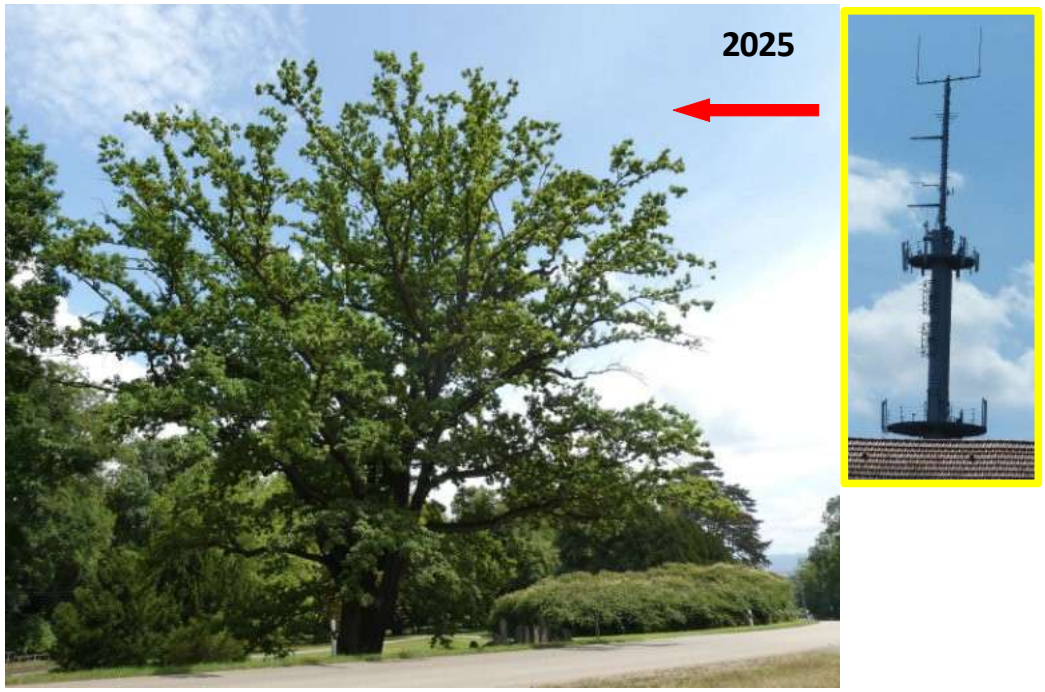
10 JUL 2015 Göttingen, University Campus. Red oak tree to the east of the blue tower (view from the west), no leaf growth on the right or top. The remaining leaves are partly yellow and growing horizontally, not upward. The main beams from the three 0° sector antennas of the mobile phone base station on the multiuse building strike the red oak tree.

Measurement near the read oak tree: 1,030 µW/m².

The red oak tree was cut back several times before it was cut down entirely.

There is a mobile phone base station (view from the west) on this multiuse building in the central square of the university, "Platz der Göttinger Sieben."

Kassel, Wilhelmshöher Allee, Oak Tree, 2016–2025



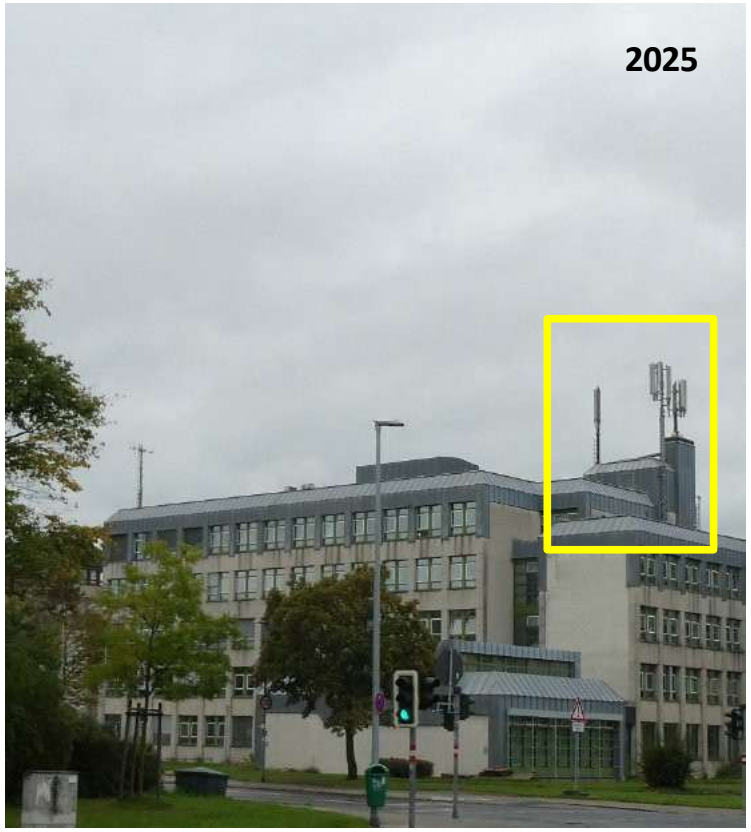
31 AUG 2016 Wilhelmshöher Allee, west end of the avenue. Oak tree (view from the west). The oak tree is strikingly wide. RF radiation from mobile base station No. 240044 at the Hessischer Rundfunk (hr) radio tower strikes it from the southeast.

25 JUL 2025 The oak tree did not grow any taller. Its foliage became increasingly sparse year after year. Since 2020, the oak tree has also been exposed to RF radiation from the mobile phone base station on the Schlosshotel to the northwest.
The measurement was taken 50 m (164 ft) northwest of the oak tree: **620 µW/m²**.

Site certificate from **March 14, 2014**: installation height 30–42 m (18–26 ft), **21** sector antennas (0°, 6 x 60°, 120°, 6 x 180°, 240°, 6 x 300°), 9 other transmitters, BOS digital radio
Site certificate from **January 13, 2025**: installation height 30–42 m (18–26 ft), **45** sector antennas (0°, 14 x 60°, 120°, 14 x 180°, 240°, 14 x 300°), 9 other transmitters, BOS digital radio

Bamberg, Eichendorff High School and Police Headquarters, Red Oak Tree, 2017–2025

23 JUN 2017 Eichendorff High School (northwest corner), intersection of Schildstraße and Starkenfeldstraße. Red oak tree (view from the northeast), transmitters on the police headquarters. The red oak tree is strikingly wide. The top half has only sparse foliage. Additional examples of the area around the police headquarters can be found on pages 205 and 213. .



25 SEP 2025 Intersection of Schildstraße and Starkenfeldstraße (view from the northeast). The red oak tree has since been removed. At the mobile phone base station, the number of antennas gradually increased from 6 in 2010 to 63 in 2025.

Site certificate from **December 15, 2010**: installation height 23.1 m (75. 8 ft) , **6** sector antennas (2 x 110°, 2 x 230°, 2 x 350°), 11 other transmitters
Site certificate from **May 26, 2025**: installation height 22.5–23,9 m (73.8–78.4 ft), **63** sector antennas (3 x 5°, 12 x 95°, 9 x 110°, 3 x 210°, 12 x 215°, 6 x 230°, 12 x 335°, 6 x 350°)

Kassel, Ihringshäuser Straße, Maple Tree and Conifer, 2018–2023

06 NOV 2018 Ihringshäuser Straße.
Maple tree and conifer (view from the south).
Left: The maple tree grew only horizontally to stay below the main beams.
Right: The conifer had a blunt top and no branches in the upper part.
The measurements were around **1,000 µW/m²**.

29 JUN 2023 Ihringshäuser Straße.
Maple tree and conifer (view from the south). From 2018 to 2023, neither the maple tree nor the conifer grew any taller. On September 10, 2023, **peak values of up to 280,000 µW/m²** were recorded here. In 2024, the top third of the conifer tree turned brown.

Base station site certificate No. 240217 from **February 5, 2015: 28** sector antennas (4 x 0°, 6 x 60°, 3 x 120°, 6 x 180°, 3 x 240°, 6 x 300°)
from **November 24, 2020: 31** sector antennas (4 x 0°, 7 x 60°, 3 x 120°, 7 x 180°, 3 x 240°, 7 x 300°)

Hamburg, 2023

05 AUG 2023 Planten un Blomen Park, near rose garden (view from the west)

Syke-Heiligenfelde, Oak Tree, 2023

05 SEP 2023 Syke, district of Heiligenfelde.
English oak tree (view from the north).
Mobile phone base station site certificate from December 20, 2022: installation height: 29–37 m (95–121 ft), 45 sector antennas, BOS digital radio, 3 other transmitters

Hannoversch Münden, Red Oak Tree, 2023

07 OCT 2023 Am Feuerteich. Red oak tree (view from the northwest). Mobile phone base station site certificate from October 19, 2021: installation height 30.5–33 m (100–108 ft), 21 sector antennas (3 x 0°, 50°, 3 x 110°, 3 x 120°, 210°, 6 x 240°, 330°, 2 x 350°)

Rostock-Warnemünde, Pine Tree, 2025

20 JUN 2025 Spa gardens. Group of pine trees (view from the southwest). Mobile phone base station at the Leibniz Institute for Baltic Sea Research (IOW), site certificate from August 3, 2022: installation height 21.7–23 m (71–75 ft), 18 sector antennas (6 x 0°, 6 x 120°, 6 x 240°)

Differences within a Row of Trees

Bamberg, Gutenbergstraße, Four Maple Trees, June 2008

Mobile phone base station No. 671069 at Gutenbergstraße 20: installation height 38.6–47 m (127–154 ft), 22 sector antennas

20 JUN 2008 Gutenbergstraße. Four maple trees. Even though the conditions in this meadow are largely the same, the maple trees have developed very differently. From maple tree No. 1 on the left, there is a direct line of sight to the base station, which is 290 m (951 ft) away. However, maple tree No. 4, on the right, has a blocked view due to a building at an angle.
Measurements: maple tree on the left: 560 µW/m², maple tree on the right: 50 µW/m²

Site certificate from June 30, 2022: 22 sector antennas (3 x 0°, 2 x 95°, 3 x 120°, 2 x 130°, 140°, 2 x 215°, 2 x 240°, 2 x 270°, 2 x 300°, 2 x 335°, 340°)

Bamberg, Michelsberg, Row of Chestnut Trees, June 2008

29 JUN 2008 Intersection of Michelsberg and Storchsgasse. Chestnut tree with brown leaf edges (view from the south-southwest). Above and below this tree, there were dense, green-leaved chestnut trees in small root pits. Only the brown chestnut tree offered a clear view of the Altenburg Castle. An aerial photograph taken on September 29, 2004, already showed brown discoloration and premature leaf loss. Measurements on October 4, 2008:
120 µW/m² at brown chestnut tree, 5 µW/m² at the entrance to the abbey

29 JUN 2008 View from the intersection through Storchsgasse to the Altenburg Castle (view from the north-northeast) with the mobile phone base station No. 670765, which is 1.5 km (0.9 mi) away.

Site certificate from October 21, 2010: 17 sector antennas (10°, 2 x 20°, 2 x 45°, 50°, 90°, 2 x 120°, 2 x 140°, 150°, 165°, 230°, 2 x 245°, 250°)

Bamberg, Schildstraße, Row of Linden Trees, October 12, 2013

Mobile phone base station No. 671627 at Schwarzenbergstr. 50

12 OCT 2013 Schildstraße. Row of linden trees with striking differences (view from the south). There is a gap in the western row of houses at the location of the brown linden trees. RF radiation from the mobile phone base station at Schwarzenbergstr. 50, located 410 m (1,345 ft) away, passes through the gap and reaches the trees.

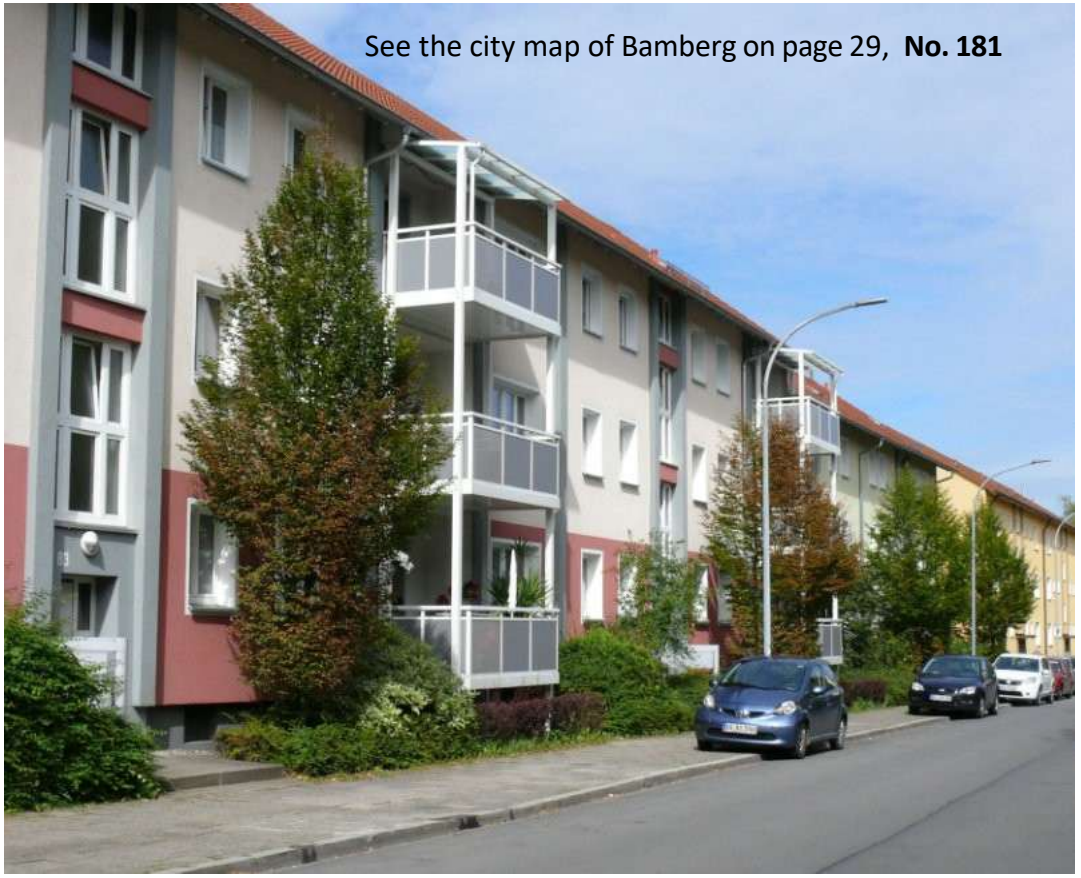
Measurement at brown linden tree: **520 µW/m²**

Site certificate from June 27, 2008: installation height 23.1 m (75.8 ft), 12 sector antennas (3 x 60°, 95°, 3 x 150°, 215°, 3 x 240°, 335°)

Bamberg, Market Gardeners' District, Hauptsmoorstraße, Row of Hornbeam Trees, August 2014

25 AUG 2014
Mobile phone base station No. 670976 at Hauptsmoorstr. 26 a: installation height 26.6–31.1 m (87.3–102 ft), 18 sector antennas (as of 2010)

See the city map of Bamberg on page 29, **No. 181**



25 AUG 2014 Hauptsmoorstraße 83 to 89. Row of hornbeam trees (**view from the southeast**). RF radiation from the **south** strikes the hornbeam trees. The two northern hornbeam trees (No. 87 and No. 89) are partially shielded from RF radiation by the trees standing to their south (No. 83 and No. 85). The former have green foliage. The mobile phone base station is 430–480 m (1,410–1,575 ft) away.

25 AUG 2014
Hauptsmoorstraße 85: **1,180 µW/m²**
Hauptsmoorstraße 89: **280 µW/m²**
The above measurements show the difference in RF radiation exposure.

Site certificate from September 2, 2010: installation height 23.1 m (75.8 ft), 12 sector antennas (3 x 60°, 95°, 3 x 150°, 215°, 3 x 240°, 335°)

documenta Project **7000 OAK TREES** **Joseph Beuys**

Most of the 7,000 trees were planted in rows, avenues, and groups between 1982 and 1987. **They have developed very differently.** Some have already had to be removed. The replanted trees are not thriving. Mobile phone base stations were installed beginning in 1992. Some of Joseph Beuys' trees are exposed to RF radiation.

Kassel, Ludwig-Mond-Straße, 124 read oak trees were planted in 1984

Ludwig-Mond-Straße/near Bantzerstraße

Ludwig-Mond-Straße/Adolf-Straße

Ludwig-Mond-Straße/Heinrich-Heine-Straße

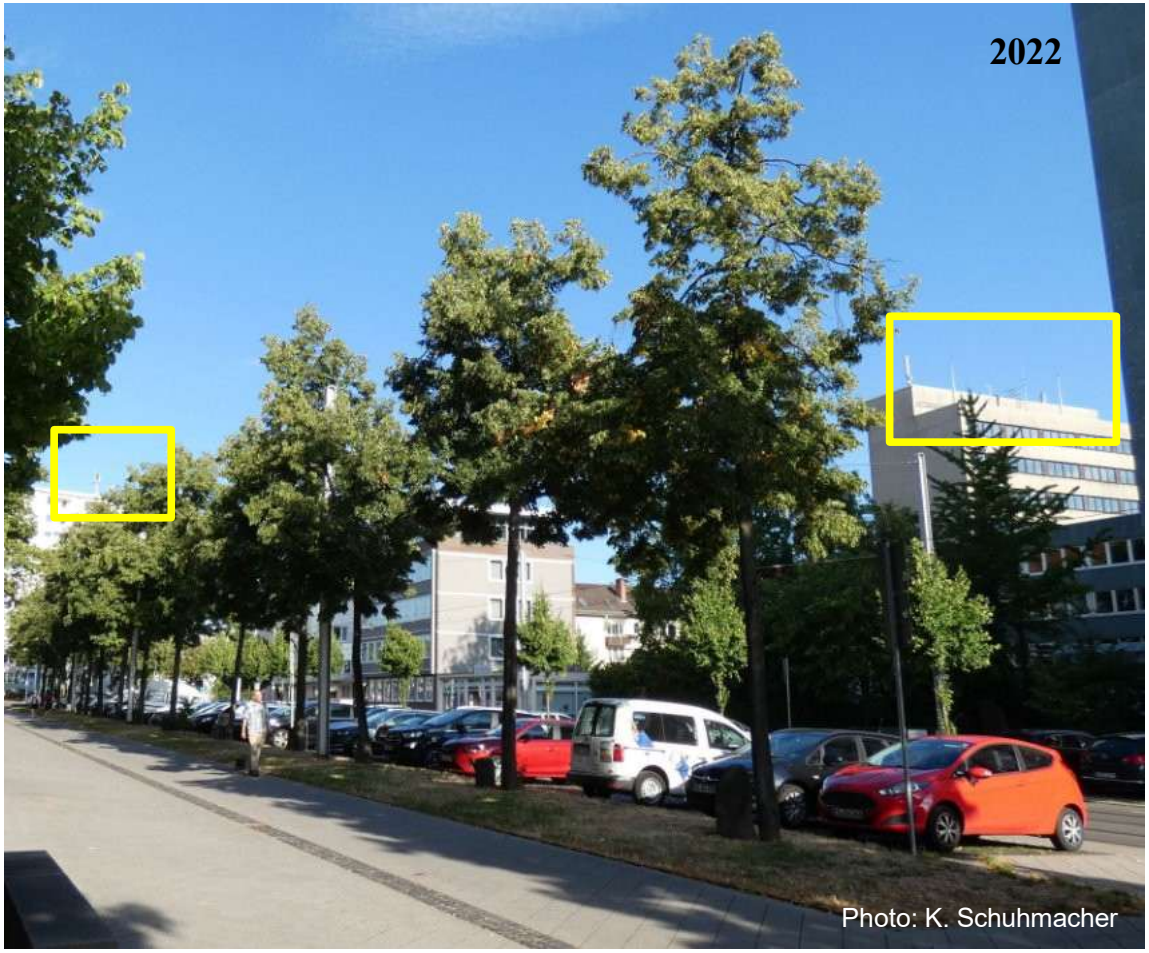
12 JUN 2017 The red oak trees have developed quite differently in different areas. RF radiation from four base stations affects the 1.2-kilometer-long (0.75-mile-long) ascending road. More than 15 red oak trees had to be replanted. However, the replanted trees are not thriving.

The geoportal of the city of Kassel provides information about the location, species, and planting (or replanting) time of the 7,000 oak trees.

Kassel, Goethestraße, 34 Linden Trees Planted in 1984

In 1984, 34 linden trees were planted on Goethestraße. Even before the dry and hot periods, they were already growing poorly. There is a direct line of sight to two mobile phone base stations.

14 JUN 2017 Section of the row of linden trees (view from the west)



03 AUG 2022 Row of linden trees with a direct line of sight to the mobile phone base station on Murhardstraße and Goethestraße (view from the west).
The measurements taken along the sidewalk ranged from **6,600** to **11,000 µW/m²**.

Kassel, Goethestraße, 34 Linden Trees Planted in 1984, 2022/2024

2022 **2024**

03 AUG 2022 Kassel, Goethestraße. Three of Beuys' linden trees (view from the north)

26 AUG 2024 The most severely damaged linden tree had to be cut down. For years, it had stood in the main beam of two 0° sector antennas, and, starting in 2021, five more, which were 70 m (230 ft) away. **Measurement: 96,000 µW/m²**

Mobile phone base station No. 241668 on Murhardstraße. The number of antennas of the base station increased from 5 in 2016 to 21 in 2021.
Site certificate from **June 21, 2016**: installation height 34.4 m (112.9 ft), **5 sector antennas** (2 x 0°, 2 x 120°, 240°)
Site certificate from **September 9, 2021**: installation height 38.3 m (125.7 ft), **21 sector antennas** (7 x 0°, 7 x 120°, 7 x 240°)

Kassel, Weserstraße, 22 Locust Trees Planted in 1986

The base station at Weserstraße 28 emits RF radiation in both directions, southward and northward, onto the locust trees. The differences between the trees are evident. Trees had to be removed in 2006, 2007, 2013, 2022, and other years. As of July 20, 2025, the southernmost tree still had dense foliage. The replanted locust trees are not thriving. Heat, drought, and unfavorable site conditions, which affect all trees equally, cannot explain these differences. The varying RF radiation exposure levels due to focused main beams and side lobes, as well as reflection from buildings and attenuation by the trees in front of them, can explain these differences. Will the replanted Hungarian oak trees tolerate the RF radiation?

20 JUL 2025 Intersection of Weserstraße and Kurt-Wolters-Straße. The three southernmost locust trees are on the western side (view from the east). The RF radiation is attenuated by the two trees on the right. **Of the two, the southernmost locust tree looks the best.**

20 JUL 2025 Weserstraße. Locust tree avenue and mobile phone base station No. 241079 (view from the south). Some locust trees have sparse foliage. There are dry branches that can break off.

20 JUL 2025 Weserstraße. Replanted locust tree with a dead top (view from the north).

Site certificate from October 25, 2018: installation height 25.2–26.9 m (82.7–88.3), 18 sector antennas (3 x 0°, 3 x 60°, 3 x 120°, 3 x 180°, 3 x 240°, 3 x 300°)

Kassel, Weserstraße, 9 Pyramidal Oak Trees Planted in 2008

2025

2025

9 8 7 6 5 4 3

21 AUG 2025 Weserstraße. Pyramidal oak trees No. 3 through No. 9 (**view from the west**). The pyramidal oak tree No. 4 is significantly smaller and has yellow leaves.

21 AUG 2025 Pyramidal oak tree **No. 4** (**view from the southeast**), **direct line of sight** to the mobile phone base station on Untere Königstraße, which is 460 m (1,509 ft) away. Measurement: **28,300 µW/m²**

21 AUG 2025 Pyramidal oak tree **No. 5** (**view from the southeast**), **no line of sight** due to an apartment building to the west. The five-story tax office building to the east is exposed to RF radiation that is reflected off of it. Measurement: **2,630 µW/m²**

Tree Damage near Bodies of Water

Bamberg, Buger Spitze Between the Right and Left Arm of the Regnitz River, 2007/2010

On September 12, 2007, the premature yellowing of a beech tree was noticed at Buger Spitze. Part of the crown is shown in the above picture.

The Buger Spitze is located within the radio frequency field of two mobile phone base stations, one of which is 1.9 km (1.2 mi) away and the other is 3.5 km (2.2 mi) away. It is also within the reach of the Geisberg radio tower and the Kälberberg TV tower, both of which are 11.5 km (7.2 mi) away.

01 JUL 2010 Compared to 2007, the damage has increased significantly. The beech tree and other trees were cut down later.

Mobile phone base station at Gutenbergstr. 20:
Height: 38.6–47 m
Sector antennas: 22
Distance: 1.9 km (1.2 mi)
The Geisberg radio tower is in the background.

Bamberg, Aerial Photographs of Buger Spitze, 2002–2020

2002

Orthophoto map, Dietrich Photogrammetrie, May 31, 2002

2020

Bavarian State Office for Surveying (LDBV), 2020

Bamberg, Buger Spitze between the left and right arm of the Regnitz River. The Buger Spitze is located in the path of the main beams of two 240° antennas (since 2020 four antennas) from the mobile phone base station on Gutenbergstraße, which is 1.9 km (1.2 mi) away, and the main beam of one 240° antenna from the mobile phone base station at Staatsstraße 2276 in the Hauptsmoor Forest, which is 3.5 km (2.2 mi) away, as well as the Geisberg radio tower and the Kälberberg TV tower, which are both 11.5 km (7.2 mi) away. A comparison of aerial photographs reveals that many trees were cut down at Buger Spitze.

Bamberg-Bug, Western Bank of the Regnitz River, 2009/2011

2011

06 MAY 2011
At the bank of the Regnitz River. Poplar tree (view from the south), Buger Spitze is in the background. In 2008, premature leaf drop began on the east side of the tree.

2011

06 MAY 2011
Franz Fischer Bridge.
Birch trees (view from the south). The birch tree on the right stands close to the Regnitz River. The birch trees have since been cut down.

2011

06 MAY 2011
Oak tree, near Regnitz River (view from the south), at the postal sports club. All oak trees showed significant damage.

2009

20 OCT 2009
The campground is located on the Regnitz River at the southern end of Bamberg-Bug. Group of alder trees (view from the south). The dead alders on the eastern side were cut down. Then, the alders on the eastern side of the group died.

RF radiation from several transmitters in the east has severely damaged much of the tree population in Bug, a town located on the Regnitz River. Many trees had to be cut down, including those at the campground, the mission museum, the Regnitz River, Café Lieb, and Buger Spitze.

Loisach between Murnau and Eschenlohe, District of Garmisch-Partenkirchen, October 8, 2010

During train rides from Murnau to Garmisch-Partenkirchen and from Oberammergau to Murnau, it became clear that riparian woodlands within the range of mobile phone base stations had lost their leaves prematurely. Meanwhile, trees in areas with low RF radiation levels retained their dense foliage.

Base station No. 571128, south of Eschenlohe. The number of antennas increased from **10** (2008) to **20** (2025).

08 OCT 2010 The riparian woodlands north and south of the mobile phone base station lost their leaves prematurely (view from the west, from the train). The RF radiation also affects the mountain forest above federal highway B2.

08 OCT 2010 Eschenlohe train station. All the trees still had dense foliage. Since the station is located behind a hill, there is no line of sight to the base station.

Base station No. 69011011, northwest of Ohlstadt. The number of antennas increased from **12** (2009) to **54** (2023).

08 OCT 2010 Riparian woodlands, ca. 1.5 km (0.9 mi) north of the Ohlstadt train station (view from the east, from the train), overlooking the Murnauer Moos nature reserve. The trees along the Loisach River had already lost their leaves. In addition, this area is exposed to base station radiation from the Murnau trauma hospital. The number of antennas increased from **10** (2010) to **48** (2022).

Bad Wiessee at Lake Tegernsee, 2011

15 SEP 2011 Shore path near Bad Wiessee. Many of the trees along the shore had sparse foliage and individual dead branches (view from the south).

15 SEP 2011 View from the northwest across the lake to Tegernsee and Wallberg Mountain.

RF radiation from several directions converges on the shore near Bad Wiessee: from the east (from Tegernsee, ca. 2 km / 1.2 mi), from the southeast (from Wallberg Mountain, ca. 7 km / 4.4 mi), from the south (from Ringberg Mountain, ca. 3.5 km / 2.2 mi), and from the northwest (from Bad Wiessee, ca. 1 km / 0.6 mi).

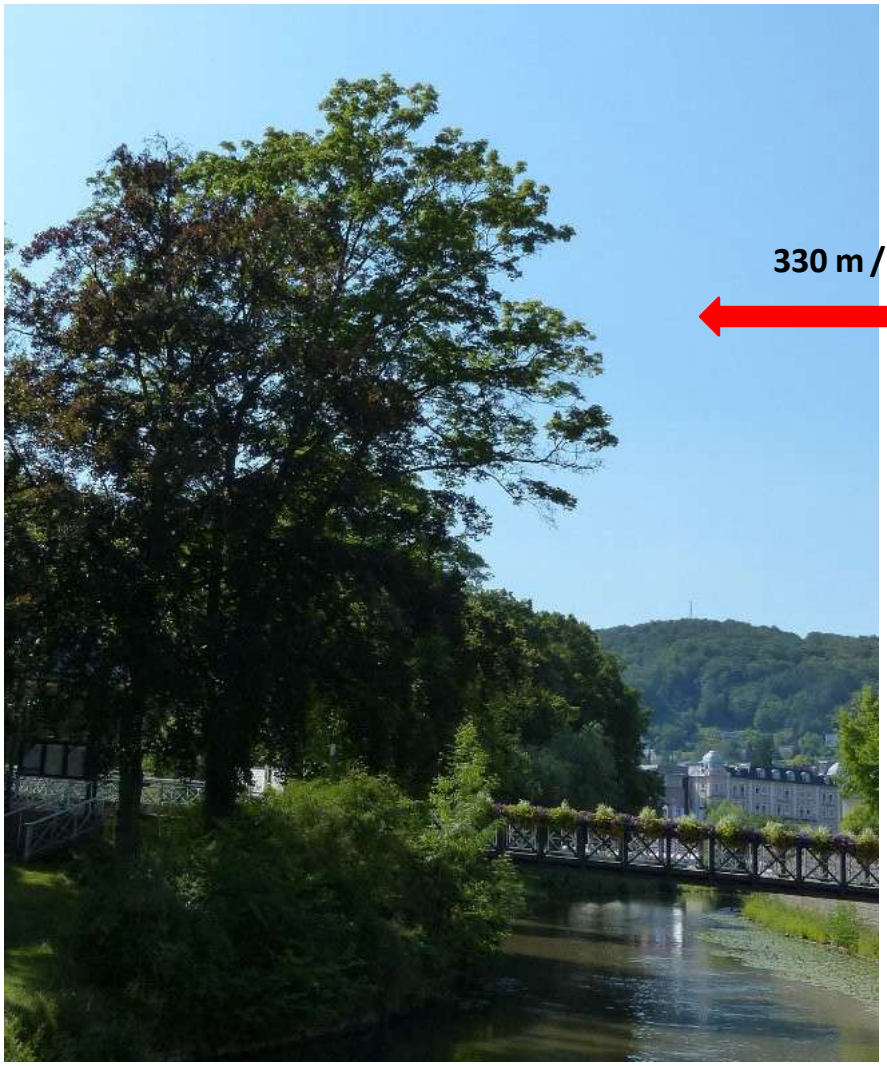
Lake Schliersee, 2011

16 SEP 2011 Lake Schliersee, southern bank, damaged riparian woodlands. There is a line of sight to the transmission tower on Huberspitz Mountain (ca. 3.5 km / 2.2 mi) and to the transmitters above Lake Schliersee (ca. 3 km / 1.9 mi).

Lake Spitzingsee, 2012

07 JUL 2012 Lake Spitzingsee, southeast bank (view from the south-southeast). Various tree species showed severe damage. The distance to the base stations (yellow) is about 1 km (0.9 mi).
Measurement: **200 µW/m²**

Bad Kissingen, 2017



330 m / 1,080 ft

19 Jul 2017 Bad Kissingen, Luitpoldpark.
Maple tree at the Franconian Saale River near Arkadensteg (view from the southeast)

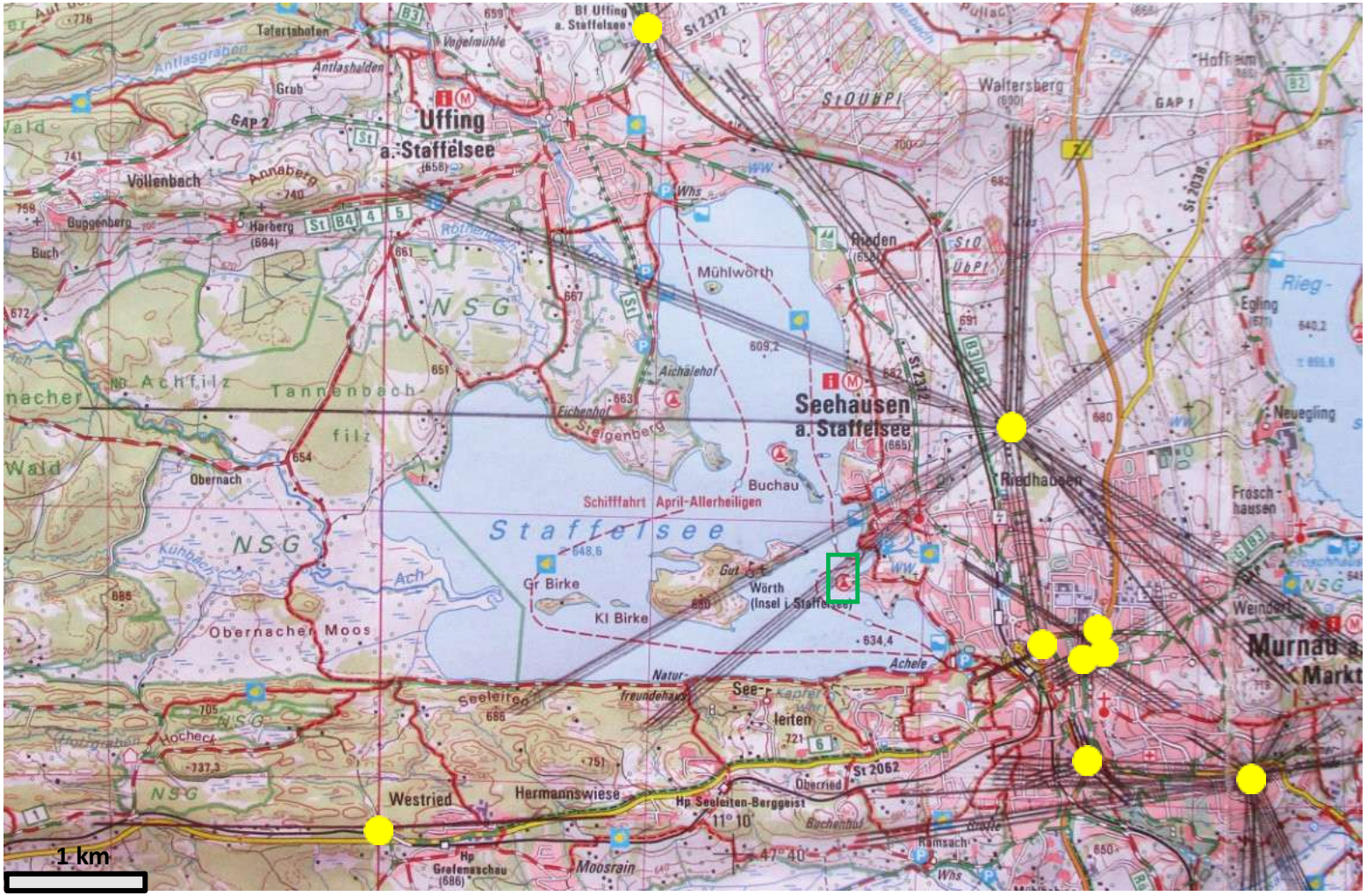
Mobile phone base station No. 660012, near Theaterplatz (installation height 30–48 m / 98–157 ft) and TETRA base station at the eastern hill.
09 NOV 2009: 21 sector antennas
18 APR 2016: 27 sector antennas
11 SEP 2018: 33 sector antennas

Seehausen am Staffelsee, Burg Peninsula Campground, 2020

25 AUG 2020 View from the Burg Peninsula Campground across Lake Staffelsee to Seehausen with mobile phone base station
Measurement at the lakeshore: **200 µW/m²**

There are many damaged deciduous trees at the campground. Several have already had to be cut back.
The Seehausen base station is 1.5 km (0.9 mi) away.

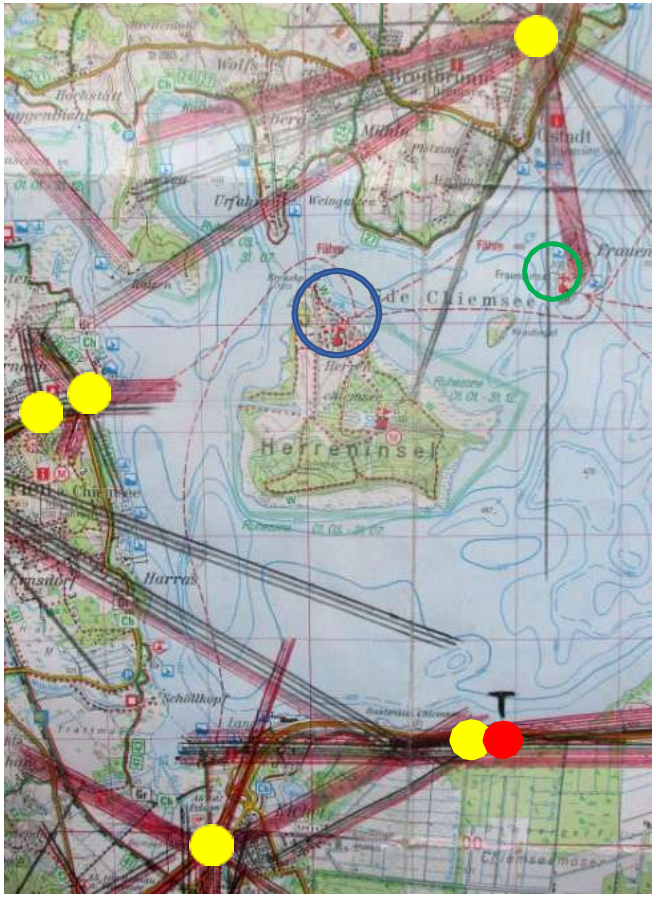
Seehausen am Staffelsee



Section of UK 50-49, Pfaffenwinkel, Bavarian State Office for Surveying (LDBV).
Added items: location of mobile phone base stations (yellow) with the main beam directions of the sector antennas, campground (green). The base station site certificate from February 2, 2022, shows an increase to **48** antennas.

Seehausen mobile phone base station (686 m / 2,250 mi above sea level): height 36.1–43.8 m, **36 antennas** (2020)

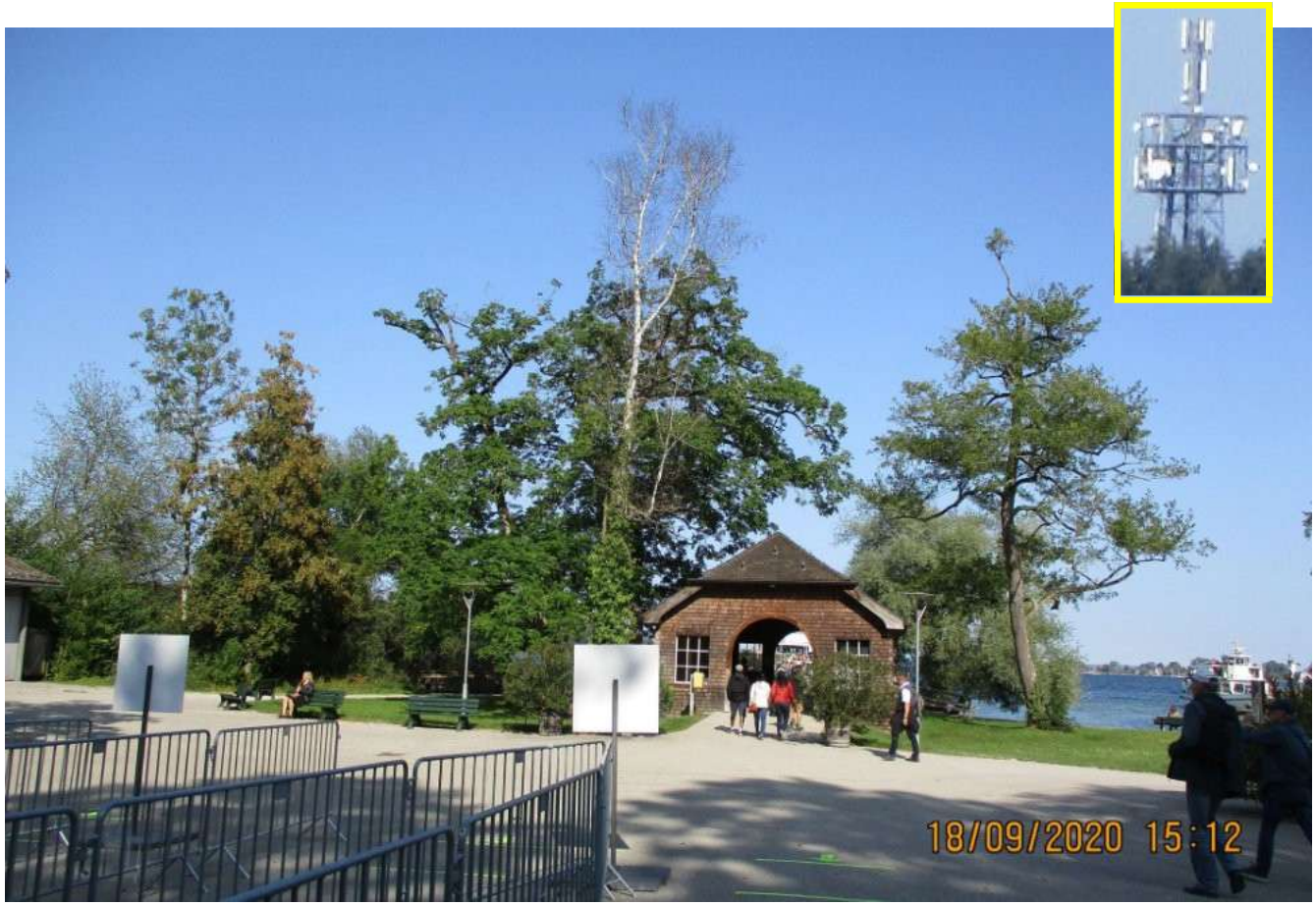
Lake Chiemsee, Herreninsel, 2020



Section of UK 50-54, Lake Chiemsee, Bavarian State Office for Survey and Geoinformation. Added items: location of base stations (yellow) with the main beam directions of the sector antennas (as of 2012: black, as of 2021: red), BOS digital radio (red dot)

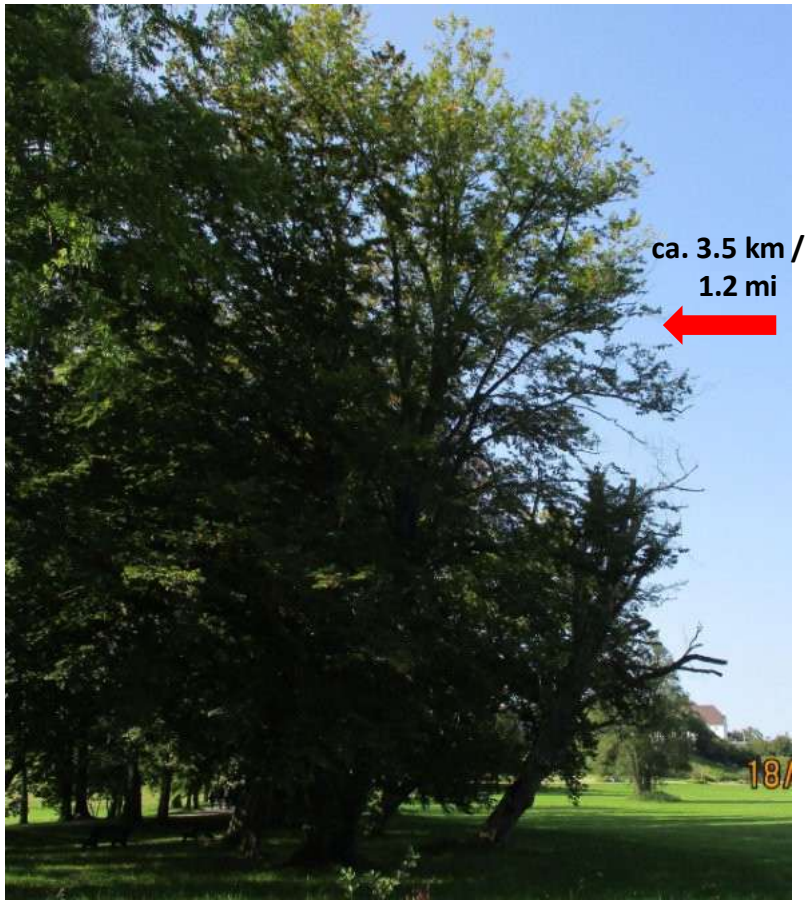
Men's Island boat landing

Women's Island west shore



18 SEP 2020 Herreninsel (Men's Island), marina. All of the trees on the lakeshore have damaged crowns. The distance to the mobile phone base station in Gstadt is ca. 3.3 km (2 mi).

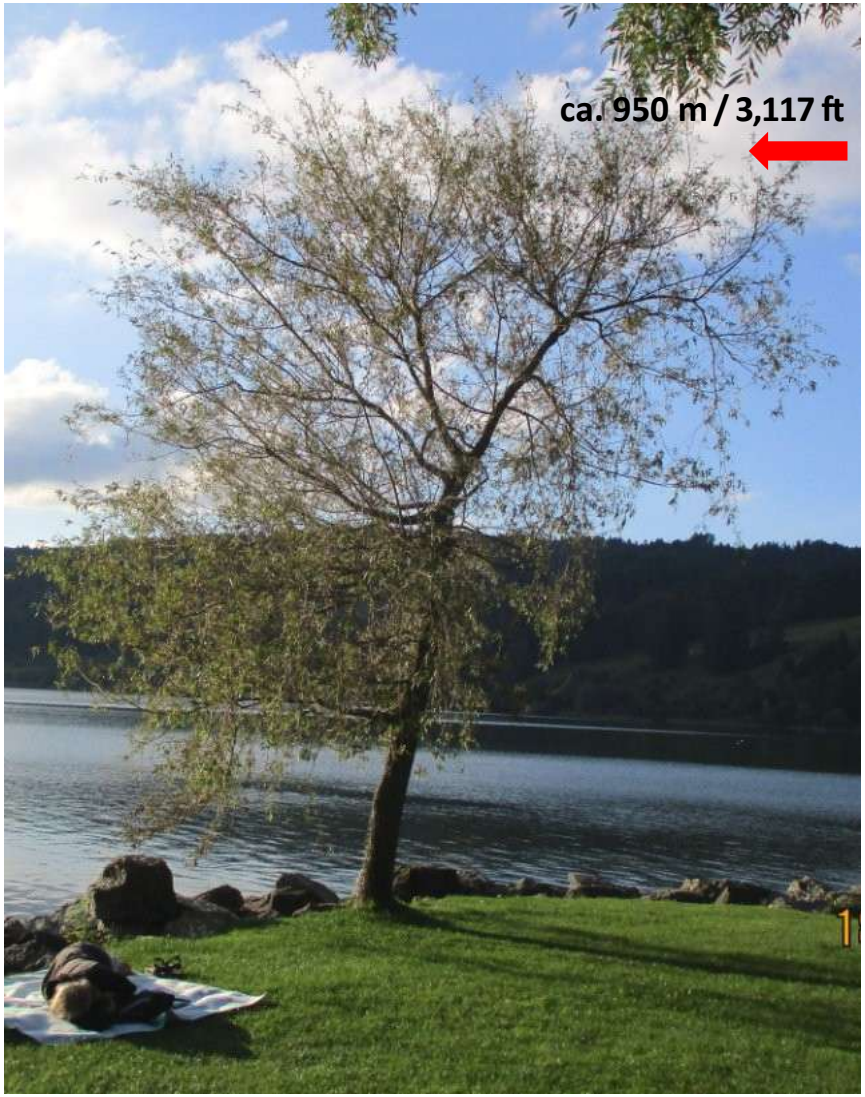
Lake Chiemsee, Herreninsel, 2020



18 SEP 2020 Herreninsel (Men's Island).
Hornbeam trees damaged on one side

Lake Chiemsee, Fraueninsel, 2020

18 SEP 2020 Fraueninsel (Women's Island), western shoreline (view from the south), direct line of sight to the mobile phone base station above Gstadt (ca. 2 km / 1.2 mi).
Measurement at the northern tip of Women's Island: **100 µW/m²**
Willow trees lost their leaves prematurely, even young willows. Some trees had to be pruned or cut back.

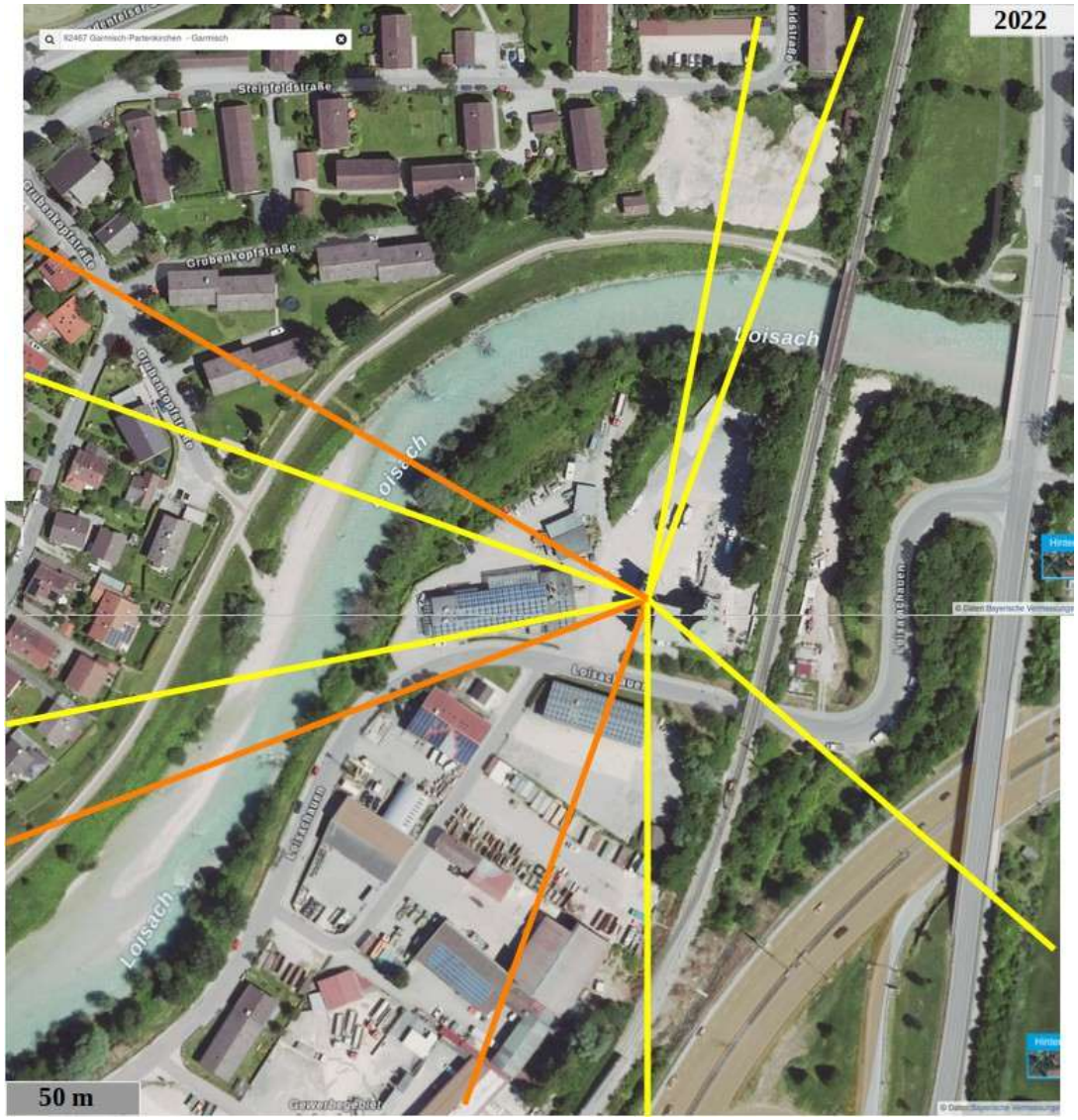


18 SEP 2021 Lake Alpsee, eastern shore. Willow tree (730 m / 2,395 ft above sea level) with asymmetric sides. There is a direct line of sight between the Zaumberg base station and this location.

Zaumberg base station (841 m / 2,759 ft above sea level), four antennas (2 x 180°, 2 x 245°

Lake Alpsee, eastern shore promenade.
Oak trees (730 m / 2,395 ft above sea level).
There is a direct line of sight to the Zaumberg base station.

Loisach bei Burgrain, Aerial Photograph, 2022



Aerial photograph, Bavarian State Office for Surveying (LDBV), 2022.
Added items: main beam directions of the sector antennas (yellow and orange). The directions in orange no longer exist. This addition helps us to understand the previous damage. The aerial photograph clearly shows that many trees along the Loisach River have been damaged. Several trees have already been removed.

Despite the damage that occurred between 2010 and 2024, the expansion of mobile phone base station No. 571454 has continued.

16 MAR 2010 **10** sector antennas, 2 omni antennas
05 SEP 2017 24 sector antennas
09 MAR 2020 27 sector antennas
16 AUG 2024 **45** sector antennas (11 x 10°, 3 x 20°, 11 x 130°, 3 x 180°, 12 x 260°, 3 x 290°), installation height 20.5–23.1 m (67.3–75.8)

Kassel, Karlsaue Park, 2023

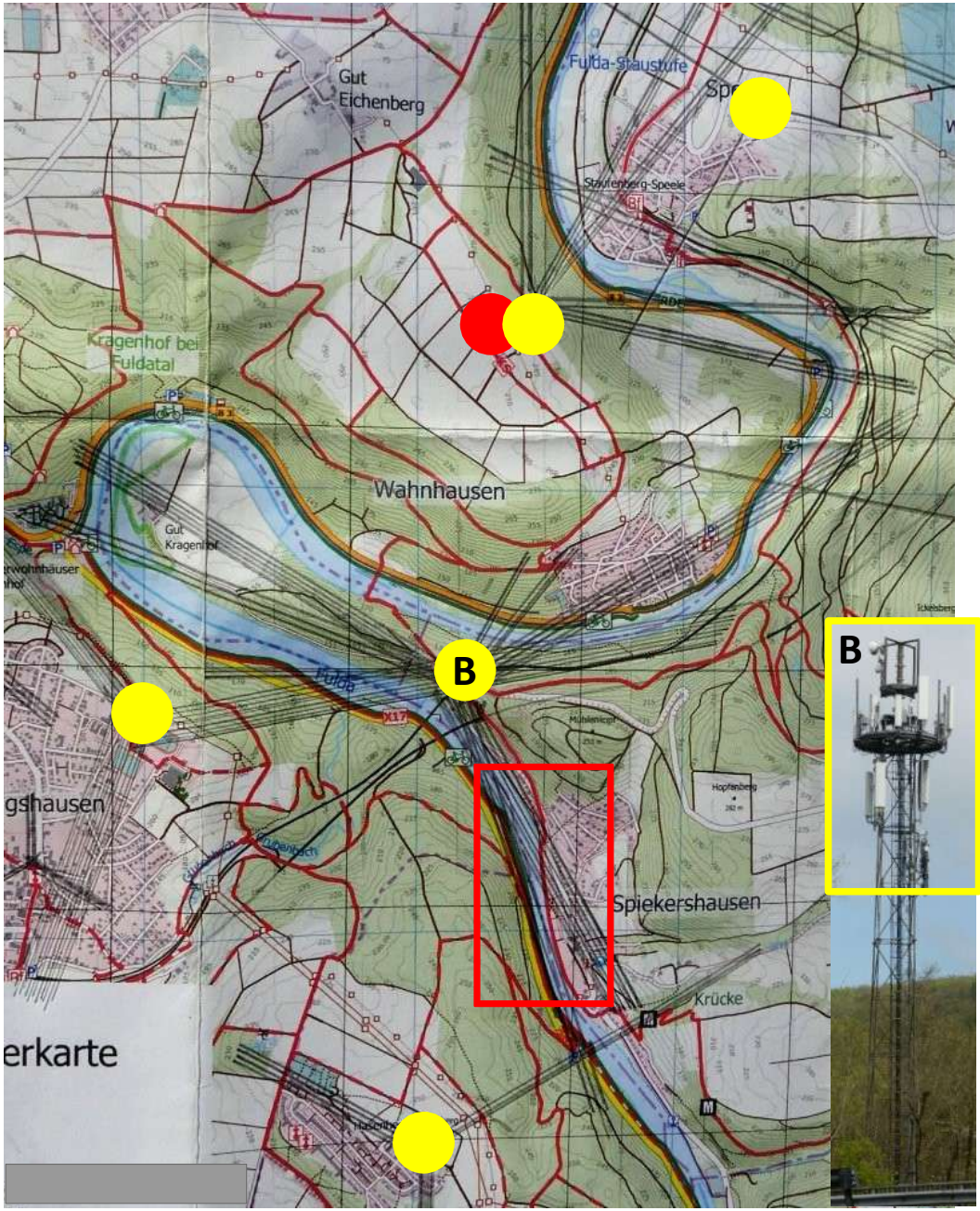
13 JUL 2023 Karlsaue Park.
Oak tree opposite the eastern tip of the Siebenbergen Island (view from the southeast), sparse foliage.
Measurement: **400 µW/m²**

Lübeck, Riverbank Path, 2023

29 SEP 2023 Riverbank path east to the Kanalstraße.
Linden tree with line of sight to the Falkenstraße base station (view from the northwest), which is ca. 300 m (984 ft) away.
Installation height 17.6–23.4 m (57.7–76.8 ft), 21 sector antennas.
Measurement taken on September 6, 2022: **85,000 µW/m²**

Fulda, North of Kassel, 2024

14 JUL 2024 Beech trees along the Fulda River between Kassel and Fuldatal (view from the south). Mobile phone base station (marked B) on a hill in the north, which is 1 km (0.9 mi) away.
Measurement: **1,260 µW/m²**



Topographic trail map, Kaufunger Forest North, ProjektNord.
Added items: location of base stations (yellow) with the main beam directions of the antennas, location of beech trees (red)

Lübeck, June 2025

St. Peter's Church, south side of the tower with mobile phone base station antennas

03 JUN 2025 Stadt-Trave at the Trave River. Birch tree (view from the southwest), sparse leaves in the upper part. Distance to St. Peter's Church: 550 m (1,820 ft)

05 JUN 2025 Mühlenteich. Maple tree (view from the west). The Lübeck radio tower is 260 m (853 ft) away. **Measurement taken on September 28, 2023: 23,100 µW/m²**

NDR Tower in Lübeck with mobile phone base station

Lake Dieksee between Timmdorf and Bad Malente-Gremsmühlen, District of Ostholstein, 2025

Bösdorf base station,
see p. 244

11 SEP 2025 West shore (view from the east). Twelve 0° antennas of the Bösdorf base station expose the shore from the south.

11 SEP 2025 Lake Dieksee, Timmdorf (view from the south), RF exposure from the east and southeast (Holm). Boat landing: **100 µW/m²**

11 SEP 2025 Langenwarder Island (view from the east, Diekseepromenade). Five 280° antennas from the Malente base station expose the island from the east (1.3 km / 0.8 mi).

From the east, southeast, and south, mobile phone base stations radiate across the lake and onto the trees along the shore. These three examples are just a few of the many damaged areas.

Malente base station at Diekseepromenade 2, height 47–49.6 m (154 – 162 ft), 36 antennas

Healthy Trees in Areas with Low RF Radiation, October 2021

Rickenbach, District of Waldshut

12 OCT 2021 Rickenbach-Altenschwand.
Sycamore tree

Fuldatal, District of Kassel

17 OCT 2021 North of Knickhagen.
Beech, alder, willow, and oak trees.
Measurement: **1 µW/m²**

Kassel

25 OCT 2021 Ihringshäuser Straße.
Birch tree

In the summer of 2024, healthy, densely leafed trees were also found in the radio shadow of buildings, other trees, and below the main beams of sector antennas.

14 JUL 2024 Kassel, Fuldatalstraße. Chestnut tree, radio shadow due to other trees

15 AUG 2024 Forstfeld, Wißmannstraße. Beuys' linden trees, radio shadow due to buildings and trees.
Measurement: **20 µW/m²**

26 AUG 2024 Kassel, Goethestraße 16 a, courtyard. Beech tree.
Measurement: **50 µW/m²**

Healthy Trees in Areas with Low RF Radiation, summer 2025

Lübeck

04 JUN 2025 St. Aegidien Church, northwest side. Plane and Norway maple trees, radio shadow due to building.
Measurement: **40 µW/m²**

Rostock

20 JUN 2025 Augustenstraße. Chestnut tree and wild vine, radio shadow due to building.
Measurement: **60 µW/m²**

Kassel

20 JUL 2025 Courtyard between Arnimstraße and Brentanostraße. Oak tree.
Measurement: **40 µW/m²**

Tree Damage in Historic Parks

Seehof Palace Park, Northeast Side, 2008 and 2010

2008

Mobile phone base station, see p. 263

Measurement at the north side of the palace: **520 µW/m²**. There is a line of sight to the base station at the sports field, which is 380 m (1,246 ft) away.

2008

18 AUG 2008 North end of the avenue of linden trees (view from the southwest). This linden tree is exposed to the RF radiation from the base station at the sports field, which is 210 m away (see map on p. 263).

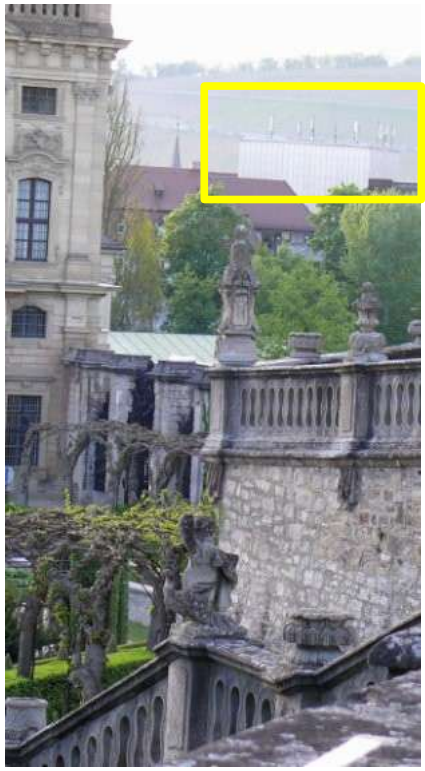
2010

01 JUL 2010 North side of the avenue of linden trees (view from the north-northwest). The northern linden trees are damaged. The northern linden trees attenuate the RF radiation from the base station. The rear linden trees have denser foliage. This path was closed in October 2023.

This is just one example of the many cases of tree and shrub damage in the palace gardens. The park is exposed to RF radiation from multiple directions. The Geisberg radio tower is 9.3 km (5.8 mi) away. Similar cases have been documented in Veitshöchheim, Würzburg, Munich, and Baden-Baden.

Würzburg Court Garden, UNESCO World Heritage Site, 2010 and 2011

Section of the Cityplan, Falk. Added items: location of base stations (yellow) with the main beam directions of the sector antennas



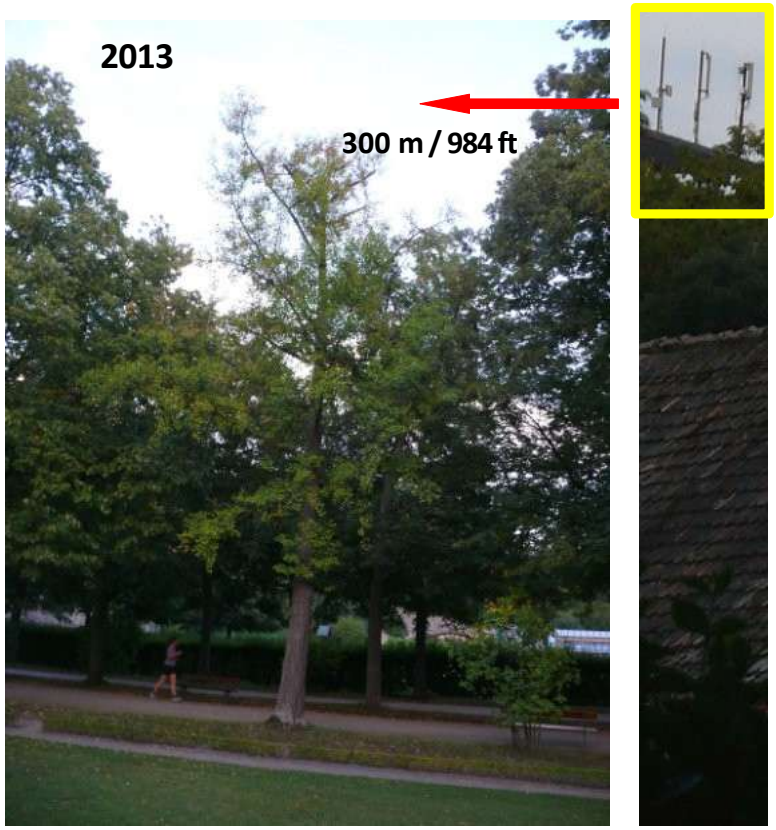
29 APR 2010 A direct line of sight to the mobile phone base station at the theater.
18 APR 2011: 1,730 µW/m²
04 MAY 2025: 38,900 µW/m²

18 APR 2011 Maple tree with damaged top (view from the north)

29 APR 2010 The walnut trees showed cracks in their trunks.

In April 2010 and 2011, damage to the crowns and trunks of many trees was evident in the court garden. The city map shows that RF radiation from base stations strikes the gardens from the northwest, east, and south. In addition, there was RF radiation exposure from DAB+ and DVB-T towers located 3 km (1.9 mi) to the west.

Würzburg Court Garden, UNESCO World Heritage Site, 2013 und 2025



07 SEP 2013 Court garden, linden avenue (view from the west). The differences within this linden avenue were striking. This linden tree was located in the main beam of the 310° antenna of the mobile phone base station at Friedrich-Ebert-Ring 14, which is 300 m (984 ft) away. The base station was visible from the eastern row of linden trees.

04 AUG 2025 Court garden, linden avenue (view from the west). This is the section with the linden tree that was severely damaged in 2013. It has not grown at all in the last 12 years.
Measurement taken in the avenue on October 25, 2023: **2,670 µW/m²**

Veitshöchheim Rococo Garden, 2011

18 APR 2011 Row of linden trees at the west side of the palace (view from the southwest). The easternmost linden tree had to be cut down. This linden tree was exposed to the main beams of two 280° antennas from the base station at Mittlere Setz 13.

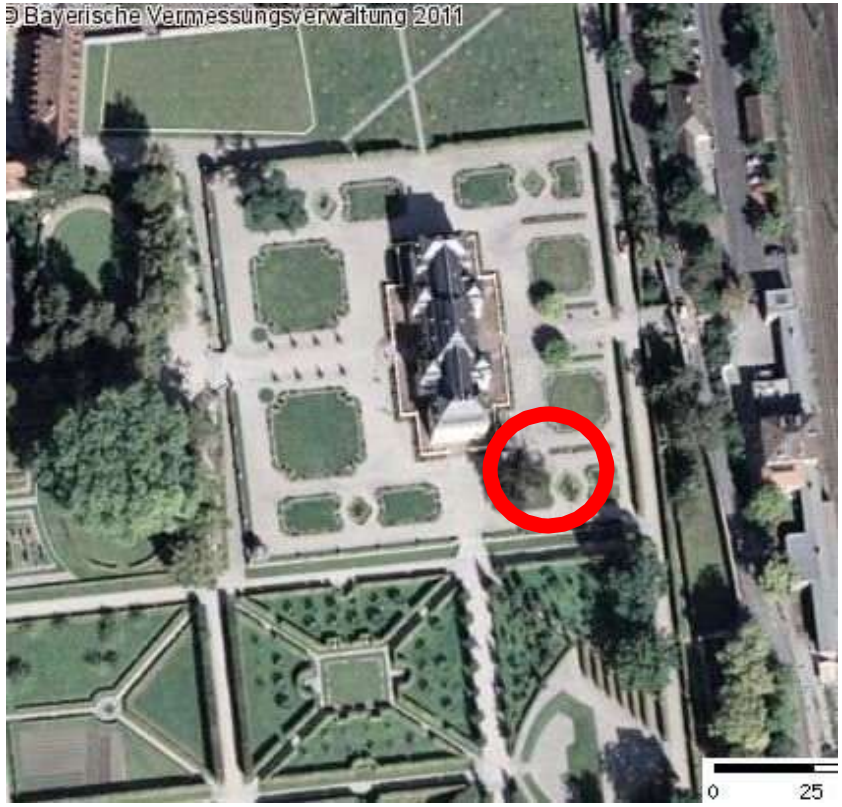
18 APR 2011
Measurement:
2,370 µW/m²

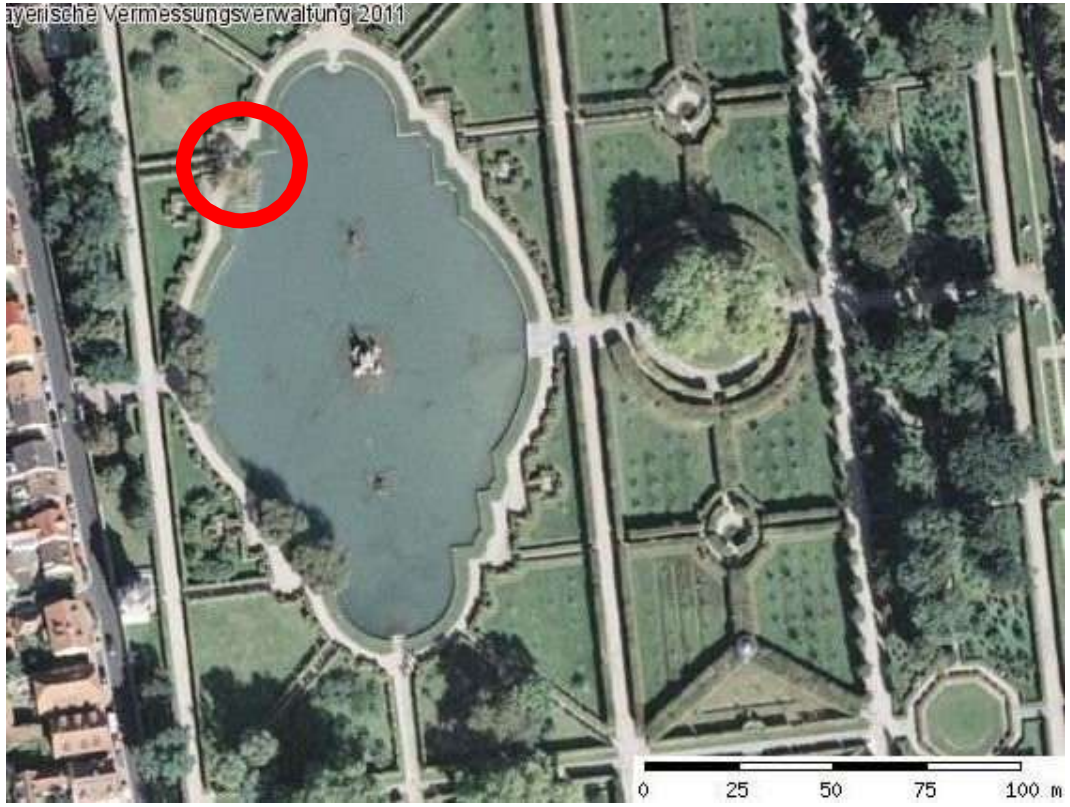
Section of the Würzburg city plan, Falk. Added items: location of the mobile phone base stations (yellow) with the main beam directions of the sector antennas, the location of the linden tree (green), and the measurement point (gray).

Mobile phone base station east of the park, No. 660865, site certificate from June 3, 2008: installation height 13.0–16.3 m (42.7 – 53.5 ft), 18 sector antennas (2 x 0°, 49°, 2 x 70°, 90°, 2 x 120°, 2 x 170°, **210°, 2 x 240°, 2 x 280°, 289°**, 330°). Six of the antennas reach the park.

Veitshöchheim Rococo Garden in Aerial Photographs from 2008

Aerial photographs taken by the Bavarian State Office for Survey and Geoinformation in 2008 clearly show damage to the trees. Since then, some of the damaged trees have had to be cut down.





Aerial photographs, Bavarian State Office for Survey and Geoinformation, 2008 (accessed on Bayernviewer in 2011).

The damaged tree at the southeast corner of the palace has since been cut down (red). A tree that once stood at the northeast corner was already missing. The locust tree to the northwest of the palace also showed signs of damage.

The damaged pair of willow trees on the north side of the pond were also cut down. In May 2023, damage to the crowns of the pair of willow trees in the center was discovered.

Nymphenburg Palace Park, Munich, Northeast Area, 2011, 2012, and 2014

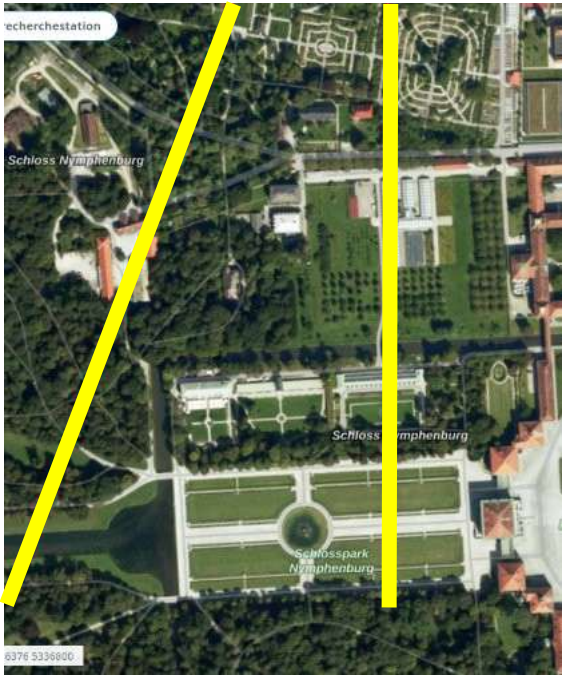
Mobile phone base station at the Bureau of Standards

18 MAY 2011 Three linden trees, near the palm pavilion (view from the west). The northern linden tree has already had to be cut back. This area is exposed to the RF radiation from four 180° antennas of the base station at the Bureau of Standards.

14 JUN 2012 Three linden trees, near the palm pavilion (view from the west). The damage is clearly visible. There is a direct line of sight to the base station at the Bureau of Standards. Measurement taken at the park entrance to the north of these linden trees: **920 µW/m²**

Mobile phone base station at the Bureau of Standards, No. 530269. The number of antennas increased from **30** in **2009** to **60** in **2022**.
Site certificate from December 23, 2022: installation height 34.1–36.1 m (111.9–118.4 ft), sector antennas (6 x 0°, 5 x 60°, 8 x 80°, 6 x 120°, 5 x 180°, 9 x 200°, 6 x 240°, 5 x 300°, 8 x 320°, 3 x 200°)

Various Tree Species in the Nymphenburg Palace Park Showed Crown Damage



Bavarian State Office for Surveying (LDBV), 2024. Added items: main beam directions of five 180° and nine 200° antennas.

11 OCT 2012 Birch trees near the Magdalene Hermitage, which is 640 m (2,100 ft) away from the base station.

11 OCT 2012 Hornbeam tree southwest of the Grotto Chapel of St. Mary Magdalene (view from the west), which is 740 m (2,428 ft) away from the base station.

11 OCT 2012 Crown damage near the museum (view from the southeast), which is 730 m (2,395 ft) away from the base station.

Between 2009 and 2015, ten surveys were carried out in the vicinity of the Bureau of Standards. A significant amount of tree damage was found and documented. The city of Munich, the Bavarian state government, and scientists were informed of this and asked to initiate an investigation. A summary of the 2014 tree damage documentation can be found here: https://www.gigaherz.ch/dokumentationen/studien/

Lichtenthaler Allee, Baden-Baden, 2014

31 OCT 2014 The two cutleaf beech trees have already had to be cut back.

01 NOV 2014 Damaged redwood (view from the south), cut down in 2017/2018.

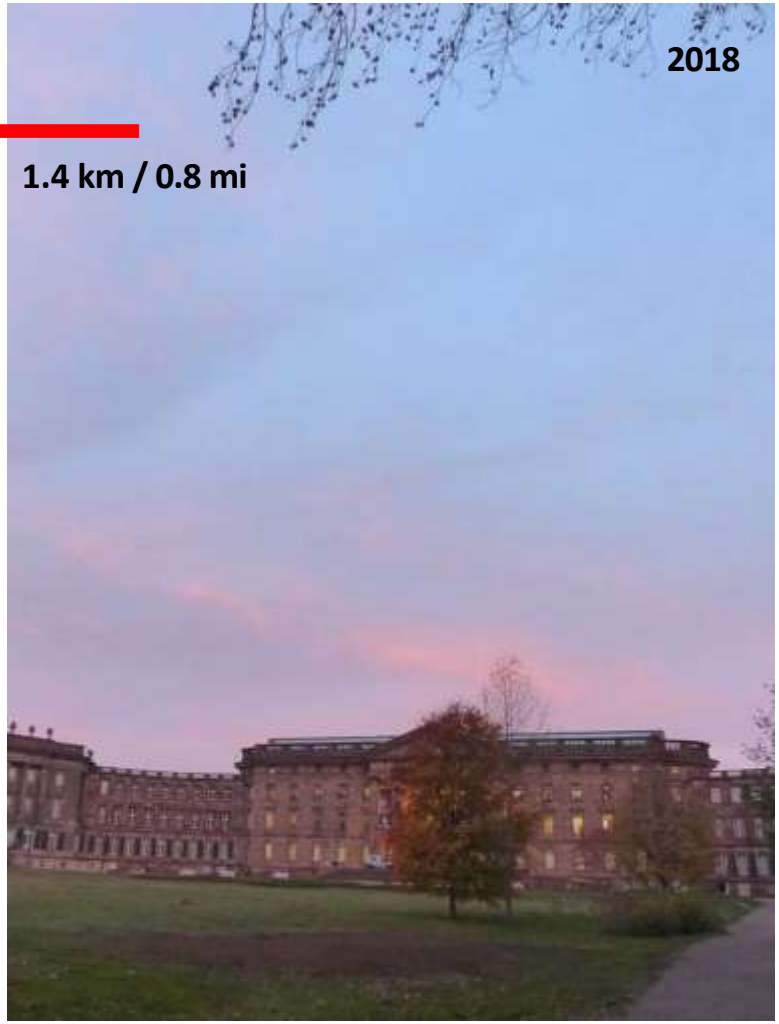
01 NOV 2014 Mobile phone base station at the Markgraf Ludwig High School. **Four 260° antennas** reach the trees along the Lichtenthaler Allee.

Mobile phone base station No. 370484, site certificate from February 1, 2022: installation height 37.4–43.1 m (122.7–141.4 ft), 39 sector antennas (3 x 45°, 4 x 50°, 6 x 60°, 4 x 150°, 9 x 180°, **4 x 260°**, 9 x 300°), 3 other transmitters

07 AUG 2017 Bergpark Wilhelmshöhe (view from the palace, from the east). Two copper beech trees west of the palace (view from the palace, from the east). There is a clear difference in the crowns on the two sides. The copper beech trees were cut down in November 2018. The mobile phone base station located higher up at Im Druseltal 12 is 1.4 km (0.8 mi) away.

Bergpark Wilhelmshöhe, Two Copper Beech Trees, Wilhelmshöhe Palace, 2016–2018

31 AUG 2016 Two copper beech trees west of the palace (view from the west). From the south, the trees are exposed to the RF radiation from the mobile phone base station at Druseltal 12 .



06 NOV 2018 The two copper beech trees had been cut down. Only the gaps in the lawn remained.

02 DEC 2016 Mobile phone base station No. 240224 at Im Druseltal 12: installation height 37–40 m (121–131 ft), 9 sector antennas

Wilhelmshöhe Palace, East Side, Group of Sycamore Trees, 2016 and 2024

2016

31 AUG 2016 Wilhelmshöhe Palace with a park on the north side **(view from the southeast).** In August 2016, damage to one side of the group of sycamore maple trees was noticed. Documentation of base station locations with the main beam directions of sector antennas suggested that radiofrequency electromagnetic fields from the Hessischer Rundfunk (hr) radio tower were the cause.

2024

10 AUG 2024 View from the Wilhelmshöhe Palace, **from the southwest,** to the group of damaged trees. In August 2024, the Hessischer Rundfunk (hr) radio tower could be seen from the east side of the palace because several trees had been cut down at the Habichtswald Clinic.
This measurement was taken at the east side of the palace: **830 µW/m².**

Schönfeld Park with Botanical Garden, Kassel, June 2017

12 JUN 2017 Scarlet oak tree (view from the south), top cut back or tree cut down.

12 JUN 2017 Conifer (view from the southwest), cut down.

Section of the Kassel city plan, 19th edition, Städte-Verlag E. v. Wagner & J. Mitterhuber GmbH. The terrain rises between the lake and the botanical garden. Base stations are marked in yellow.

Mobile phone base station at the city parks department, No. 240723, site certificate from October 12, 2015: installation height 15.8–18.1 m (51.8–59.4 ft), **15 antennas** (5 x 60°, 5 x 180°, 5 x 300°)
Mobile phone base station at the city parks department, No. 240723, site certificate from March 7, 2023: installation height 15.8–18.1 m (51.8–59.4 ft), **36 antennas** (12 x 60°, 12 x 180°, 12 x 300°)

Schönfeld Park with Botanical Garden, Kassel, October 2017

02 OCT 2017 Beech and trumpet trees (view from the southeast), line of sight to the base station. Even before the hot and dry periods, crown damage and premature leaf drop were noticeable. Measurement northeast of the two trees: **13,580 µW/m²**

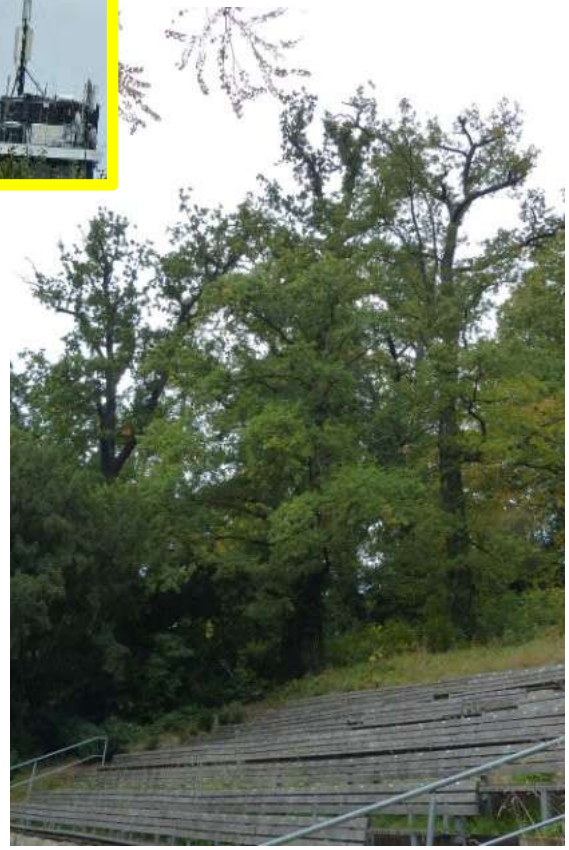
Base station at the city parks department

02 OCT 2017 Trumpet tree (view from the southwest) with a distinct difference in growth on each side.

In 2017, significant damage to various tree species was observed in the botanical garden.

Schönfeld Park with Botanical Garden, Kassel, September 2019

26 SEP 2019 At the lake. Katsura tree. Extensive damage was also found in the lower part of the park and near the lake. This area is exposed to RF radiation from the base station on Frankfurter Straße.



26 SEP 2019 Several oak trees had damaged crowns.

26 SEP 2019 This beech tree was shielded from RF radiation by other trees.

Mobile phone base station on Frankfurter Straße, No. 240751, site certificate from August 3, 2017: installation height 26.1 m–31.8 m (85.6–104.3 ft), **18 antennas** (2 x 10°, 4 x 60°, 2 x 120°, 4 x 180°, 2 x 240°, 270°, 2 x 280°, 300°)

Schönfeld Park with Botanical Garden, July 2024

The amount of damage to the trees in the park had increased significantly. Many of them had to be pruned or cut down. Only the trunk remained of the beech tree. On the mobile phone base station on the grounds of the city parks department, the number of antennas increased from 15 to 36.
Measured RF radiation levels rose dramatically: from a maximum of 13,600 µW/m² in 2017 to 320,000 µW/m² in 2024.

02 OCT 2017 Dawn redwood (view from the southwest).
Measurement: **2,270 µW/m²**

21 JUL 2024 Dawn redwood (view from the southwest).
Measurement at redwood: **320,000 µW/m²**

21 JUL 2024 Japanese maple tree (view from the southwest), difference between left and right side as well as between top and bottom. This type of damage pattern suggests RF radiation exposure as a cause.

Damage of Beech Trees in Parks

Starting in 2007, damage to beech trees was observed in parks, even though there was no shortage of water.

Bad Wildbad, 2007

11 JUN 2007 Spa gardens. Beech trees with sparse crowns stood next to the Große Enz Stream. A chimney with antennas on the east side of the municipality is visible in the background (view from the west).

Bamberg, 2010

24 JUN 2010 Bürgerpark Hain (Hain Park) at the Regnitz River. These crowns are exposed to RF radiation from mobile phone base stations coming from multiple directions.

Garmisch-Partenkirchen, 2011

09 SEP 2011 Spa gardens. Beech tree with sparse crown (view from the north). The damage steadily increased. By 2022, the beech tree had died. RF radiation reaches the spa gardens from multiple directions, including from the mountains.

Forest Damage

Massive Intervention at the Geisberg Mountain 2021

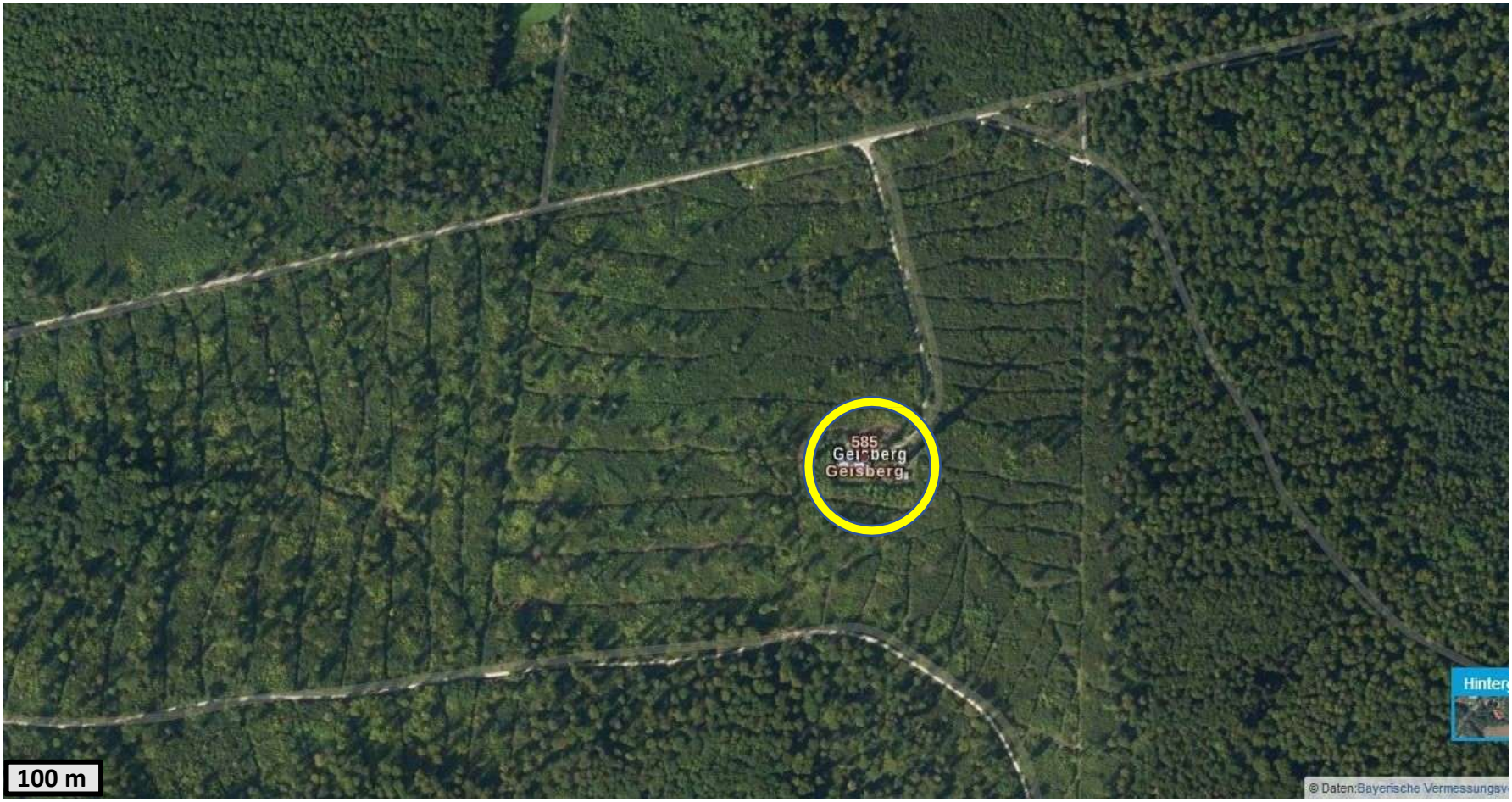
19 FEB 2021 Photo from *Fränkischer Tag*
https://www.fraenkischertag.de/gemeinde/bamberg/massiver-eingriff-am-geisberg-art-17479

District of Bamberg – **Hundreds of thick beech trees** were cut down in the Geisberg Forest in January. Nature lovers are alarmed. The trees, however, were heavily damaged and were about to die.
21 FEB 2021: https://www.fraenkischertag.de/lokales/bamberg/garten-freizeit/massiver-eingriff-in-den-geisberger-forst-art-17075

The damage to the beech trees on Geisberg Mountain was clearly visible by September 2009.

15 SEP 2009 This is the view from Zeegendorf on the southern slope of Geisberg Mountain. The beech trees at higher elevations were clearly damaged. The trees were exposed to RF radiation from radio and microwave radio transmitters, as well as mobile phone base station antennas, on Geisberg Mountain (585 m / 1,919 ft above sea level) and television and microwave radio transmitters, as well as mobile phone base station antennas, at the Bamberg Tower near Kälberberg (558 m / 1,831 ft above sea level, 3.7 km / 2.3 miles away). The Geisberg Mountain and Forest are located in the southernmost part of the Albtrauf Fauna Flora Habitat Reserve (FFH No. 6032-371) between Dörnwasserlos and Zeegendorf.

Geisberg Mountain, Aerial Photograph 2020

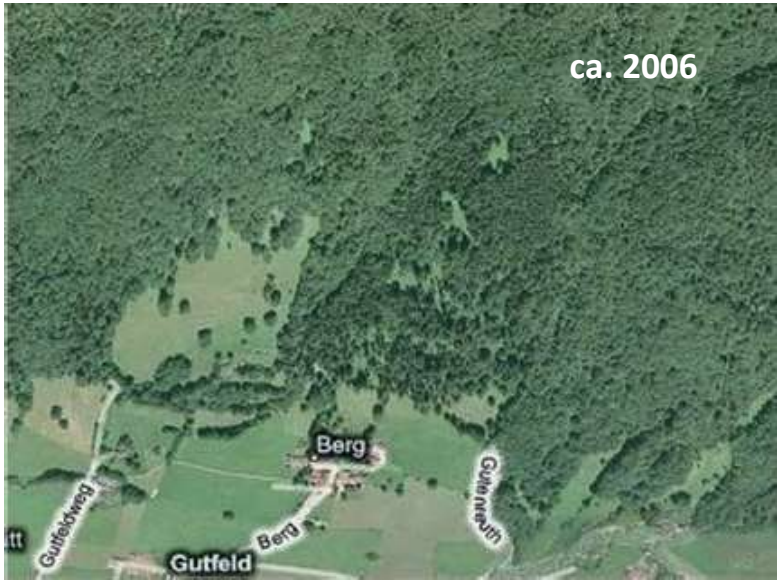


Aerial photograph, Bavarian State Office for Surveying (LDBV), BayernAtlas.
Geisberg Forest is home to radio and microwave transmitters as well as mobile phone base station antennas on Geisberg Mountain. By 2020, many of the beech trees on the mountain plateau had been cut down.
Site certificate from March 24, 2021: installation height 49–101 m (161–331 ft),
18 sector antennas (3 x 15°, 3 x 90°, 3 x 120°, 3 x 220°, 3 x 230°, 3 x 320°), 10 other transmitters

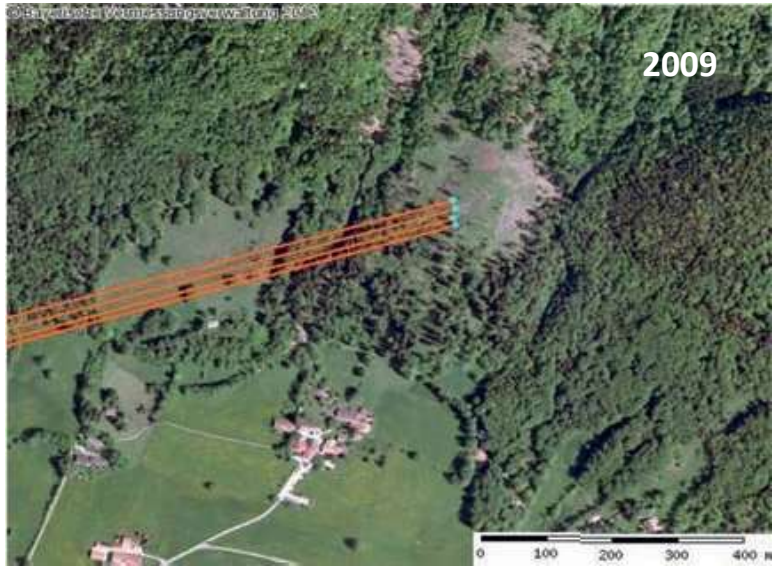
Newly Discovered Clearing in the Forest East of Rottach-Egern (2006–2009)

On the train and bus rides to those people affected by RF radiation, we observed new clearings in forested areas. In September 2011, we noticed clearings in the forests of the Mangfall Mountains, Chiemgau and Berchtesgaden Alps, as well as in the Werdenfels region. Comparing these areas with aerial photographs from previous years revealed that the clearings had developed between 2006 and 2009. In addition, comparing the antenna maps with the aerial photographs revealed that there was damage to the forest in the vicinity of each mobile phone base station.

16 SEP 2011
Ringberg base station



Perspective view, bing maps.
At the slope above the municipality of Berg, small clearings are emerging.



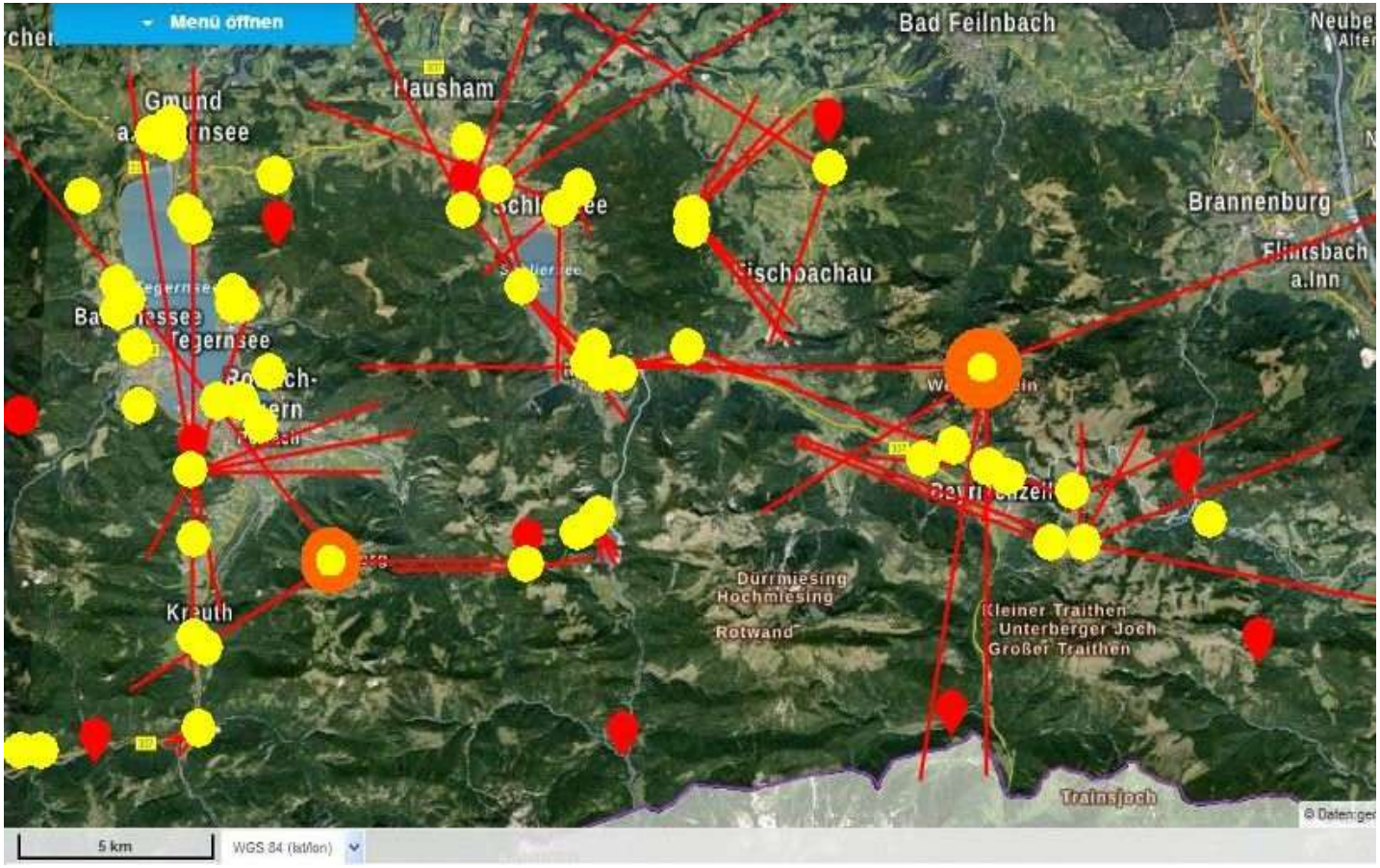
Orthophoto, Bavarian State Office for Survey and Geoinformation, 2009. A large clearing has developed in the mountain forest. In this area, the main beams of four 70° sector antennas strike the slope.

Ringberg base station on 21 SEP 2009: **17 sector antennas** (2 x 20°, **4 x 70°**, 2 x 80°, 170°, 2 x 180°, 210°, 280°, 337°, 340°, 350°), 3 other transmitters

Ringberg base station on 18 MAY 2015: **30 sector antennas** (3 x 0°, 3 x 20°, **4 x 70°,** 5 x 80°, 4 x 90°, 170°, 7 x 180°, 210°, 280°, 350°) and 3 others plus TETRA

In the path of the main beams of the other sector antennas, damage to trees or parts of the forest could also be observed. Despite this damage, the mobile phone base station was upgraded to include 30 sector antennas. A TETRA base station was also added. The distance between Ringberg base station and the clearing is 5 km (3.1 mi).

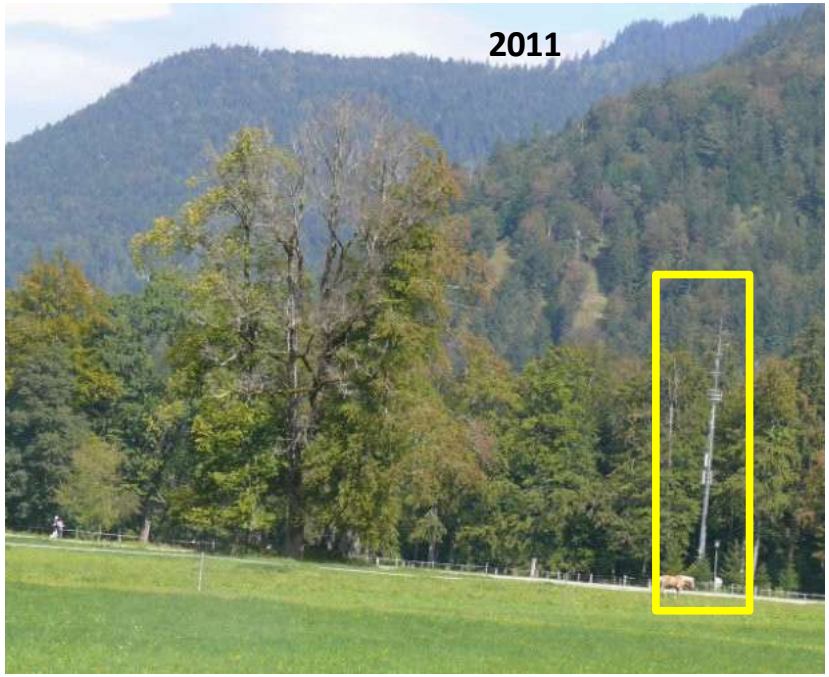
The forests in the southern part of the district of Miesbach are exposed to RF radiation from numerous transmitters, including mobile phone base station antennas, digital audio and video broadcasting, microwave radio, and BOS digital radio.



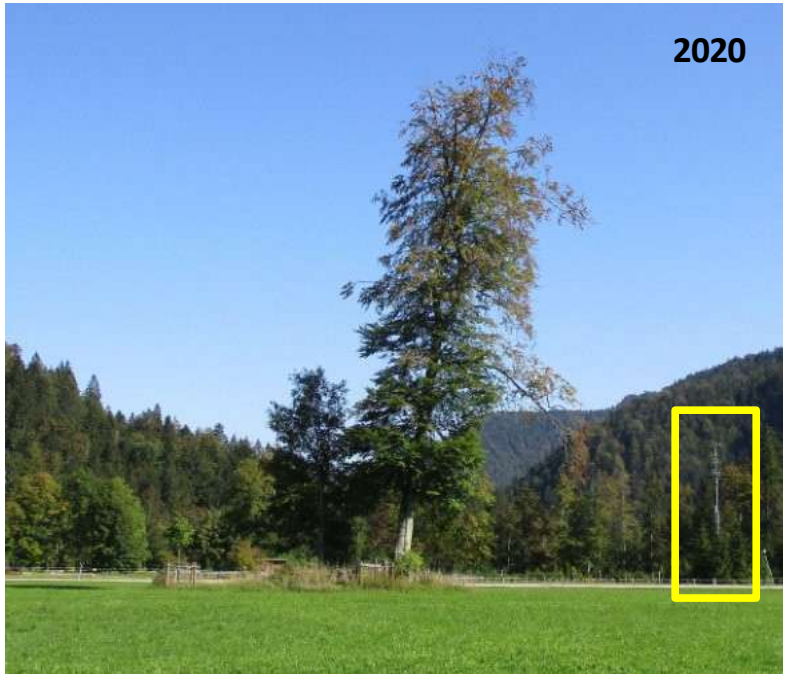
Aerial photograph by Bavarian State Office for Surveying (LDBV), 2018

Added items: **Mobile phone base stations** (yellow), some with their main beam directions, and **BOS base stations** (red). In addition, RF radiation is emitted from **Wendelstein Mountain** (orange) to the east, at an elevation of 1,794 m (5,886 ft), through digital audio broadcasting (since 1995) and DVB-T (since 2005, previously analog). RF radiation is also emitted from **Wallberg Mountain** (orange), at an elevation of 1,618 m (5,308 ft), through DAB+ (since December 2017, previously analog). The aerial photographs commissioned by the Bavarian State Office for Surveying, taken every three years, show an increase in forest damage.
The distribution of the damaged areas suggests that exposure to RF radiation from transmitters was a contributing factor.

Wildbad Kreuth, Damage to Beech, Maple, Linden, and Chestnut Trees, 2011–2020



15 SEP 2011 Group of beech and linden trees on a meadow (view from the south). The base station is 200 m (656 ft) away. There was extensive damage to other trees. Given the favorable location, locals found the damage to be inexplicable.



15 SEP 2020 The same group of trees, photographed from close up. After nine years, only one beech tree remained. According to the site certificate from June 11, 2025, the base station is to be expanded to 35 sector antennas.

07 JUL 2012 Measurement at beech stump in the group of trees: **3,600 µW/m²**

The closing event for the WINALP project, which aimed to protect mountain forests, took place in Wildbad Kreuth on September 13, 2011. Funding for the project was provided by the European Union, the Bavarian Forest Administration, Bavarian State Forests, Interreg, the Salzburg State Forestry Directorate, and the Tyrolean Forest Administration Office. During the conference, damage to trees was noticed in and around the clearing.

Site certificate from 2011:	height 11.6–19.8 m, **4 sector antennas** (5°, 220°, 257°, 270°) and **4 omni antennas**
Site certificate from October 28, 2021:	height 13.7–30.5 m, **11 sector antennas** (3 x 40°, 3 x 220°, 2 x 257°, 3 x 270°) and **2 omni antennas**
Site certificate from June 11,2025:	height 27.5–33 m, **35 sector antennas** (3 x 20°, 12 x 40°, 3 x 220°, 9 x 240°, 2 x 257°, 3 x 260°, 3 x 270°)

Wildbad Kreuth in Arial Photographs from 2009 and 2018

2018

Bavarian State Office for Surveying (LDBV), 2018. Added items: main beam directions of the sector antennas (yellow) (omnidirectional antennas produce additional effects), location of the previous group of trees and the gap occurred in the forest (red), see images to the right.

2009

Bavarian State Office for Survey and Geoinformation, 2009, Wildbad Kreuth, southern part

2018

Bavarian State Office for Surveying (LDBV), 2018. A comparison of aerial photographs from 2009 and 2018 shows that many trees had to be removed south of the education center.

The Bavarian state government, members of parliament, the district administration, and the Schliersee forestry office were all informed about the damage that had occurred.

Rhön Biosphere Reserve, Bubenbarder Stein Mountain, 2014–2017

07 SEP 2017 View from the Scheppenbach Valley on Wasserkuppe Mountain (950 m / 3,120 ft) and Bubenbarder Stein Mountain (759 m / 2,490 ft) with tree damage visible from a distance (view from the northeast).

Transmitters on Wasserkuppe Mountain.
The radome is no longer in operation.

ca. 4 km / 2.5 mi

31 JUL 2014 Section from the mountain ridge (view from the northeast)

The main beams from two 340° sector antennas of the mobile phone base station on Wasserkuppe Mountain reach Bubendorfer Stein Mountain, which is 4 km (2.5 miles) away. To the southwest, RF radiation from the base station strikes the north slope of Nallenberg Mountain, which is 6.5 km (4 mi) away. The forester in charge could not explain the tree damage in this area.

Bubenbarder Stein Mountain, 2017

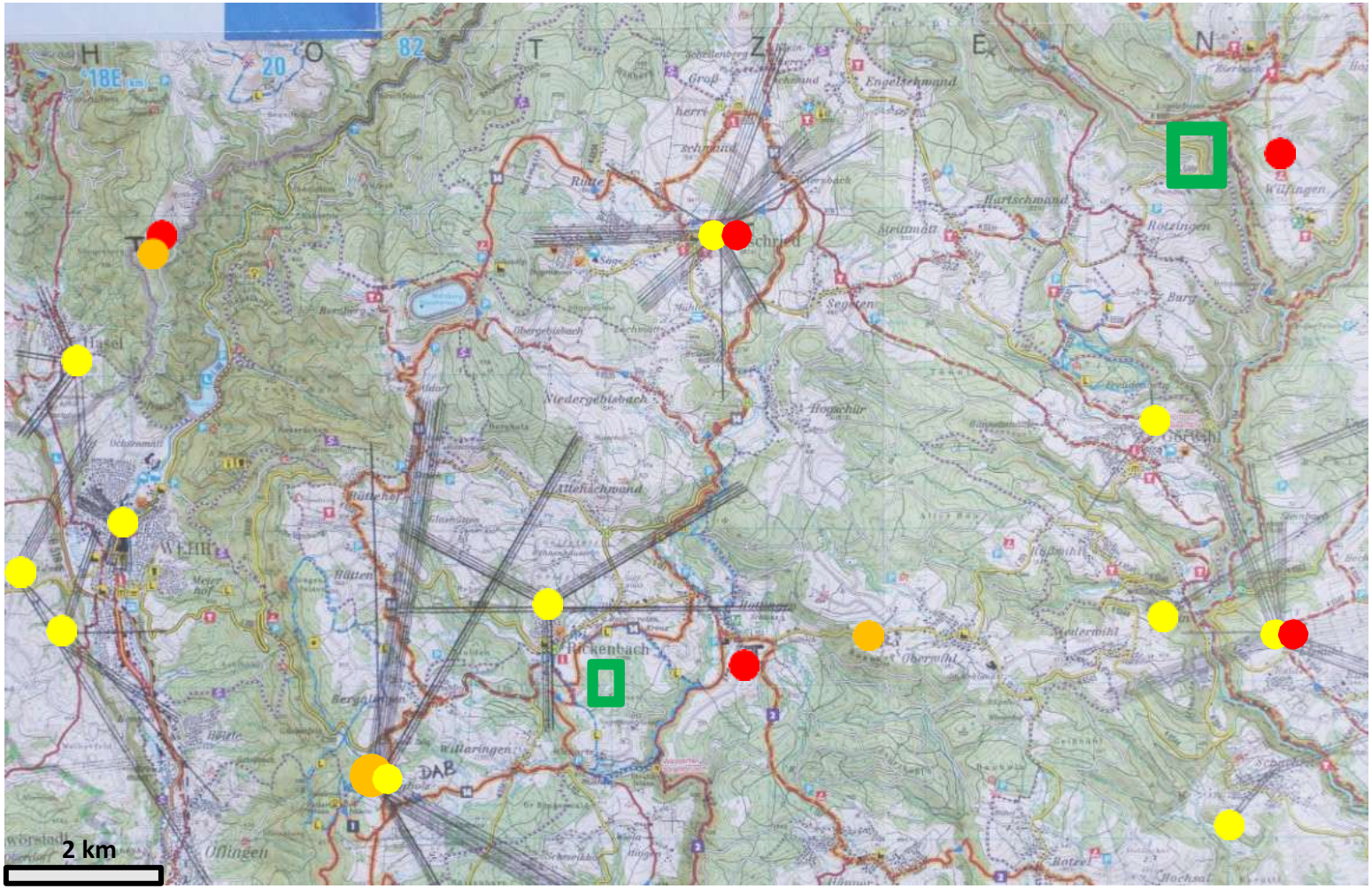
07 SEP 2017 Bubenbarder Stein Mountain. Beach trees. In 2014, foresters announced that nearly all of the beech trees in the Rhön region had abnormal foliage. Wasserkuppe Mountain is home to mobile phone base stations, microwave radio, and BOS digital radio. In May 2006, the analog television transmitter on Heidelstein Mountain was replaced with a digital TV transmitter (DVB-T). In November 2017, the transmitter was converted to DVB-T2.

Four Examples from the District of Waldshut in the Southern Black Forest, 2021: Contrast between an Exposed and a Non-exposed Mountain Forest

05 SEP 2021 Wittenschwand. The western slope is exposed to RF radiation from three antennas belonging to a mobile phone base station located about 1.5 km (0.9 mi) south of Wittenschwand. A clearing has developed in this forest area.

13 OCT 2021 Oberibach.
This southern slope is not exposed to RF radiation from mobile phone base stations.

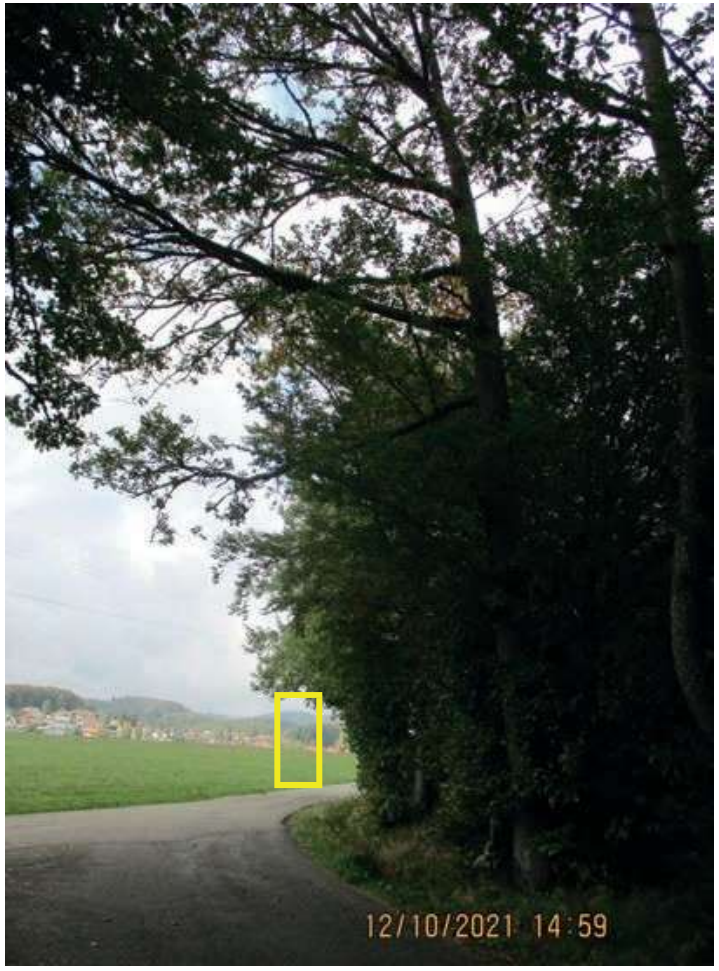
Region of Wehr, Bergalingen, Herrischried, Rickenbach, Görwihl, Etzwihl, and Wilfingen



Map section of the district of Waldshut with bike routes from the State Office for Geoinformation and Land Development (LGL). Added items: mobile phone base stations (yellow) including the main beam directions of the sector antennas, TETRA base stations (red), other transmitters (orange), and discussed forest areas (green).

Forest's Edge, Southeast of Rickenbach, 2021

Rickenbach mobile phone base station (view from the south, from the forest's edge)



12 OCT 2021 Forest's edge south of Rickenbach. Oak tree (view from the south), damaged crown. The base station is located about 1 km (0.6 mi) away. Measurement: **1,050 µW/m²**

12 OCT 2021 Forest's edge. Beech tree located south of the oak tree. There is significant damage to its crown.

The forest to the south and southeast of Rickenbach has been severely damaged. RF radiation levels from different directions have been superimposed.

Forest Area West of the TETRA Base Stations in Dachsberg-Wilfingen, 2021

TETRA base station for BOS digital radio. Site certificate No. 27010505 from September 8, 2009: installation height 50.5 m (165 ft)

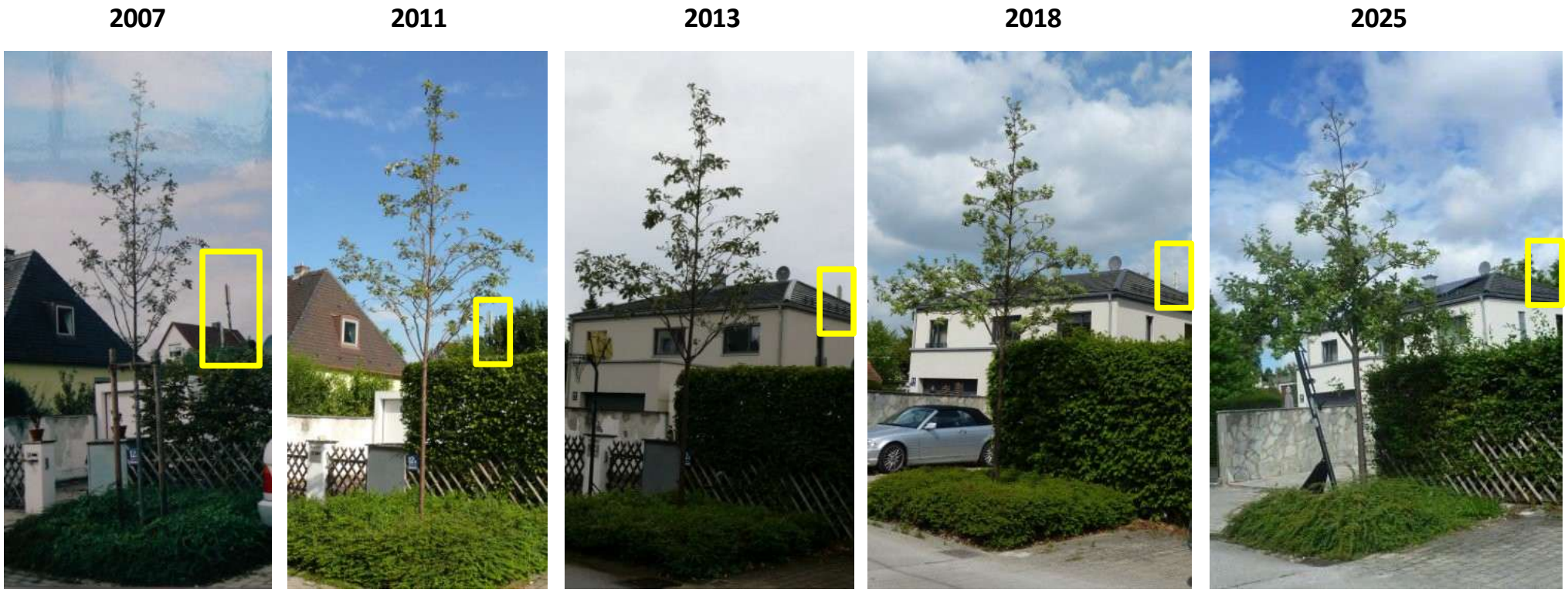
ca. 900 m / 2,950 ft

07 SEP 2021 View from K6598, near Krembach, toward the south. TETRA radiation strikes the slope from the east. The conifers and deciduous trees on the eastern slope are damaged or dead and have been cut down.

Despite two unpublished studies from 1999 and 2001 finding harmful effects on conifer seedlings exposed to 383 MHz (the frequency of the TETRA signal), TETRA base stations were installed and put into operation for the BOS digital radio network. Only a summary of the studies was published. https://de.scribd.com/doc/35928188/Studies-on-the-effects-of-radio-frequency-fields-on-conifers

Radiofrequency electromagnetic fields interfere with the growth and development of young trees.

Munich, Whitebeam Tree, 2007–2025



2007 Photo: E. Weber | 18 AUG 2011 | 20 SEP 2013 | 25 APR 2018 | 29 AUG 2025 Photo: E. Weber

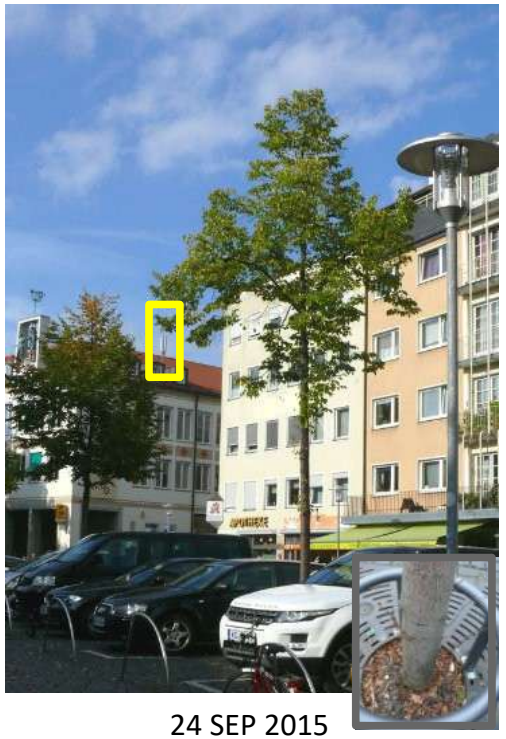
Untermenzing, Hahnemannstr. 12. Whitebeam tree (view from the south). The tree was replanted in 2006/2007 due to damage to the original tree. There is a direct line of sight to the base station at Von-Kahr-Str. 61 (see p. 173). On October 7, 2008, the measurement at house No. 14 was **3,310 µW/m²**. House No. 14 was renovated and expanded in 2012. **The whitebeam tree has not grown in 18 years.** By August 2025, only the lower third of the tree had leaves. The building shields it.

Bamberg, Linden Tree, 2007–2023

2007 **2009** **2015** **2023**

29 AUG 2007

30 JUN 2009



24 SEP 2015

19 MAR 2023 Age: 18 years

Sparse foliage, premature yellowing. Nördliche Promenade: Linden tree (view from the south).
It was planted after the square was redesigned in 2005 and has a protective barrier around the tree pit. There is a direct line of sight to the mobile phone base station at Heinrichsdamm 1 (shown in the image). Additional RF radiation comes from the base station at Grüner Markt 23.
From 2007 to 2023, the linden tree did not grow.
Several large linden trees were cut down at the central bus station to the south in 2007. The replanted linden trees are not thriving.

Base station No. 670394, Heinrichsdamm 1, site certificate from January 14, 2005: installation height 23.7 m (77.8 ft), 3 sector antennas (105°, 225°, 345°)
Base station No. 670921, Grüner Markt 23, site certificate from July 13, 2006: installation height 27.5–34.5 m (90.2–113.2 ft), 23 sector antennas

Bamberg, St. Michael's Monastery, Aerial View of the Geometric Terraced Garden, 1996–2017

RF radiation from several mobile phone base stations from the northeast, east, and southeast affect the northeastern slope.
An aerial photograph from 2002 showed that some of the newly planted fruit trees were developing poorly, especially in the southern area.

1996	2002	2011	2017
			
Orthophotomap 84-22, Bavarian State Office for Survey, 22 JUL 1996	Orthophotomap 84-22, Dietrich Photogrammetrie, 31 MAY 2002	Bayernatlas, State Office for Survey and Geoinformation, 2011	Bayernatlas, State Office for Survey and Geoinformation, 2017
Geometric terrace garden. The **lush growth** made it impossible to recognize the garden's structures.	Basic repair work and **replanting were completed in spring 1998.**	The slope is exposed to RF radiation from multiple mobile phone base stations located to the northeast, east, and southeast.	After 19 years, many fruit trees, especially in the southern area, had grown poorly or not at all.

Bamberg, St. Michael's Monastery, Geometric Terraced Gardens, 2007–2014

The terraced garden is exposed to RF radiation from multiple mobile phone base stations.

2007

12 SEP 2007 Age: **9 years**

2014

16 APR 2014 Age: **16 years**

Top terrace, southern part of the garden (view from the northwest).
The fruit trees were planted in 1998.
Measurement taken on August 19, 2012: **660 µW/m²**

2007

19 OCT 2007 Age: **9 years**

2014

16 APR 2014 Age: **16 years**

Lowest terrace, southern part of the garden (view from the southeast).
The fruit trees were planted in 1998.
Measurement taken on June 25, 2015: **440 µW/m²**

Hünfeld, St. Elisabeth Hospital, 2007 and 2023

15 JUL 2007 Hünfeld, parking lot at the east side of the hospital (view from the **north**). The young trees in the parking lot, including the maple trees, were damaged to varying degrees. There was a mobile phone base station on the hospital building to the right of the parking lot, which is not shown in this photo.

18 MAY 2023 Hünfeld, parking lot at the east side of the hospital (view from the **northeast**).
Mobile phone base station No. 230668.
Many of the trees had not developed properly.

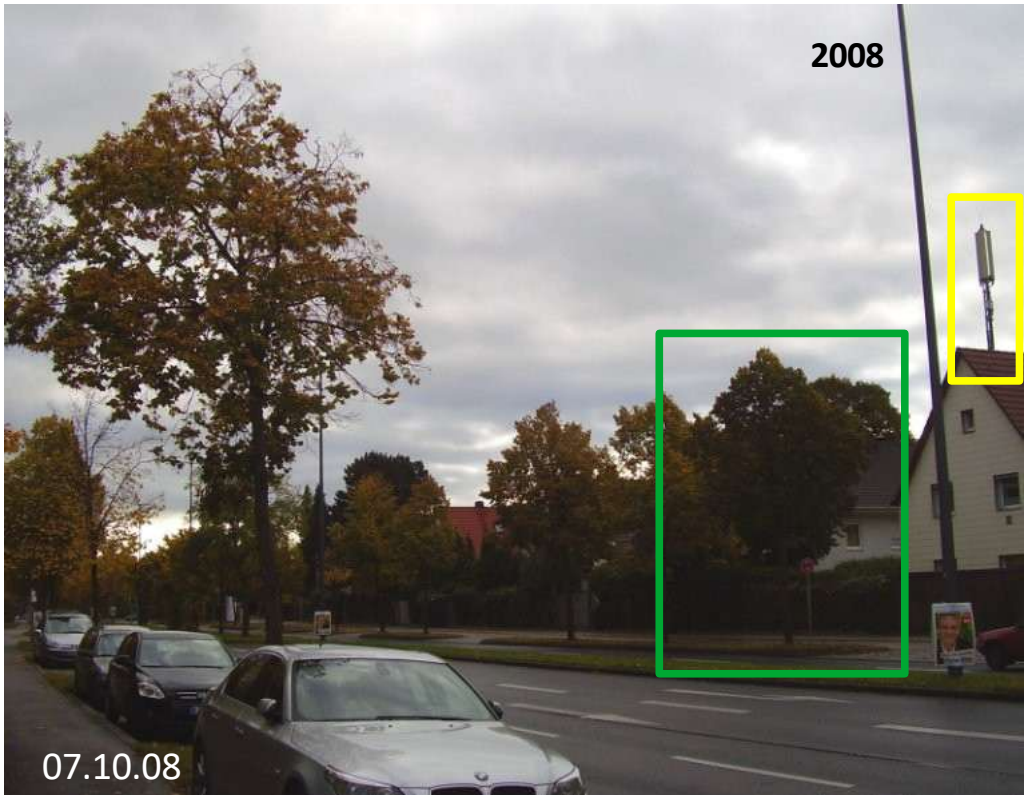
Site certificate from August 10, 2021: installation height 24–27.7 m (78.7–90.9 ft), 15 sector antennas (3 x 0°, 2 x 30°, 2 x 110°, 3 x 120°, 3 x 240°, 2 x 310°)

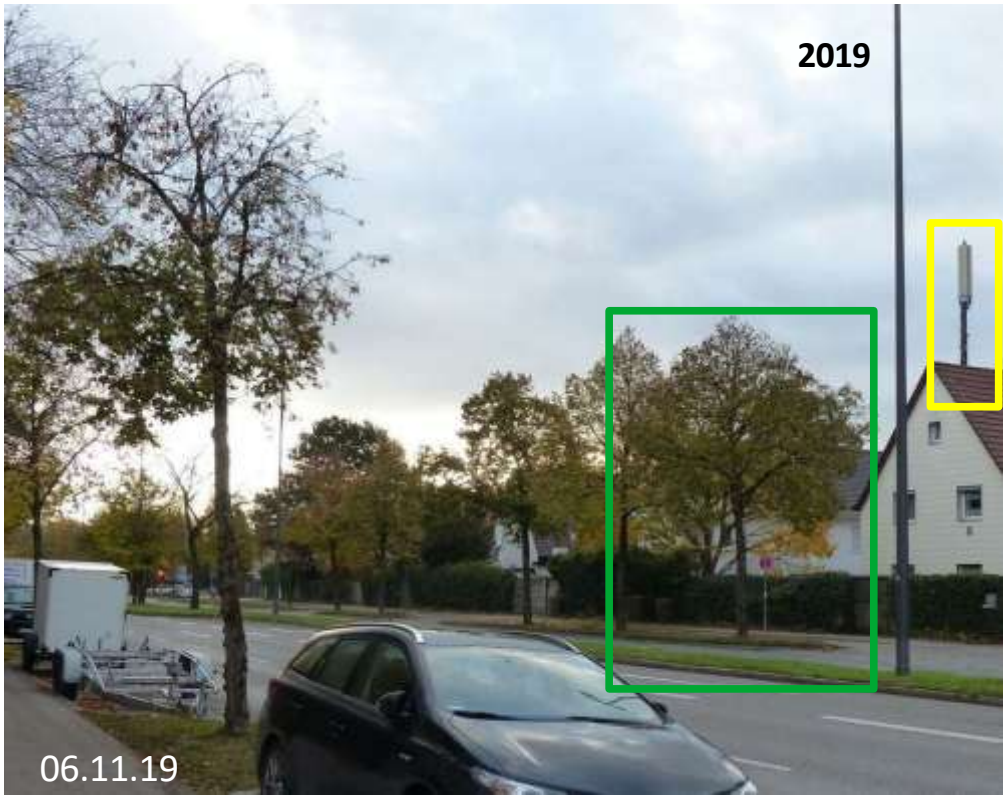
Bamberg, Two Hornbeam Trees (2008–2023)

2008	2009	2012	2013	2023
				
20 JUN 2008	25 SEP 2009	01 AUG 2012	28 JUN 2013	19 MAR 2023 **Age: 15 years**

Gutenbergstraße. The upper halves of the two hornbeam trees have a direct line of sight to the mobile phone base station at Gutenbergstraße 20, which is 370 m (1,214 ft) away. Site certificate No. 671069 from June 30, 2008: installation height 38-47 m (125-154 ft), 22 antennas. The lower halves are in the radio shadow of the car repair shop. The upper halves were already damaged in 2009. In 2013, the main central shoots were cut off. Between 2013 and 2023, the hornbeam trees did not grow any taller.

Munich, 2008–2019





Munich, Von-Kahr-Straße. Linden tree (view from the west) with mobile phone base station No. 530853 at Von-Kahr-Str. 61.
The linden tree on the left has not grown in 11 years. The linden tree on the right (green) is located under the main beams.
It has been growing horizontally. In 2024, the tree on the left was cut down.

2000/2001: GSM launched
2004 September: UMTS added
2006: Change in network technology
2012: LTE 1800 added
2015: LTE 811 added

Base station site certificate from May 6, 2015: installation height 12.9 m (42.3 ft), **12** sector antennas (4 x 80°, 4 x 200°, 4 x 320°)
Base station site certificate from July 25, 2025: installation height , **30** sector antennas (10 x 80°, 10 x 200°, 10 x 320°)

Dresden, 2009

13 MAR 2009 Pillnitz Park. Oak tree.
Measurement: **530 µW/m²**

Erlangen, 2009

06 AUG 2009 Train station, parking lot west side. Hornbeam tree.
Measurement taken on 13 OCT 2010:
1,190 µW/m²
RF radiation is coming from the east. The lower half of the hornbeam tree is in the radio shadow of the railway embankment.

District of Bamberg, 2009

15 SEP 2009 Kälberberg, radio tower for television, microwave radio, and mobile phone base station.
Cherry tree. Many fruit trees had been planted along lanes. They did not thrive. The apples had unusual shapes.

Stuttgart, 2010

03 JUL 2010 View from the Upper Palace Garden to the state library and the transmitters on the courthouse, damaged beech tree.
Measurement on July 8, 2021: 28,300 µW/m²

Hof, 2010

16 SEP 2010 Bahnhofsplatz. Linden tree. Dr. Kurz and a biologist from the **State Office of Environmental Protection** were shown the tree damage near the train station.

Würzburg, 2011

18 APR 2011 Market square. Globe Norway maple trees with crown damage. The trunks were protected. The market square is exposed to RF radiation from the mobile phone base station on Schönbornstraße, which is also reflected off the buildings.
The trees have since been removed.

Veitshöchheim, Bavarian State Institute for Viticulture and Horticulture, April 2011

Name unknown

Golden rain tree

Sargent's cherry tree

Oak tree

05 APR 2011 Veitshöchheim, An der Steige, Bavarian State Institute for Viticulture and Horticulture (LWG). In this area, several trees have been replanted. When leafless, all trees showed signs of disturbed development.
Measurement: 9,670 µW/m²

Mobile phone base station at LWG, No. 660088, site certificate from June 3, 2008: installation height 14.7–20 m (57–65.6 ft)
17 sector antennas (2 x 50°, 2 x 130°, 160°, 2 x 170°, 200°, 3 x 230°, 2 x 290°, 2 x 300°, 2 x 330°)

Garmisch-Partenkirchen, Linden Tree, 2011–2022

08 SEP 2011 | 10 AUG 2013 | 11 MAR 2016 | 12 AUG 2022 | 14 MAY 2015 From the south

Train station. Linden tree (view from the east), line of sight to the base station at Bahnhofstraße 34, which is 200 m (656 ft) away.
Measurement taken north of the linden tree on **May 14, 2015: 4,870 µW/m²**
The linden tree was unable to grow properly. It never formed a crown and will never provide shade.

Mobile phone base station No. 570228, Bahnhofstraße 34, site certificate from April 13, 2011: installation height 18.2–24.9 m (59.7–81.7 ft), 17 sector antennas (2 x 0°, 2 x 10°, 20°, 30° 2 x 90°, 2 x 130°, 140°, 150°, 2 x 230°, 250°, 260°, 270°)

Kassel, Federal Social Court, Beuys' Oak Tree, 2011–2025

Many of the replanted trees of the 7,000 oak trees demonstrate that they cannot thrive in an area with RF radiation from mobile phone base stations.

2011

11 AUG 2011 Federal Social Court. Pin oak tree (**view from the south**), line of sight to the base station on IC Hotel

11 AUG 2011 IC Hotel. Pin oak tree (**view from the north**)

2016

30 SEP 2016 Pin oak tree (**view from the north**). The oak tree did not grow.
Measurement: 450 µW/m²

2025

14 JUL 2025 Replanted oak tree (**view from the north**). This oak tree could not grow here either.
Measurement: 2,670 µW/m²

Weihenstephan, Bavarian State Institute for Agriculture (LfL), 2011–2016

29 SEP 2011 Lange Point 10.
Linden tree (view from the west),
sparse foliage, premature leaf drop.

20 JUN 2012 Lange Point 10.
Linden tree (view from the west).
Measurement: **6,840 µW/m²**

17 OCT 2016 Lange Point 10. Linden tree (view from the west), clearly damaged, no growth since 2011. Measurement: **5,760 µW/m²**

Mobile phone base station at Bavarian State Institute for Agriculture (LfL), No. 691156, site certificate from June 3, 2008: installation height 17.7–19.4 m (58–63.6 ft), 9 sector antennas (2 x 0°, 85°, 2 x 120°, 205°, 220°, 240°, 325°)

Bamberg, State Garden Show, 2012

14 MAY 2012 Chestnut tree

26 JUL 2012 Hornbeam and oak trees.
Measurement: **870 µW/m²**

26 JUL 2012 Oak tree with long, curved leading shoot

The State Garden Show site is exposed to RF radiation from mobile phone base stations in six directions.

Bamberg, State Garden Show, 2012

26 JUL 2012 Honey locust (Gleditsia) tree with early yellowing

30 JUL 2012 Birch trees, yellowing and premature leaf drop

14 AUG 2012 Field maple tree, premature yellowing

27 AUG 2012 Hazelnut tree. Measurement taken on May 12, 2014: **940 µW/m²**

The State Garden Show grounds are exposed to RF radiation from **mobile phone base stations in six directions**. As a result, many of the newly planted trees and shrubs did not thrive. Some leaves turned yellow as early as July and fell in August. The tree experts from the horticultural companies involved could not explain what happened. They were at a loss: "Even though we water them constantly, the branches are drying up!" Several gardeners reported feeling unusually exhausted and experiencing headaches after working on this site.

During the Dresdner StadtBaumtage (Dresden City Tree Days) conference on March 14 to 15, 2013, a speaker reported that deviations from normal development occur relatively frequently (Conference Proceedings, p. 111).

Signs of impairment in young tree development

This manifests itself in various ways:

- Predominant formation of short shoots and short long shoots with limited or missing branching
- Usually strong fructification, which is atypical for young trees
- Discoloration and other leaf damage
- Sparse foliage and premature leaf drop
- Tearing of the initially closed crown
- Unstable, "bending" leading shoots
- Reduced secondary growth of trunks
- Lack of stability, even after several years
- Pronounced formation of root suckers
- Formation of dead wood in the crowns
- Death of parts of the crown and entire trees

Causes of impaired growth

These include, among others:

- Nutrient deficiency / nutrient oversupply
- Soil compaction
- Insufficient rooting space
- Insufficient water supply
- Waterlogging
- Salt contamination
- Pollutants
- Diseases, pests

Bamberg, Kirschäckerstraße 24, 2009–2013

10 JUN 2009 Oak tree. The top half of the tree was dead.

15 MAY 2010 A new oak tree was planted in 2010. Measurement: **4,290 µW/m²**

17 SEP 2013 The replanted oak tree did not thrive either. RF radiation exposure should be considered as a possible cause.

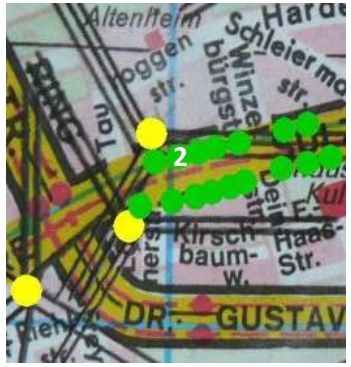
The given reasons do not explain the damage observed in the trees on the grounds of the State Garden Show in Bamberg. The high incidence of abnormalities and growth disorders in young trees, which occurred alongside increased RF radiation exposure levels in the same location at the same time, suggests a causal relationship.

GALK Street Tree Test 2, Nuremberg, 2017

Liquidambar styraciflua 'Paarl' (sweet gum tree)
2007: 8 x Dr.-Gustav-Heinemann-Straße

27 JUN 2017 Dr.-Gustav-Heinemann-Straße. The two southernmost sweet gum trees (view from the west). The leading shoots are dead. Age: 10 years.
The trees are located within the radiofrequency field of two mobile phone base stations.
Measurement taken on June 28, 2016: **6,700 µW/m²**

Prunus padus 'Schloss Tiefurt' (bird cherry tree)
2007: 16 x Äußere Sulzbacher Straße



Section of the Nuremberg city map, Falk. Added items: location of mobile phone base stations (yellow) with the main beam directions of the antennas.

27 JUN 2017 Äußere Sulzbacher Straße. Bird cherry tree 2 (view from the south). Age: 10 years, tree sponsorship for maintaining the tree pit. The 16 test trees look very different from one another. Most of them have grown poorly. Due to reflections from buildings and radiation interference patterns, each tree is exposed to a different level of RF radiation.

The location of the trees in the GALK Street Tree Test 2 is available on the Conference of Garden Authority Directors (GALK) website.

Berlin, 2017

16 SEP 2017 View from Paul-Löbe-Allee (view from the northwest) across Platz der Republik to the German Bundestag in the Reichstag building. Pin oak trees.
In **2000**, pin oak trees were planted along the avenues in the government district. When the trees began showing signs of malformation in **2011**, targeted pruning and soil improvement measures were implemented in **2013**. Initially, the trees regenerated. However, by September **2017**, some of the trees had again sustained obvious damage, including premature leaf drop, long leading shoots, and disturbed branching. RF radiation exposes the Platz der Republik from the northwest, west, south, and east.

15 SEP 2017 Cora-Berliner-Straße.
Linden tree, impaired tree development. Not a single linden tree on this street has grown properly.

Augsburg, Exhibition Center Parking Lot, German Tree Care Conference, April 2018

24 APR 2018 Parking lot, Augsburg Exhibition Center.
Maple tree (view from the east).
Many trees in the parking lot are damaged.

24 APR 2018 Parking lot, Augsburg Exhibition Center.
Maple tree (view from the south)

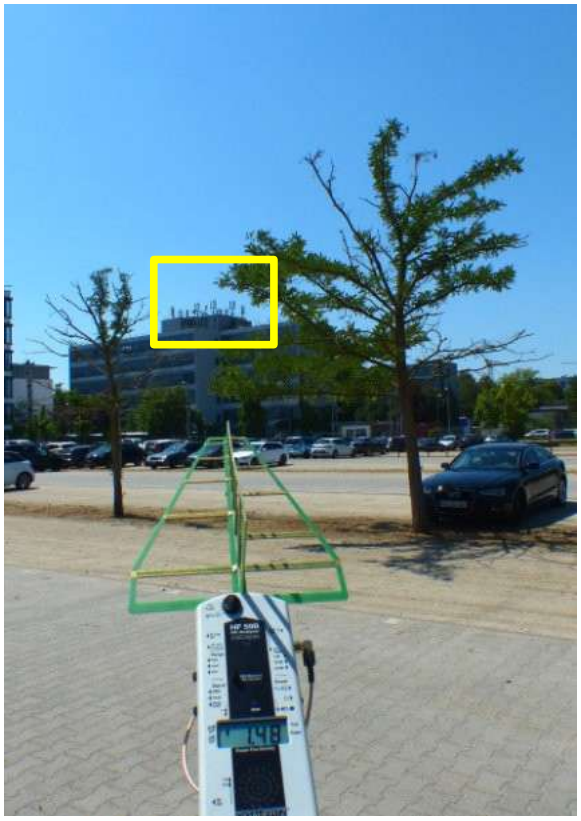
24 APR 2018 Cracks along the trunk and lichens

24 APR 2018
Measurements between **1,000** and **13,090 µW/m²** confirmed the uneven distribution of the radiofrequency field.

Calden, District of Kassel, 2019

10 JUL 2019 Airport.
Pyramidal English oak trees

Ingelheim, 2019



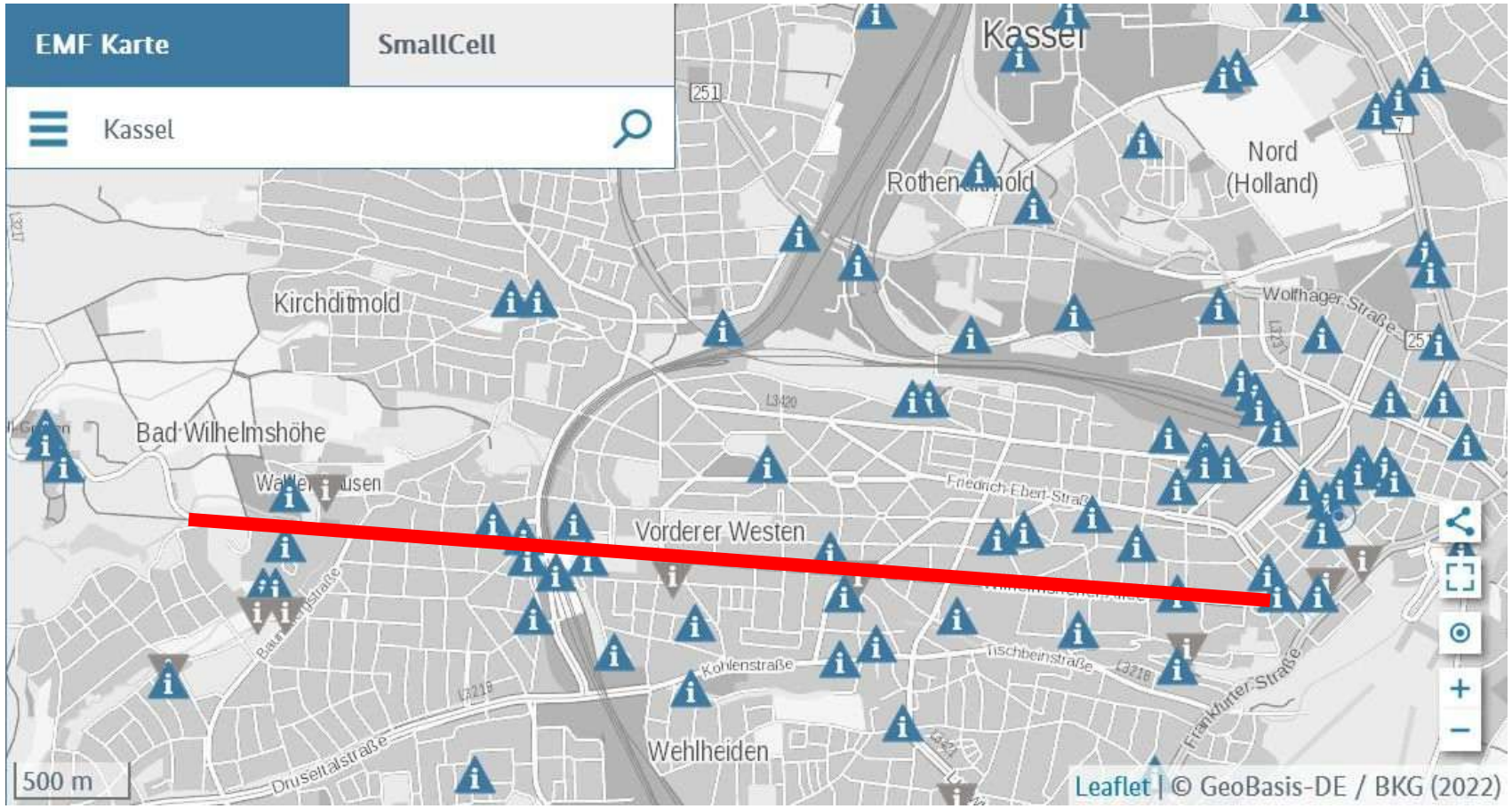
24 JUL 2019 Parking lot at the Boehringer company. Damaged locust trees.
Measurement: **1,480 µW/m²**
Mobile phone base station No. 400379, site certificate from June 28, 2019: installation height 27.5 m (90 ft), 33 sector antennas

Darmstadt, 2019

25 JUL 2019 Friedensplatz, white tower.
Hornbeam trees (view from the north) with sparse foliage

Redesign of Wilhelmshöher Allee – A Premium Project of the Federal Program "National Projects of Urban Development," Trees Planted in 2018/2019

City's Press Release: "Wilhelmshöher Allee, a prominent traffic and visual axis connecting the Bergpark with the city center, will be redesigned. Several individual initiatives are planned to this end. Two hundred twenty-five linden trees will be planted, and existing trees will be restored."
The linden trees were planted in 2018/2019. Unfortunately, due to RF radiation pollution, it is feared that many will not thrive. There were already signs of this in 2019.



Section of the EMF database of the German Federal Network Agency (BNetzA) with locations of mobile phone base stations. Several mobile phone base stations (marked in red) emit RF radiation in different directions along Wilhelmshöher Allee. This results in an **uneven distribution of radiofrequency fields**. In summer 2016, severe damage to linden trees was observed, with significant variation noted among the trees.

27 MAY 2019
Schwälmer Brotladen, newly planted linden tree with long leading shoot

Kassel, Wilhelmshöher Allee, Examples of Newly Planted Linden Trees

2020

17 AUG 2020
Wilhelmshöher Allee.
Line of sight to Hessischer Rundfunk (hr) radio tower

2023

17 JUL 2023
Intersection of Wilhelmshöher Allee and Hupfeldstaße

2023

17 JUL 2023
Intersection of Wilhelmshöher Allee and Fröbelstraße

2023

17 JUL 2023
Intersection of Wilhelmshöher Allee and Ludwig-Mohr-Straße

Each linden tree developed differently.

Kassel, Wilhelmshöher Allee, Examples of Newly Planted Linden Trees

2025

View from the east

2025

View from the west

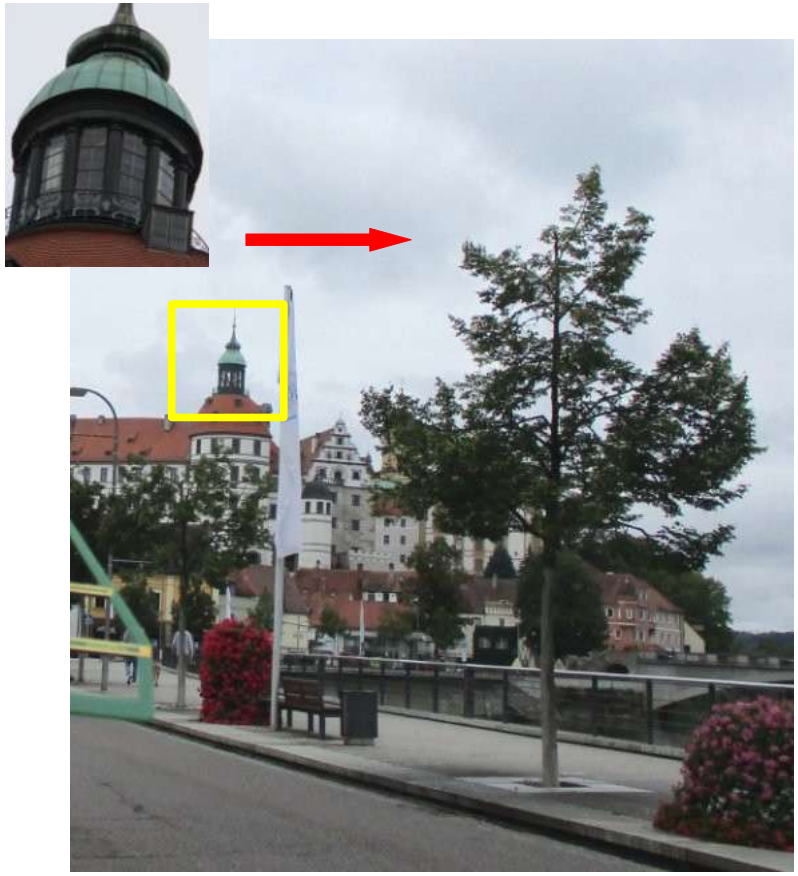
2025

View from the north

07 JUL 2025 Wilhelmshöher Allee 13. Linden tree. This linden tree is exposed to RF radiation from mobile phone base stations from the east and west. In August 2025, it sprouted leaves for the second time.
Measurement facing east: **123,000 µW/m²**
Measurement facing west: **45,900 µW/m²**

20 SEP 2025 Wilhelmshöher Allee and Kirchweg. Despite being watered, this young linden tree is struggling to thrive. Side lobes are striking the tree.
Measurement: **800 µW/m²**

Neuburg a. d. Donau, 2020



29 AUG 2020 Oskar-Wittmann-Straße.
Linden trees (view from the east).
Measurement: **1,920 µW/m²**
Despite a protective coating, all linden trees had trunk damage on various sides (see p. 218).

Frauenchiemsee Island, 2020

18 SEP 2020 Natural Monument of Lindenhain. This linden tree on the north side of the linden grove has signs of disturbed development. There is a line of sight to the transmitter near Gstadt, which is 2 km (1.2 mi) away.

18 SEP 2020 This maple tree is located near the church. Its shoots have no branches. The transmitter above Gstadt is 2.2 km (1.4 mi) away.

Rosenheim, 2020

17 SEP 2020 Schmucken. Linden trees with water bags. Mobile phone base stations at the hospital.

Nürtingen, 2021

06 JUL 2021 Neuffener Straße, green space north of the district court. Sweet gum tree. The base station at the German Red Cross (DRK) office is 200 m (656 ft) away.
Measurement: 57,400 µW/m²

Solingen, 2022

24 MAY 2022 Hospital with mobile phone base station. Sweet gum tree. The trees around the hospital have sustained extensive damage, typically beginning on the side facing the transmitters.

Lübeck, Carlebach Park in the University District, 2007–2022

2007

29 AUG 2007 Aerial photograph by Bernard Mende, a part of the Carlebach Park (view toward the south). Front right: Multifunction Center (MFC) with mobile phone base station. The RF radiation from the transmitters is reflected off the apartment building.

2022

07 SEP 22 Maple avenue in front of the apartment building (view from northwest). Age: 17 years. There is a direct line of sight from the maple avenue to the MFC, which is 120 m (394 ft) away.

2022

07 SEP 2022 Maple tree in front of the apartment building (view from the southeast). The base station is 120 m away. **Age: 17 years.**
Measurement on September 27, 2023: **15,100 µW/m²**

Built in 2005, Carlebach Park features over 600 trees and shrubs. The base station at the Multifunctional Center was already operational.
Unfortunately, many of the newly planted trees did not thrive. It must be excluded that mistakes were made when planting the maple trees. However, the newly planted birch and honey locust trees in the park have not developed properly either.

Lübeck, 2022

07 SEP 2022 University district, Alexander-Flemming-Straße (view from the south). The oak trees were planted in 2007.
Mobile phone base station No. 87016849, site certificate from June 16, 2022: installation height 19–20 m (62–65.6 ft), **36 sector antennas** (12 x 0°, 12 x 120°, 12 x 240°).
The safety distance for three antennas in the main beam direction is 17 m! All of the trees show signs of distress, including long shoots. Some trees were topped. Others were staked to prevent bending. On September 28, 2023, **the measurements along the street were extremely high, reaching up to 250,000 µW/m².**

Düsseldorf, 2022

18 JUL 2022 There is a row of oak trees on the south side of the State Criminal Investigation Office with an unobstructed view of the mobile phone base station at the Chamber of Trade Office, which is between 250 and 420 m (820 and 1,378 ft) away.
Measurement: **6,000 µW/m²**

Mobile phone base station at the Chamber of Trade Office

Kiel, 2022

09 SEP 2022 Olshausenstraße (view from the west)

Sigmaringen, 2022

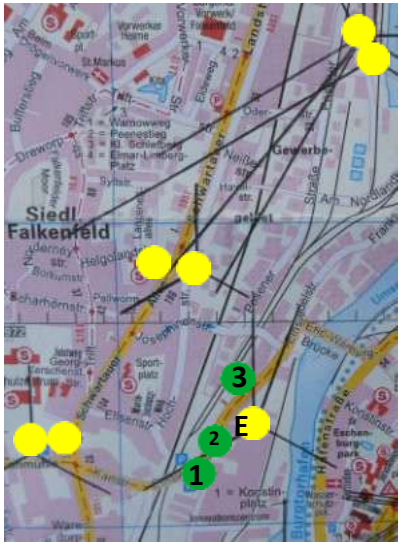
02 DEC 2022 Allee der Hundertjährigen (Avenue of the Centenarians).
Fruit tree, planted in January 2012.
Measurement: 2,190 µW/m²

Bremen, 2023

31 OCT 2023 An der Weide 17.
Linden tree (view from the southeast).
Measurement: 20,700 µW/m²

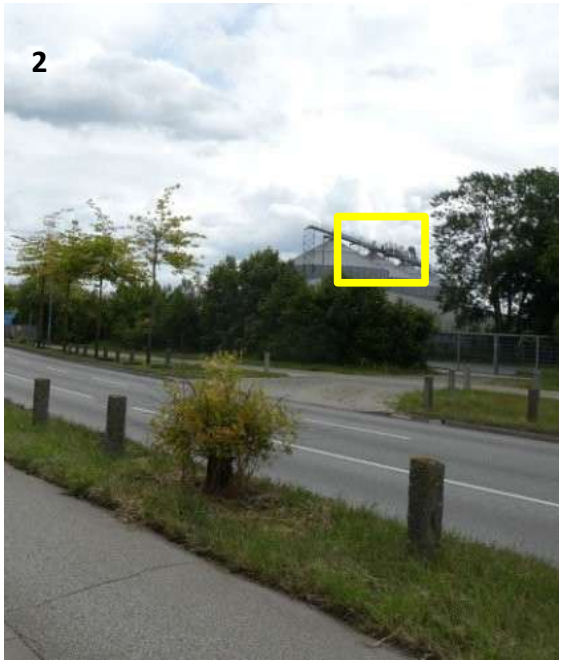
Lübeck, Einsiedelstraße, June 2025

Numerous oak trees along Einsiedelstraße had to be removed due to severe damage.



Section of the city map, Falk. Added items: location of mobile phone base stations (yellow) with the main beam directions of the known antennas and the location of trees (green).

05 JUN 2025 Einsiedelstraße (view from the south). This oak tree is shielded by the building on the right and by trees from the base station on Einsiedelstraße.



05 JUN 2025 Pin oak trees (view from the southwest). The topped oak tree stands roughly in line with the main beams of the eighteen 240° antennas.
Measurement: 374,000 µW/m²

05 JUN 2025 Pin oak tree (view from the northwest). This oak tree stands in the sector of ten 0° and eight 20° antennas.
Measurement: 327,000 µW/m²

Mobile phone base station, No. 320420, site certificate from September 26, 23: installation height 30.6–31.9 m (100.4–104.7 ft), **54 antennas** (10 x 0°, 8 x 20°, 10 x 120°, 8 x 140°, 18 x 240 °)

Rostock-Diedrichshagen, 2025

18 JUN 2025 Kantenweg. Pin oak tree (view from the north). Line of sight to the base station, No. 66011002, on Doberaner Landstraße, which is 380 m (1,247 ft) away.
Measurement: 23,500 µW/m²

Rostock, 2025

21 JUN 2025 ZOB, southwest side of the main train station. Honey locust tree (view from the south). In addition, base station radiation from the south affects the young trees. There was significant damage throughout the area, affecting both young and older trees.

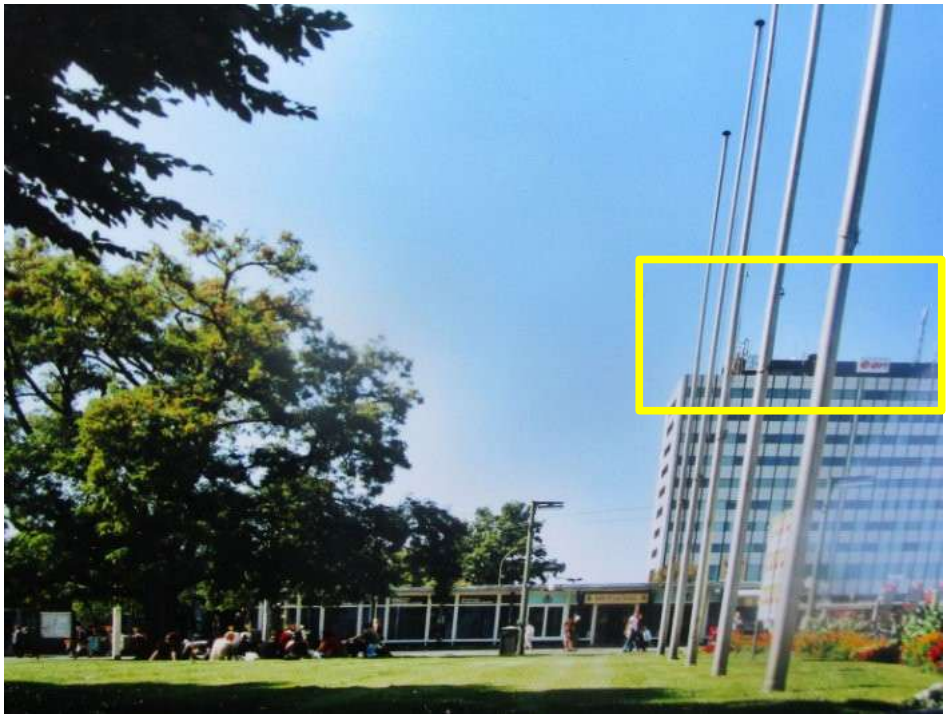
Kassel, Clinic, 2025

20 JUL 2025 Kassel, hospital entrance. Pyramidal oak trees (view from the west). The mobile phone base station at Mönchebergstr. 50 has 33 sector antennas.
Measurement: 6,400 µW/m²

Damage in Climate-Resilient Tree Species

Würzburg, 2006

26 AUG 2006 Würzburg, Röntgenring, near train station.
A row of locust trees on a grass strip between road and sidewalk **(view from the south).** The locust trees all had sparse foliage. They had to be cut down in subsequent years.



26 AUG 2006 Würzburg, Bahnhofplatz. Locust tree on a meadow (**view from the east**). Not only along the road did locust trees show crown damage, but also in the meadow in front of the train station building. Side lobes struck the locust tree from above. The tree was cut down in 2017/2018.

Mobile phone base station No. 660076 on the high-rise building at Bahnhofplatz 2. Site certificate from June 23, 2008: installation height 42.7–52 m (140–171 ft), **36 sector antennas** (5 x 0°, 55°, 4 x 70°, 2 x 80°, 5 x 120°, 170°, 175°, 180°, 4 x 190°, 3 x 240°, 2 x 250°, 2x 260°, 4 x 270°, 295°)

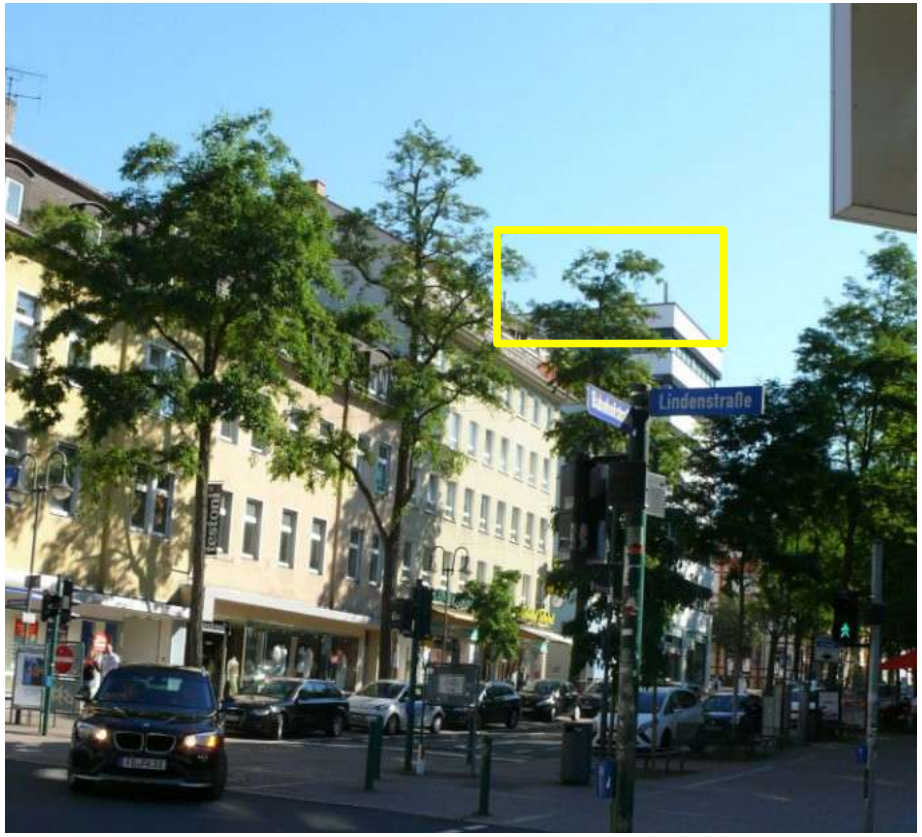
Waiblingen, 2006

08 SEP 2006 Waiblingen, train station.
Several locust trees showed premature yellowing and premature leaf drop.

Nuremberg, 2011

27 JUN 2011 Nuremberg, intersection of Bahnhofsplatz and Königstor. Locus tree (view from the northwest)

Fulda, 2016



24 JUN 2016 Fulda, intersection of Bahnhofstraße and Lindenstraße. Locust trees with sparse foliage (view from the southwest). The other locust trees on Bahnhofstraße had damaged crowns.
In the meantime, they had to be cut down.

Kassel, 2017

10 JUN 2017 Kassel, Eisenschmiede.
Locust tree (view from the northeast)

Plattling, 2008

13 JUN 2008 Plattling, Reiterstraße. Tree hazel avenue (view from the south). There is a line of sight from the tree hazel on the right to the base station. This tree shows clear crown damage. The tree hazel on the left is located in the radio shadow of the yellow house.

Fürth, 2012

02 AUG 2012 Fürth, Bahnhofplatz.
Tree hazel. The location was carefully protected.
Measurement: **6,890 µW/m²**

Hamburg, 2024

08 SEP 2024 Steindamm.
Tree hazel (view from the southeast). The tree is exposed to RF radiation from the southwest.

Würzburg, 2025

04 AUG 2025 Würzburg, Bahnhofplatz.
Tree hazel with crown damage in a small grass strip (view from the southeast).
Measurement: **4,200 µW/m²**

04 AUG 2025 Würzburg, Ringpark, near Justice Center. Two tree hazels (view from the south). The eastern tree hazel already had to be cut back. From the base station at Friedrich-Ebert-Ring 14, RF radiation reaches the west and north part of the Ringpark. Numerous trees had to be cut back, topped, or cut down.

04 AUG 2025 Mobile phone base station at Friedrich-Ebert-Ring 14

Veitshöchheim, Bavarian State Institute for Viticulture and Horticulture (LWG), 2008–2023

16 JUL 2008 Birkentalstraße.
A row of honey locust trees (view from the southeast). There are big differences between the trees in this row.

05 SEP 2013 Birkentalstraße. Two honey locust trees (view from the southwest). Line of sight to the base station on An der Steige, premature yellowing. There was extensive damage to trees and shrubs on the LWG premises.
Measurement: **1,810 µW/m²**

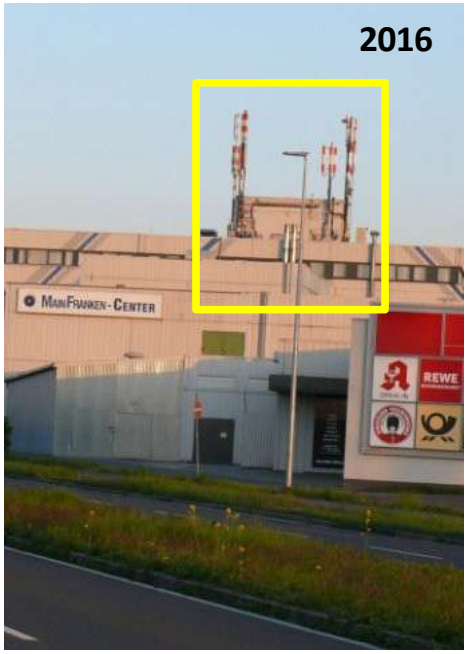
12 MAY 2023 Birkentalstraße. Two honey locust trees (view from the southwest).
They have not grown in ten years.

Mobile phone base station on LWG, No. 660088, site certificate from June 3, 2008: installation height 14.7–20 m (48.3–65.6 ft) , 17 sector antennas (2 x 50°, 2 x 130°, 160°, 2 x 170°, 200°, 3 x 230°, 2 x 290°, 2 x 300°, 2 x 330°)

Bamberg, Berliner Ring, 2009–2016

10 JUN 2009 Berliner Ring, MainFranken Center. A maple tree from a row on the median strip (view from the north). All of the maple trees had damaged crowns, so they were cut down.

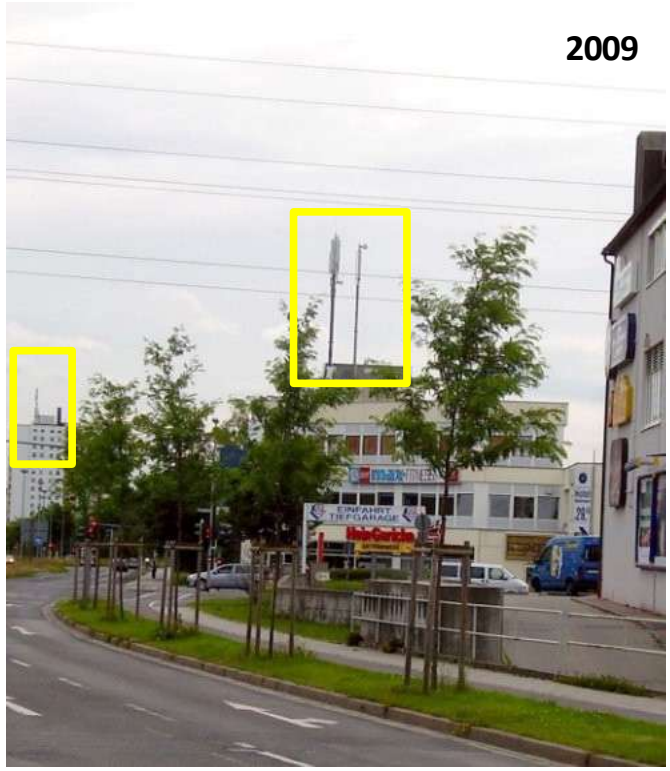
23 MAY 2012 Berliner Ring, MainFranken Center. A row of honey locust trees (view from the northwest).
The row was planted in 2010.
Measurement: **5,460 µW/m²**
The honey locust trees already showed crown damage in 2012. There was extensive damage to various tree species in the vicinity of the base station.



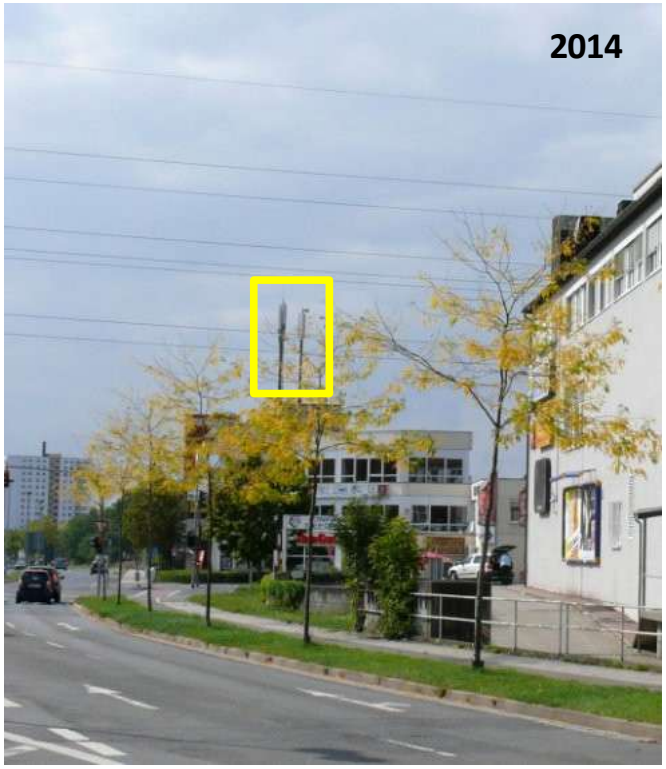
02 MAY 2016 Berliner Ring, MainFranken Center. The honey locust trees were removed again in winter 2015 due to increased damage.
Measurement in 2016: **16,920 µW/m²**

Mobile phone base station MainFranken Center, No. 671399, site certificate from June 25, 2011: installation height 20.6–27.8 m, 21 sector antennas (0°, 2 x 40°, 2 x 95°, 120°, 2 x 140°, 2 x 160°, 2 x 215°, 2 x 220°, 240°, 2 x 280°, 2 x 320°, 2 x 335°)

Bamberg, Starkenfeldstraße, 2009–2025



19 JUN 2009 Intersection of Starkenfeldstraße and Berliner Ring. Honey locust trees. Here, too, damaged maple trees were replaced by honey locust trees. These trees were planted in the radiofrequency field of two base stations.

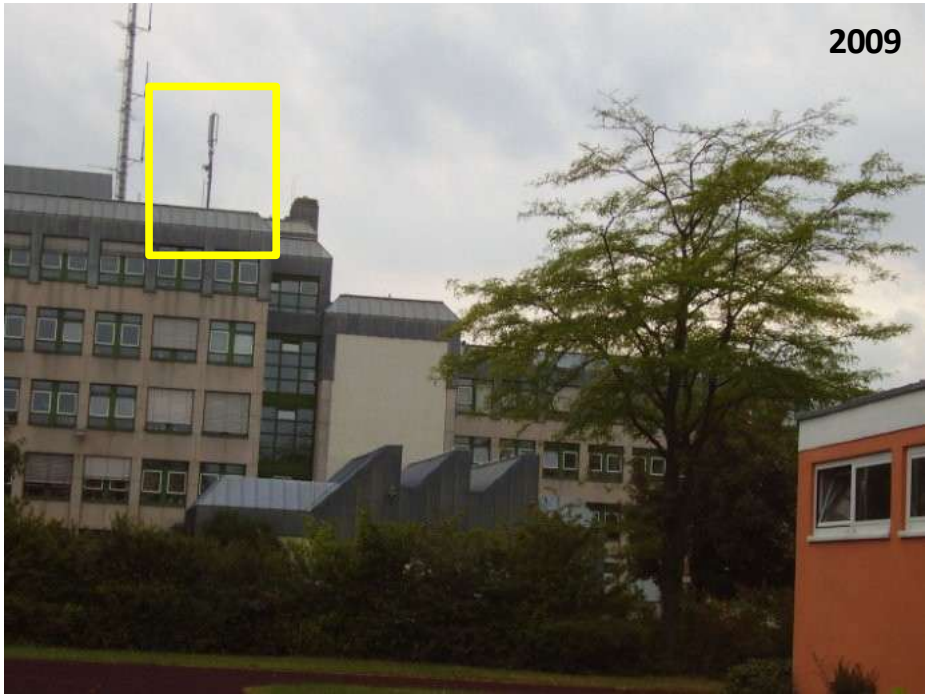


10 SEP 2014 The 2014 photo shows that the honey locust trees did not thrive in this location. Their leaves turned yellow prematurely and fell off early.
Measurement: **6,860 µW/m²**

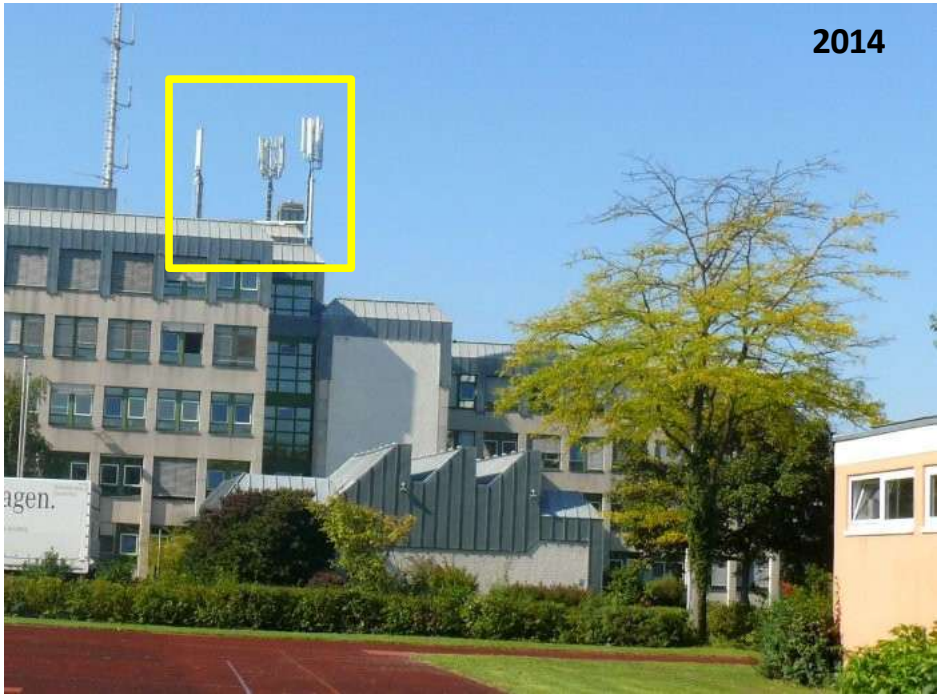
25 SEP 2025 The honey locust trees are 16 years old. They have not developed appropriately for their age. They lost their leaves prematurely.
Measurement: **14,000 µW/m²**

Mobile phone base station at Pödeldorfer Str. 144, No. 69010066. Site certificate from October 4, 2010: installation height 21.9–23.6 m (71.9–77.4 ft), 18 sector antennas (3 x 0°, 3 x 60°, 3 x 120°, 3 x 180°, 3 x 240°, 3 x 300°)

Bamberg, Eichendorff High School, 2009–2014



02 SEP 2009 Eichendorff High School, schoolyard.
Honey locust tree with a line of sight to the base station at Schildstr. 81, police headquarters (view from the east). The top third of the honey locust tree lost its leaves prematurely. Meanwhile, the number of antennas of base station at the police headquarters increased from 6 in 2010 to 63 in 2025 (see pp. 210, 213).



17 SEP 2014 Eichendorff High School, schoolyard.
Hone locust tree (view from the east). The leaves have turned yellow prematurely. The top third of the tree is already bare. The expansion of the base station at the police headquarters has continued in 2014.
Measurement taken on July 7, 2014: **4,240 µW/m²**

Site certificate from **December 15, 2010**: height 23.1 m (75.8 ft), **6** sector antennas (2 x 110°, 2 x 230°, 2 x 350°), 11 other transmitters
Site certificate from **May 26, 2025**: height 22.5–23.9 m (73.8–78.4), **63** sector antennas (3 x 5°, 12 x 95°, 9 x 110°, 3 x 210°, 12 x 215°, 6 x 230°, 12 x 335°, 6 x 350°)

Kassel, Main Train Station, 2019

31 MAY 2019 Kassel, main train station.
Honey locust tree (view from the west).
There is a line of sight to additional base stations.

Lübeck, University District, 2022

07 SEP 2022
Base station on Alexander-Flemming-Straße, No. 87016849: height 19–20 m (62–66 ft), 36 antennas

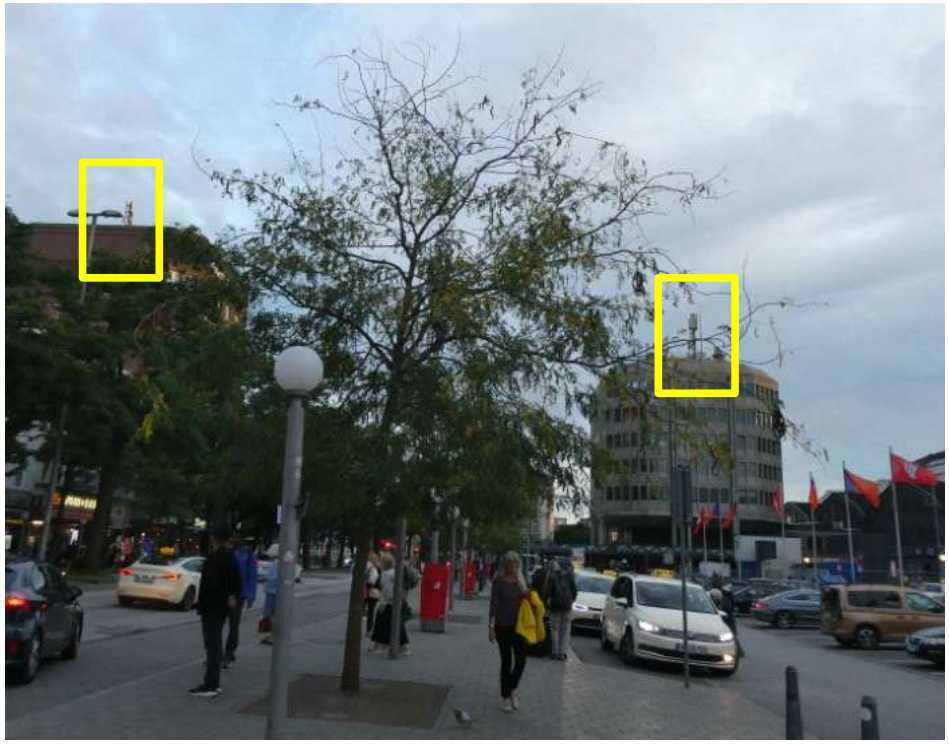
07 SEP 2022 Daycare center, Gerti-Cori-Straße (view from the southeast). This honey locust tree is **17 years old**. It has grown poorly. It is also exposed to the RF radiation from two base stations: one on the Multifunction Center MFC (460 m / 1,509 ft) to the northeast, and one on Alexander-Flemming-Straße (120 m / 394 ft) to the southwest.
Measurement: **7,070 µW/m²**

07 SEP 2022
Base station MFC, No. 320759: height 26 m (85.3 ft), 24 antennas

Hamburg, 2022

14 SEP 2022 Hamburg, Bahrenfeld, Albert-Einstein-Ring.
Honey locust trees

Hamburg, 2023



20 SEP 2023 Hamburg, main train station.
Honey locust tree (view from the north)

Ingelheim, 2019

24 JUL 2019 Ingelheim, parking lot at the Boehringer company.
All of the hornbeam trees showed abnormal growth.

Hamburg, 2023

05 AUG 2023 Hamburg, Planten un Blomen Park.
These three hornbeam trees have excessively long shoots.

Schweinfurt, 2025

1 2 3

04 AUG 2025 Schweinfurt.
Three damaged hornbeam trees on the north side of the train station **(view from the northwest)**. The hornbeam trees that stood farther to the west also showed signs of damage.

3

04 AUG 2025 Hornbeam Tree No. **3 (view from the southeast)**. There is a direct line of sight from the hornbeam trees to two mobile phone base station: No. 661216 and No. 660515.
Measurement: 94,800 µW/m²

3

04 AUG 2025 Trunk of hornbeam tree No. **3:** cracks, patches of necrosis, and lichens.

Bamberg, Police Headquarters, 2014–2025

17 SEP 2014 Bamberg, police headquarters, west side of parking lot. Young field maple tree with dead top.
Measurement: **4,190 µW/m²**

25 SEP 2025 Bamberg, police headquarters, west side of parking lot. The tree's shape is striking. Its top shoots have died off. The field maple tree could only grow horizontally, not upward. This is due to higher RF radiation levels at higher elevations.
Measurements taken in the parking lot showed RF radiation levels of up to **20,000 µW/m²**.

Kassel, 2023

08 JUL 2023 Kassel, Karlswiese (meadow in the Karlsaue State Park).
Field maple tree. There is a direct line of sight to the base station on the city hall, which is 610 m (2,001 ft) away, and to other base stations (view from the northeast).
Measurement in 2024: 4,590 µW/m²

Würzburg, 2025

04 AUG 2025 Würzburg, Ringpark, west of the train station.
Field maple tree (view from the west). Several trees have already been cut down in this area.

Göttingen, 2016

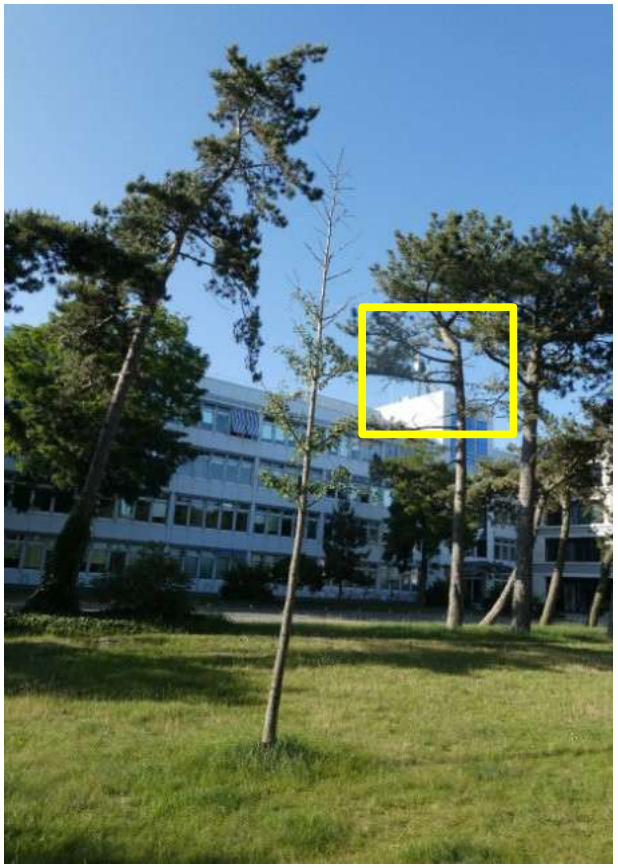
21 MAY 2016 Göttingen, intersection of Nikolausberger Weg and Bühlstraße. Ginkgo in a garden (view from the west). There is a mobile phone base station in the steeple of St. Paul's Church.

Berlin, 2017

16 SEP 2017 Berlin-Wannsee, S-Bahn station

16 SEP 2017 Berlin-Wannsee, intersection of Kronprinzessinnenweg and Königsstraße. Ginkgo (view from the southeast), lower half of the tree is in the radio shadow of the building. The mobile phone base station at the S-Bahn station is 210 m (689 ft) away.

Rostock-Warnemünde, 2025



20 JUN 2025 Rostock-Warnemünde, spa gardens, north. Ginkgo (view from the southwest). Mobile phone base station at the Leibniz Institute for Baltic Sea Research (IOW). Site certificate from August 3, 2022: 18 antennas (6 x 0°, 6 x 120°, 6 x 240°). The pine trees show signs of disturbed growth.

Damaged trees were visible at the police headquarters as early as 2014.

Bamberg, Police Headquarters, 2025

17 SEP 2014 Bamberg, police headquarters, west side of parking lot. Damaged oak trees were visible here as early as 2014 (view from the southwest).
Measurement: **4,190 µW/m²**

19 AUG 2025 Bamberg, Starkenfeldstraße. A row of ginkgo trees (view from the west). There is a direct line of sight to base station No. 670448, which is located on the roof of the police headquarters building at Schildstraße 81.
Measurement: **18,500 µW/m²**

Site certificate from **December 15, 2010**: height 23.1 m, **6** sector antennas (2 x 110°, 2 x 230°, 2 x 350°), 11 other transmitters.
Site certificate from **May 26, 2025**: height 22.5–23,9 m, **63** sector antennas (3 x 5°, 12 x 95°, 9 x 110°, 3 x 210°, 12 x 215°, 6 x 230°, 12 x 335°, 6 x 350°)

Since 2009, numerous cases of tree damage have been noticed in the vicinity of this base station (see example on p. 205).

Bamberg, 2009

31 AUG 2009 Bamberg, Strullendorfer Straße.
Whitebeam tree. This whitebeam tree and others lost their leaves prematurely. The mobile phone base station at Gutenberg-Str. 20 is 320 m (1,050 feet) away.
Measurement: **200 µW/m²**. The base station was surrounded by trees that had sustained extensive damage.

Kassel, 2025

25 JUL 2025 Kassel, Schlosspark 8, Schlosshotel. Four whitebeam trees.
Base station No. 66011818, located in the white chimneys, began operating in 2020. The focused RF radiation from the main beams and side lobes, as well as the attenuation caused by leaves, may explain the differences in crown damage.
Measurement taken on July 25, 2025 within 30 m (98 ft) of the base station:
145,000 µW/m²

Research projects have investigated how tolerant trees are of drought and heat stress. However, the question of tolerance to RF radiation exposure has not yet been addressed. Nevertheless, after a guided tour of trees in Bamberg on September 2, 2010, Klaus Körber of the Bavarian State Institute for Viticulture and Horticulture (LWG) deemed it necessary.

The examples provided here demonstrate that RF radiation impacts trees listed by GALK (the German Association of Municipal Garden and Parks Department Heads) as resilient and future-proof street trees. In some cases, the results of street tree tests varied among participating cities for the same species. Examples from the evaluation include: “poor to good development depending on the region" and "regional dry damage to varying degrees resulting in increased pruning efforts.“

These regional differences may be caused by variations in RF radiation exposure.

A New Type of Damage on Trunks and Branches – Unusual Cracks and Bulges

Since 2003, Niek van't Wout (https://www.youtube.com/watch?v=KPLh_VWj80k) and his colleagues from the parks department in Alphen aan den Rijn, the Netherlands, had observed novel changes in trees, in addition to their crowns thinning. These changes included cracks on all sides of the trunks, discoloration, and bulges, and other types of damage (http://www.boomaantastingen.nl, last accessed in September 2025). Such changes were observed in several European countries. There was a temporal correlation with the launch of UMTS mobile networks. In Germany, residents living near mobile phone base stations who had fallen ill showed members of the doctors' initiative tree trunks with cracks, bulges, and patches of necrosis.

Schwäbisch-Hall-Sulzdorf, 2007

30 APR 2007 Sulzdorf. Base station No. 770395

30 APR 2007 Sulzdorf, Im Rohr. The base station is about 450 m (1,476 ft) away. The fruit trees in this garden were covered in cracks and peeling bark. Lichens had spread.

Bad Wildbad, 2007

30 JUN 2007 König-Karl-Straße. Line of sight to the base station at Palais Thermal.

Völklingen, 2007

15 SEP 2007 Völklingen, Am Volksgarten

Rosengarten, District of Schwäbisch-Hall, 2007

29 NOV 2007 Rosengarten-Westheim. Base station at the water tower in Uttenhofen since 1993

On July 17, 2007, Minister Dr. Monika Stolz received a letter (see p. 266) informing her of human illnesses and suspected tree damage in Baden-Württemberg and requesting her assistance. The affected areas included Sulzdorf, Bad Wildbad, and Rosengarten, among others.

Cracks were observed on the north, east, south, and west sides of tree trunks – and also branches.

Weilersbach, 2008

19 JAN 2008 Weilersbach.
Measurement: **4,600 µW/m²**

Bayreuth, 2008

10 JUL 2008 Bayreuth, near the Old Palace. Cherry tree.
Measurement: **770 µW/m²**

Bamberg, 2008

30 AUG 2008 Bamberg, St. Michael's Monastery, terraced gardens. Many of the fruit trees planted in 1998 showed damage to their trunks.

Würzburg, 2011

18 APR 2011 Würzburg, court garden. Fruit tree

Neuburg an der Donau, 2020

29 AUG 2020 Oskar-Wittmann-Straße. Trunk of a linden tree (view from the northwest)

29 AUG 2020 Oskar-Wittmann-Straße. Another linden tree (view from the northwest)

29 AUG 2020 Oskar-Wittmann-Straße. Another linden tree (view from the northwest)

29 AUG 2020 Castle tower with base station (view from the east)

There was a line of sight from the row of linden trees on Oskar-Wittmann-Straße to the mobile phone base station in the castle tower to the west. Measurements taken along the street ranged from **880 µW/m²** to **1,920 µW/m²**. Some of the linden trees have since been removed.

Bulges

Ebrach, 2008

21 JUL 2008 Ebrach, Otto-Leybold-Ring.
Beech tree, with a direct line of sight to two mobile phone base stations.

Bamberg, 2009

11 APR 2009 AOK (health insurance company), building entrance. Copper beech tree. Despite the trunk protection, bulges like those in Ebrach still occurred.

Bamberg, 2011

21 APR 2011 Bamberg, St. Michael's Monastery, terraced gardens.
Fruit tree, planted in 1998 (see p. 170).

Niek van't Wout, from the parks department in Alphen aan den Rijn, the Netherlands, asked the doctors' initiative to document trunk damage, in addition to crown damage.

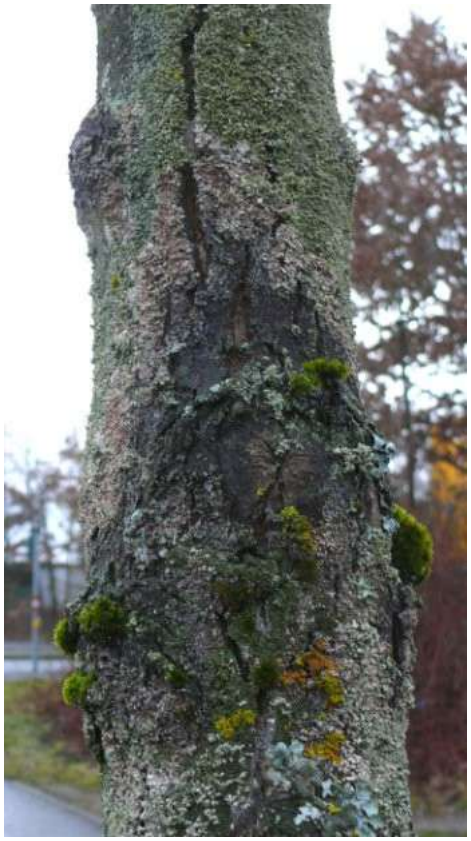
Increase in Fungi, Algae, Lichens, and Mosses since 2003

Starting in 2003, the installation of UMTS transmitters was linked to an increased growth of fungi, algae, lichens (a symbiotic relationship between fungi and algae), and mosses. This growth was observed **not only on tree trunks and branches**, but also on fences, balconies, roofs, and sculptures. Lichens also appeared on busy roads.

Munich, 2010

31 MAY 2010 Munich, Prof.-Eichmann-Straße. Apple tree

Bamberg, 2011



11 FEB 2011 Bamberg,
Würzburger Straße.
Norway maple tree, no shade

Veitshöchheim, 2011

18 APR 2011 Veitshöchheim, court garden

Premature Reddening of Wild Vine due to RF Radiation Exposure

Wild vines typically begin to redden in October. Premature reddening due to RF radiation exposure means that reactions in leaf metabolism have been triggered.

Bamberg, Hotel Residenzschloss, 2009–2014

2009

25 AUG 2009
The wild vine on the northeast side of the building had turned red prematurely. In contrast, the wild vine on the southeast side was still green. The wild vine had grown over both sides of the building.

2010

27 AUG 2010
This phenomenon repeated itself in subsequent years. On the northeast side, the wild vine gradually died off.

2014

27 JAN 2014
In winter 2013, the wild vine was removed.

The northeast side of the building is exposed to RF radiation from two 215° sector antennas belonging to the mobile phone base station at the municipal utility, which is 720 m (2,363 ft) away (for the location, see page 6).

Munich, Botanical Institute, 2012

03 AUG 2012 Nymphenburg, Menzinger Straße, Botanical Institute, view from the botanical garden to the south side.
Measurement on the south side: 10 µW/m²

03 AUG 2012 Botanical Institute, north side. There is a direct line of sight from the north side of the institute to the mobile phone base station at the Bureau of Standards.
Measurement on the north side: 4,980 µW/m²

Berlin, Federal Chancellery of Germany, 2017

15 SEP 2017 Federal Chancellery, north side of the south wing

15 SEP 2017 Federal Chancellery, south side of the north wing

The wild vine has grown in an irregular pattern on the north and south sides of the building. In addition, the wild vine has turned red in some areas. RF radiation strikes the exterior of the Federal Chancellery from various directions and is reflected off the building. It is unclear whether RF radiation from internal sources also strikes the walls from the inside.

Hamburg, 2023

05 AUG 2023 Schlüterstraße. Maple trees with crown damage and the premature reddening of the wild vine on the upper stories (view from the south).
RF radiation from a mobile phone base station on a university building strikes the trees and the wall of the house.
Measurement at the entrance of house No. 6: **6,200 µW/m²**

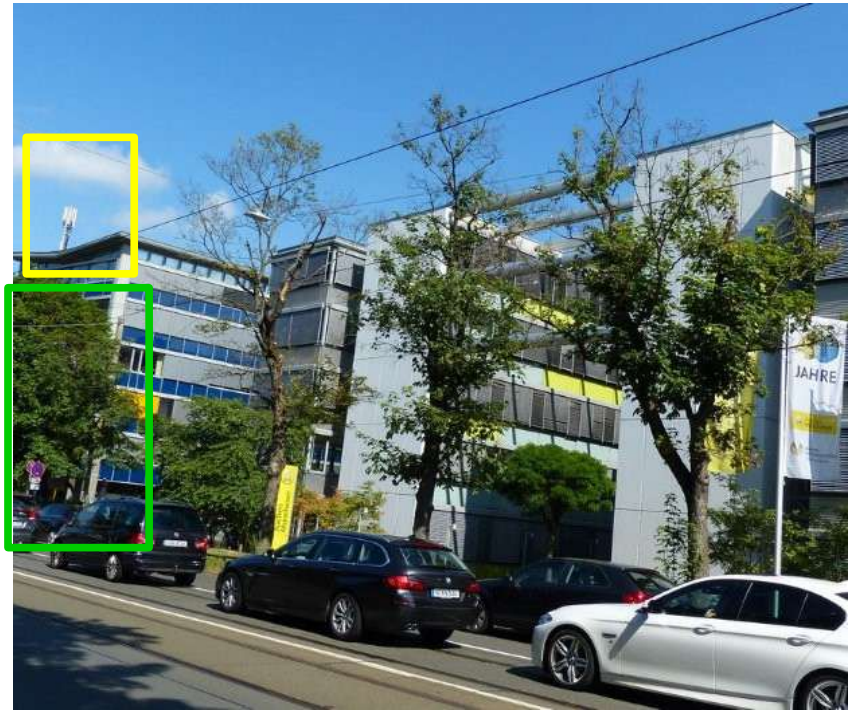
The Risk of Rapidly Increasing Tree Damage

In 2017 – before the dry and hot periods – severe crown damage posing a threat was documented in numerous cities.

Nuremberg, 2017

27 JUN 2017 Intersection of Bismarckstraße and Äußere Sulzbacher Straße. A row of Norway maple trees (view from the northwest)

27 JUN 2017 Äußere Sulzbacher Straße. Norway maple tree (view from the west)



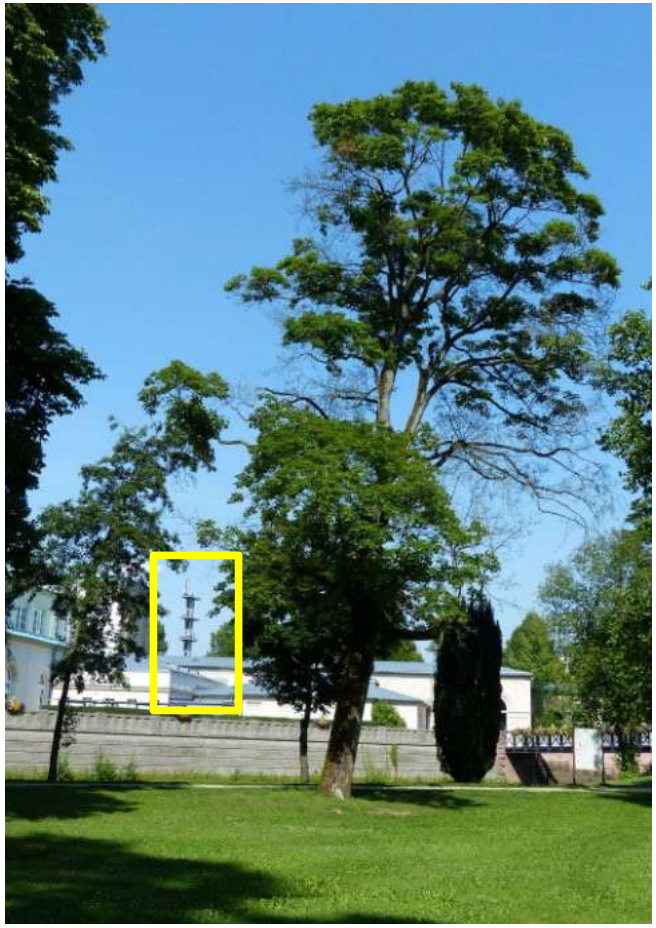
27 JUN 2017 Äußere Sulzbacher Straße, south side. A row of maple trees (view from the west). A leafy tree (green) stands in the so-called near-field radio shadow.

These three photos show maple trees near the mobile phone base station at the intersection of Äußere Sulzbacher Straße and Bismarckstraße. The damage had been visible for several years.

Bamberg, 2017

18 JUN 2017 Bürgerpark Hain (Hain Park). A linden avenue directly along the Regnitz River (view from the south) ẃith a line of sight to four mobile phone base stations. Several linden trees were topped or cut down.

Bad Kissingen, 2017



19 JUL 2017 Spa gardens. Norway maple tree (view from the southwest). The mobile phone base station (yellow) is located near Theaterplatz, which is 380 m (1,247 ft) away. The maple tree was cut down.

Erlangen, 2017

17 AUG 2017 Palmsanlage. Norway maple tree and other trees (view from the north). The mobile phone base station (yellow) is located at Bismarckstraße 1, at the university.

Over the following years, a large number of trees were severely damaged. Parks department and public works yard staff repeatedly pruned and cut down trees. Given the significant number of damaged trees, even in favorable locations such as parks near bodies of water, how can long-term traffic safety be ensured?

Göttingen, 2023

13 JUN 2023 Bürgerstraße.
Maple tree (view from the north).
The RF radiation from the mobile phone base station at the new city hall hits the top of the tree from the east.

District of Kassel, 2023

17 JUL 2023 Holzhäuser Straße, L3239.
Sycamore tree (view from the northeast).
The distance to the mobile phone base station at the Termenei parking lot is 1 km (0.9 mi). Damage on one side of the road was visible as early as 2019.

Hamburg, Eppendorf Park, 2023

UKE Tower,
66 antennas

05 AUG 2023 Eppendorf Park at the bus stop Martinistraße (view from the southwest). Cut-back silver maple tree, dead wood in pine trees. A direct line of sight to the transmitters at the hospital building and the UKE tower.
Measurement at the bus stop: **30,000 µW/m²**
Measurement taken on the grounds of the **University Medical Center Eppendorf (UKE)**:
up to 440,000 µW/m²

Lübeck, June 2025

04 JUN 2025 Falkenwiese playground. Damaged, already cut-back silver maple tree (view from the east). There is a direct line of sight to the base station with **78 antennas** on the high-rise building at Schevenbarg 1, which is 620 m (2,034 ft) away.
Measurement: 26,800 µW/m²

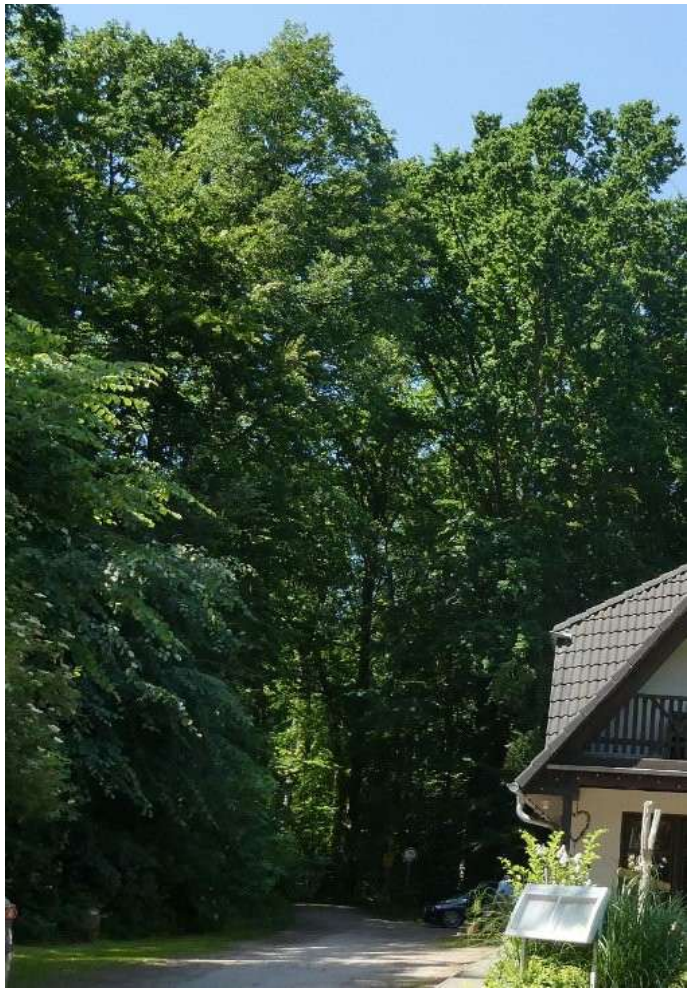
03 JUN 2025 Wallbrücke Bridge on Possehlstraße. Locust tree (view from the southwest). The locust tree is exposed to RF radiation from three base stations: St. Peter's Church to the north (480 m away), Mühlenstraße to the east, and the high-rise building "Behördenhochhaus" to the south.
Measurement: 12,300 µW/m²

Heiligendamm Seaside Resort, District of Rostock, June 2025

Numerous damaged beech and oak trees line the road to Heiligendamm, the train station, and Heiligendamm itself.

Base station between the train station and Garten-straße: height 46 m (151 ft), 42 sector antennas.
Measurement at Gartenstraße 1 A: 11,700 µW/m²

21 JUN 2025 Kühlungsborner Straße (view from the southeast). Eleven 120° sector antennas strike oak and beech trees from the northwest at a distance of about 350 m (1,148 ft). The sides of the beech tree are clearly different. Measurements along the road ranged **from 3,500 to 7,700 µW/m².**



21 JUN 2025 Hunting lodge. At this lodge, the trees were healthy and had dense foliage. Due to the forest in between, there is no line of sight to the base station, which is about 500 m (1,640 ft) away. The forest blocks the RF radiation.
Measurement: 3 µW/m²

Heiligendamm Seaside Resort, District of Rostock, June 2025

21 JUN 2025 Heiligendamm, train station (view from the south). The base station is 200 m (656 ft) away.
All beech trees showed significant crown damage.

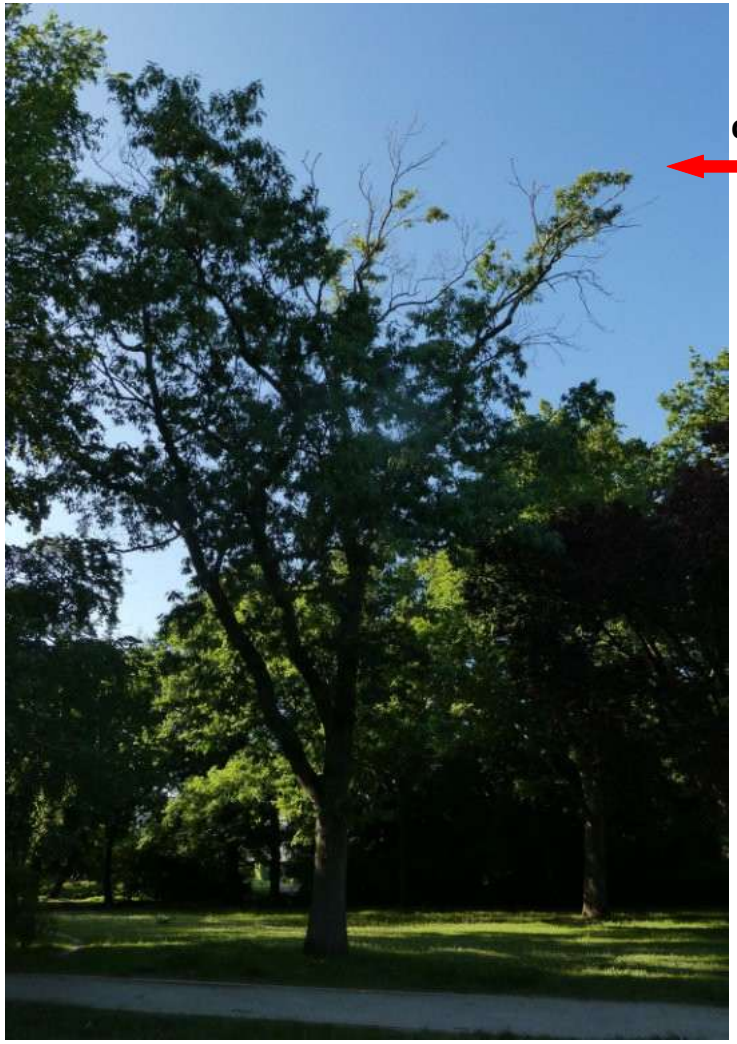
21 JUN 2025 Bus stop. Beech tree damaged on one side only (view from the north). The base station (yellow) is 180 m (590 ft) away and eleven 0° antennas radiate toward the north.
Measurement: 2,360 µW/m²

21 JUN 2025 Kühlungsborner Straße, hotel. Significant damage to the beech trees (view from the south)

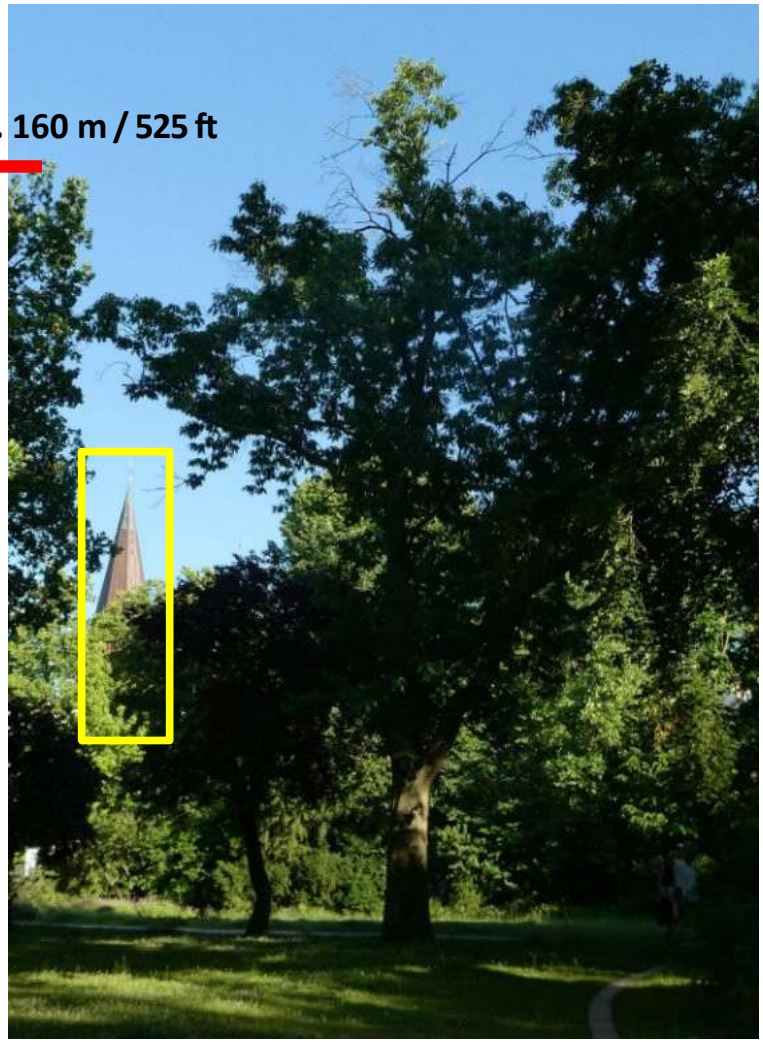
21 JUN 2025 A group of beech trees and the base station at the Median Klinik (view from the northwest), which is 200 m (656 ft) away. Three 280° antennas radiate toward the west.
Measurement: 7,400 µW/m²

Base station No. 820827, site certificate from August 5, 2020: installation height 46 m (151 ft), **42 sector antennas** (11 x 0°, 3 x 80°, 11 x 120°, 3 x 180°, 11 x 240°, 3 x 280°)

Warnemünde Seaside Resort, Spa Gardens, Southeast Corner, June 2025



20 JUN 2025 Spa gardens, southeast corner. Red oak tree (view from the north) with significant crown damage, more on the right than on the left. Mobile phone base station radiation reaches the park from the southeast.



20 JUN 2025 Spa gardens, southeast corner. Red oak tree **(view from the north)**. There is a direct line of sight from the red oak tree to the base station at the church steeple. Measurement north of the red oak tree: **14,500 µW/m²**

Section of the north side of the church steeple with antennas, which are painted red. According to the site certificate, there are eighteen 330° antennas that radiate toward the spa gardens.

Mobile phone base station at the church, No. 820064, site certificate from April 24, 2023: installation height 35.1–36.4 m (115.2–119.4 ft), 54 sector antennas (18 x 90°, 18 x 210°, 18 x 330°)

Not only does RF radiation from base stations reach the gardens from the south, but it also reaches them from the northeast, from the Institute for Baltic Sea Research (view from the north and the spa gardens).

20 JUN 2025 Spa gardens, northern edge. Hornbeam tree (view from the south)

06 JUN 2025 Institute for Baltic Sea Research (view from the west, gardens)
Measurement: 80,500 µW/m²

06 JUN 2025 Northern edge of the spa gardens. Oak tree (view from the south)

06 JUN 2025 Northern edge of the spa gardens. Two beech trees (view from the southwest). The healthy beech tree on the south side (right) is shielded from RF radiation by the tree on the north side (left).

Institute for Baltic Sea Research, site certificate No. 820821 from August 3, 2022: installation height 21.7–23 m, 18 sector antennas (6 x 0°, 6 x 120°, 6 x 240°)

There is significant crown damage in the spa gardens. Some trees have already been cut down.

Kassel, 2025

07 JUL 2025 Luisenstraße.
Maple tree (view from the west). The tree is exposed to RF radiation from the northeast and the southeast.

Kassel, 2025

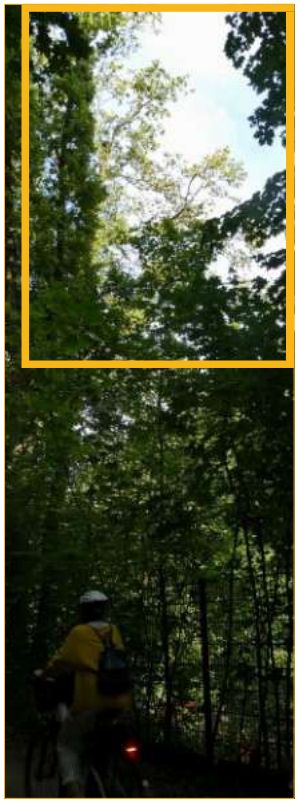
25 JUL 2025 Near the parking lot of Wilhelmshöhe Palace and Bergpark.
Sycamore tree next to the sidewalk (view from the west). For many years, the group of trees has been exposed to RF radiation from the south, and since 2020, from the west as well. By 2011, the damage to the crowns was noticeable. Branches could break off at any time. Many trees in the Bergpark to the west had to be cut back.

Würzburg, 2025

02 AUG 2025 Würzburg, Bahnhofplatz.
Red oak tree (view from the northeast). The damaged crown is located above the area where taxis wait. Over the past 20 years, numerous trees in the radiofrequency field of this base station (marked in yellow) have had to be cut down.

Hamburg-Volksdorf, 2025

09 SEP 2025 At Volksdorfer Damm and Am Buckhornwald. Two oak trees (view from the east). RF radiation strikes the pair of trees from the northeast.



A detail from the photo left

09 SEP 2025 Shared-use path west of the U1 route near the Buckhorn stop. A detail from the crown damage above the U1 route. There are numerous instances of significant crown damage above the path that also pose a hazard.

10 SEP 2024
Base station:
height 35.5–44.4 m,
54 antennas

09 SEP 2025 Im Regestall 49, forest cemetery entrance. Oak tree (view from the east). It has only a few leaves.

Site certificate No. 311992 from July 18, 2024: height 35.5–44.4 m (116.5–145.7 ft), **54** antennas (8 x 0°, 10 x 60°, 4 x 120°, 4 x 135°, 10 x 180°, 4 x 240°, 4 x 265°, 10 x 300°)

Trees act as receiving antennas for radiofrequency electromagnetic fields.

It cannot be ruled out that this has an impact on the roots, soil life (including root symbionts), and soil chemistry.

Bruderwald Forest near Bamberg, 2008

11 MAY 2008 Beech tree at the eastern edge of the forest

11 MAY 2008 Beech tree trunk with many longitudinal cracks

- Measurement in the air: **170 µW/m²**
- With trunk contact a significant increase!

The measurement taken when the antenna touches the trunk cannot be used quantitatively because the device is calibrated for measurements in the air. However, the significant increase demonstrates how trees function as antennas.

The northeast slope of the Bruderwald Forest is exposed to RF radiation from five transmitters with different frequencies, modulations, pulse sequences, bandwidths, field strengths, and polarizations: Gutenbergstraße, Hauptsmoorwald, A73 near Strullendorf, the Geisberg radio tower, and the TV tower near Kälberberg. The latter two towers are 11 km (6.8 mi) away.

Radio stations could be heard when the measuring device came into contact with the tree trunk.

J. Zenneck, a physicist at the Technical University of Munich, described how a water jet can act as an antenna for receiving and transmitting radiofrequency electromagnetic waves. Zenneck J (1916). *Lehrbuch der Drahtlosen Telegraphie* [Textbook of Wireless Telegraphy]. 4th edition, published by Ferdinand Enke. Around 1920, communications engineers discovered that trees make good receiving antennas for radio waves due to their water-transporting vessels. For example, a tall poplar tree enabled radio reception from the Eiffel Tower, located 300 km (186 mi) away.

Schaufling, Asklepios Clinic, Bavarian Forest, 2009

19 SEP 2009 Schaufling, Asklepios Clinic, in the clinic garden

Measurement in the air:
240 µW/m²

The measurement value increases when the antenna touches the tree trunk.

Heckmühle, Rhön Mountains

25 MAY 2008 Measurement in the air and at the trunk:
4 µW/m²

Several beech trees surrounding the Asklepios Clinic had damaged crowns and trunks. Radio stations could be heard when the measuring device came into contact with the trunks. The Brotjacklriegel radio and TV tower is located 12 km (7.5 mi) away.

In areas with low ambient RF radiation levels, such as near Heckmühle in the Rhön Mountains, we observed no difference in the measurements obtained using the non-contact method (in the air) and the contact-based method (on the tree trunk). In these areas, both methods measured 4 µW/m².

Examples of fallen trees from November 2022 to May 2025. Some of the trees had almost no roots.

18 NOV 2022 "Very lucky": Huge oak tree falls in the middle of Baden-Baden
https://bnn.de/mittelbaden/baden-baden/grosses-glueck-gehabt-riesige-eiche-stuerzt-mitten-in-baden-baden-um-experten-raetseln-ueber-ursache-kaiserallee
29 DEC 2022 Tree crashes down, striking a youth hostel in Baden-Baden
https://bnn.de/mittelbaden/baden-baden/baum-sturz-jugendherberge-baden-baden-unklare-ursache
24 JAN 2023 Tree fell on a moving car in Dürrhennersdorf
https://www.saechsische.de/lokales/goerlitz-lk/loebau/unfall-in-duerrhennersdorf-bei-loebau-baum-stuerzt-auf-fahrendes-auto-A3RLFNS7BKEIBSBYKAZ5FNS2QU.html
19 FEB 2023 Once again, a tree has fallen in the middle of Baden-Badens's Kaiserallee
https://bnn.de/mittelbaden/baden-baden/baden-baden-baum-stuerzt-in-kaiserallee-um-bereits-das-zweite-mal-november-2022
11 MAR 2023 Tree falls on teenagers – Ten injured
https://hamburg.t-online.de/region/hamburg/id_100142204/hamburg-altona-baum-stuerzt-auf-jugendliche-zehn-verletzte-.html
29 FEB 2023 Mysterious: Old maple tree at district office suddenly falls
https://www.abendblatt.de/hamburg/eimsbuettel/article238021277/Mysterioes-Alter-Ahornbaum-am-Bezirksamt-stuerzt-ploetzlich-um.html (maple)
03 APR 2023 Falling tree narrowly missed a child in the Wiesbaden Spa Park
https://www.wiesbadener-kurier.de/lokales/wiesbaden/stadt-wiesbaden/umstuerzender-baum-im-wiesbadener-kurpark-verfehlt-kind-knapp-2443708 (oak)
05 APR 2023 Another large tree has fallen in Wiesbaden
https://www.wiesbadener-kurier.de/lokales/wiesbaden/stadt-wiesbaden/erneut-grosser-baum-in-wiesbaden-umgestuerzt-2449290 (beech)
05 APR 2023 Volksgarten Eickel: Large beech tree crashes down onto a playground
https://www.waz.de/staedte/herne-wanne-eickel/article238073939/Herne-Baum-faellt-im-Park-auf-einen-Spielplatz-Sperrung.html (beech)
20 APR 2023 Siegen: Large tree crashes onto car – Child still inside
https://www.wp.de/staedte/siegerland/article238186721/Siegen-Grosser-Baum-kracht-auf-Auto-Kind-sitzt-noch-drin.html
08 APR 2023 Firefighting operation in Spremberg: Tree fell on a car and against a house
https://www.lr-online.de/lausitz/spremberg/feuerwehreinsatz-in-spremberg-baum-kippt-in-petriegasse-und-knallt-auf-auto-70561053.html
16 MAY 2023 75-year-old silver linden tree fell in Lennéstraße
https://www.bonn.de/pressemitteilungen/mai-2023/jahre-alte-silberlinde-in-der-lenn-strasse-umgestuerzt.php
16 MAY 2023 Bochum: Investigation why the tree fell on the playground
https://www.bonn.de/pressemitteilungen/mai-2023/jahre-alte-silberlinde-in-der-lenn-strasse-umgestuerzt.php
19 SEP 2023 Beech tree kills cyclist in Würzburg Ringpark
https://www.br.de/nachrichten/bayern/buche-erschlaegt-radfahrerin-im-wuerzburger-ringpark,TqHmtrm
13 OCT 2023 On the Alster River: 30-meter-high tree falls and hits cyclist
https://www.mopo.de/hamburg/polizei/an-der-alster-30-meter-hoher-baum-stuerzt-auf-radfahrer/
02 JAN 2024 Tree falls at Breslauer Platz in Friedenau – Adults and a small child seriously injured
https://www.bz-berlin.de/berlin/tempelhof-schoeneberg/berlin-friedenau-baum-stuerzt-um-zwei-personen-verletzt
03 FEB 2024 Tree crashes down on playground: City report on consequences
https://www.waz.de/staedte/herne-wanne-eickel/article241563034/Baum-krachte-auf-Spielplatz-Stadt-berichtet-ueber-die-Folgen.html
18 APR 2024 Workplace accident – Forestry worker killed
https://www.polizei.bayern.de/aktuelles/pressemitteilungen/065794/index.html
19 APR 2024 Tree falls on pedestrians – Two injured
https://www.azonline.de/nrw/baum-stuerzt-auf-fussgaengerinnen-zwei-verletzte-2960556

28 MAY 2024 Fallen trees: Großneumarkt remains closed for the time being – Weekly market relocated
https://www.abendblatt.de/hamburg/hamburg-mitte/article242435256/Grossneumarkt-bleibt-vorerst-gesperrt-akute-Gefaehrdung-1.html
02 JUN 2024 Child with head injuries in hospital: Tree falls in Berlin's Mauerpark on group of people
https://www.tagesspiegel.de/berlin/kind-mit-kopfverletzungen-im-krankenhaus-baum-sturzt-im-berliner-mauerpark-auf-menschengruppe-11755346.html
09 AUG 2024 Tree falls – 45-year-old fatally injured – Detectives investigate
https://www.polizei.bayern.de/aktuelles/pressemitteilungen/071218/index.html
08 OCT 2024 Road closure in Esslingen – Fallen tree damages overhead line
https://www.stuttgarter-nachrichten.de/inhalt.strassensperrung-in-esslingen-umgestuerzter-baum-beschaedigt-oberleitung.73acdb7d-21ec-4ed3-b4f2-47a1a27721a6.html
10 OCT 2024 Tree blocks route: Mountain railway in Baden-Baden at a standstill
https://www.swr.de/swraktuell/baden-wuerttemberg/stehende-bergbahn-100.html
16 OCT 2024 Trees fell in the Nikolaiviertel quarters: The authorities knew for so long
https://www.morgenpost.de/bezirke/mitte/article407478534/baumsturz-im-nikolaiviertel-gefahr-seit-vier-jahren-bekannt.html
05 JAN 2025 Fallen trees: Train accident and road closures near Westerburg
https://www.ww-kurier.de/artikel/151027-umgestuerzte-baeume--bahnunfall-und-strassensperrungen-bei-westerburg
08 JAN 2025 S8 hits tree: S-Bahn line to Munich remains closed for longer after accident
https://www.abendzeitung-muenchen.de/muenchen/umland/s8-erfasst-baum-s-bahn-strecke-nach-unfall-bei-muenchen-laenger-gesperrt-art-1030014
10 JAN 2025 Regional train collides with fallen tree – Significant damage after collision between Utting and Riederau
https://www.merkur.de/lokales/landsberg-kreisbote/regionalbahn-kollidiert-mit-baum-riederau-utting-verletzt-gleise-schaden-zug-bundespolizei-93507472.html
10 JAN 2025 Karlsruhe Police Headquarters: (KA) Rheinstetten – Cyclist collides with fallen tree
https://www.presseportal.de/blaulicht/pm/110972/5946634
10 JAN 2025 Large tree fell "Im Lichtenbruch" – It's a miracle that nothing happened! (beech)
https://www.lokalkompass.de/hattingen/c-blaulicht/grosser-baum-im-lichtenbruch-umgestuerzt-ein-wunder-dass-nichts-passiert-ist_a2014561
10 JAN 2025 Man killed by falling tree
https://www.stuttgarter-zeitung.de/inhalt.tragischer-vorfall-in-waiblingen-polizei-findet-toten-spaziergaenger.9fc84992-856d-4c28-8dc0-84022b565a2c.html
12 JAN 2025 Mighty oak falls in Enger onto the road
https://www.westfalen-blatt.de/owl/kreis-herford/enger/maechtige-eiche-stuerzt-in-enger-auf-die-strasse-3225266?pid=true
14 JAN 2025 After tree falls: Cause unclear (oak)
https://www.westfalen-blatt.de/owl/kreis-herford/enger/regen-baeume-sturm-kontrollen-3225798?pid=true
16 JAN 2025 Tree falls onto overhead line: Massive disruption to rail traffic
https://www.merkur.de/lokales/fuerstenfeldbruck/kreisbote/baum-faellt-in-oberleitung-der-s4-einschraenkungen-im-bahn-sowie-regionalverkehr-von-und-nach-memmingen-93518512.html
20 JAN 2025 Herford: Tree falls near the zoo onto sidewalk
https://www.westfalen-blatt.de/owl/kreis-herford/herford/baum-umgekippt-stadtwald-tierpark-weg-blockiert-swk-3230009?pid=true
27 JAN 2025 Fallen tree blocks passage on Hagener Straße
https://www.wp.de/lokales/herdecke-wetter/article408171797/umgestuerzter-baum-blockiert-durchfahrt-auf-hagener-strasse.html
02 FEB 2025 Fallen trees block federal highway B57 between Xanten and Birten
https://rp-online.de/nrw/staedte/xanten/xanten-umgestuerzte-baeume-blockieren-b57-zwischen-xanten-und-birten_aid-123716319
04 FEB 2025 Danger from fallen trees
https://www.rhein-zeitung.de/lokales/rhein-lahn-zeitung/gefahr-durch-umgestuerzte-baeume_arid-4019747.html
06 MAY 2025 Beech tree falls in castle park and causes damage
https://www.merkur.de/lokales/starnberg/gauting-ort69895/gauting-buche-stuerzt-im-schlosspark-um-und-richtet-schaden-an-93717900.html

Munich, Maximilian Park, on March 30, 2023, a beech tree fell in calm weather

2011

Münchner Merkur: Photo: Markus Götzfried

Suddenly, the tree fell over. Workers cut up the fallen beech tree and hauled it away.

29 JUN 2011 A beech tree from the Maximilian Park after pruning, sparse foliage.

From the *Münchner Merkur* on March 31, 2023: Kämpf wonders: **“There was no wind. How could the tree simply fall over like that? It had almost no roots. Not that the surrounding trees will also fall over ...”**

According to a statement from the Bavarian Palace Administration, which is responsible for the Maximilian Gardens, its tree inspectors will pay special attention to the surrounding trees "to rule out further damage and ensure traffic safety.“ All trees are inspected regularly in the winter and summer. However, "Despite regular inspections, nature is unpredictable. In individual cases, such as this one, a tree can fall even if it was not expected beforehand despite careful inspections." The fallen tree was probably 50 to 60 years old and had white rot in the root area. Unfortunately, this was not detectable during regular inspections. https://www.tz.de/muenchen/stadt/muenchen-riesiger-baum-maximiliansanlagen-weg-schock-92182317.html

The Maximilian Park is exposed to RF radiation from several mobile phone base stations: from the north, east, south, southwest, and northwest. The Olympic Tower with radio and television transmitters is 5 km (3 mi) away. Crown damage was observed and documented on various tree species along the route to Rechts der Isar Hospital on June 29, 2011, May 28, 2015, and September 20, 2021.

Berlin. On January 2, 2024, a red oak tree fell in calm weather in Breslauer Platz. Two adults and a child were seriously injured.

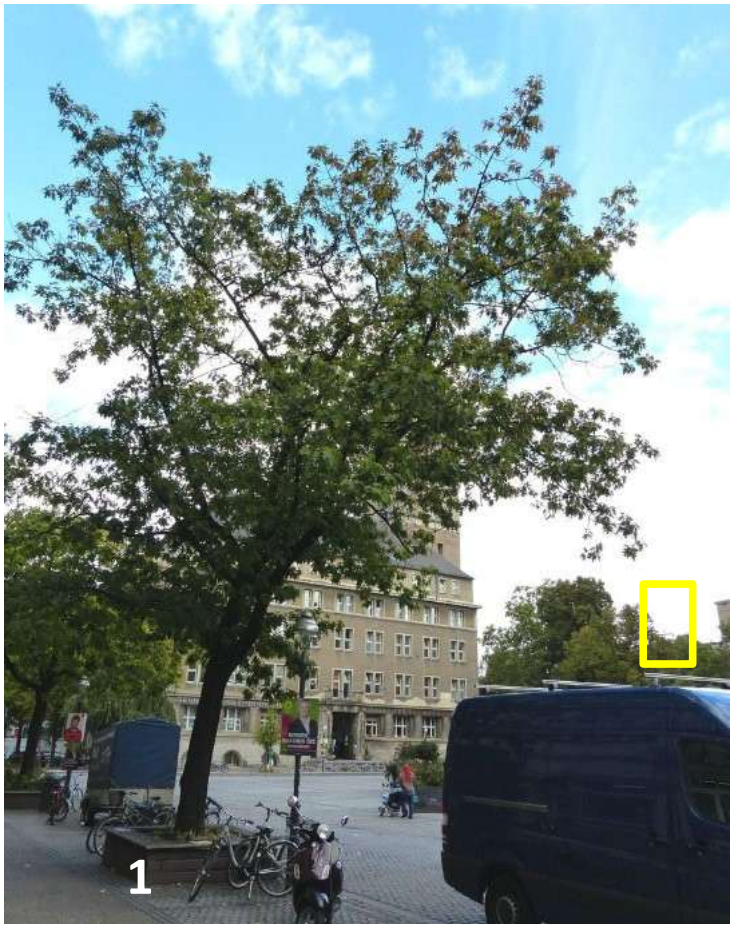
Photo: rbb

Red oak tree. Photo: C. Waldmann-Selsam

Injuries — Tree Falls on People
A large tree fell in Berlin-Friedenau. Two adults and two toddlers were injured. One toddler suffered minor injuries, while the other three suffered serious injuries. According to the fire department, all four were taken to the hospital. The reason the tree fell in Breslauer Platz is still unclear. The police and the parks department are now investigating. Post by Kerstin Breinig
https://www.bz-berlin.de/berlin/tempelhof-schoeneberg/berlin-friedenau-baum-stuerzt-um-zwei-personen-verletzt

A photo taken by rbb on January 2, 2024, shows the fallen tree and two standing trees to the north that had already been cut back. This reveals a line of sight to a mobile phone base station.

Berlin, Tempelhof-Schöneberg District, Breslauer Platz, Three Red Oak Trees, September 2017



15 SEP 2017 Breslauer Platz, west side. Red oak tree No. 1 (from the southwest), slanted growth, strikingly sparse crown, some branches dry. There is a direct line of sight to a mobile phone base station.

15 SEP 2017 Breslauer Platz, west side. Red oak trees No. 2 and No. 3 are located north of red oak tree No. 1 (view from the east). The oak tree on the left is only growing horizontally, not upward. The red oak tree on the right has significant crown damage, more on the east side than the west.

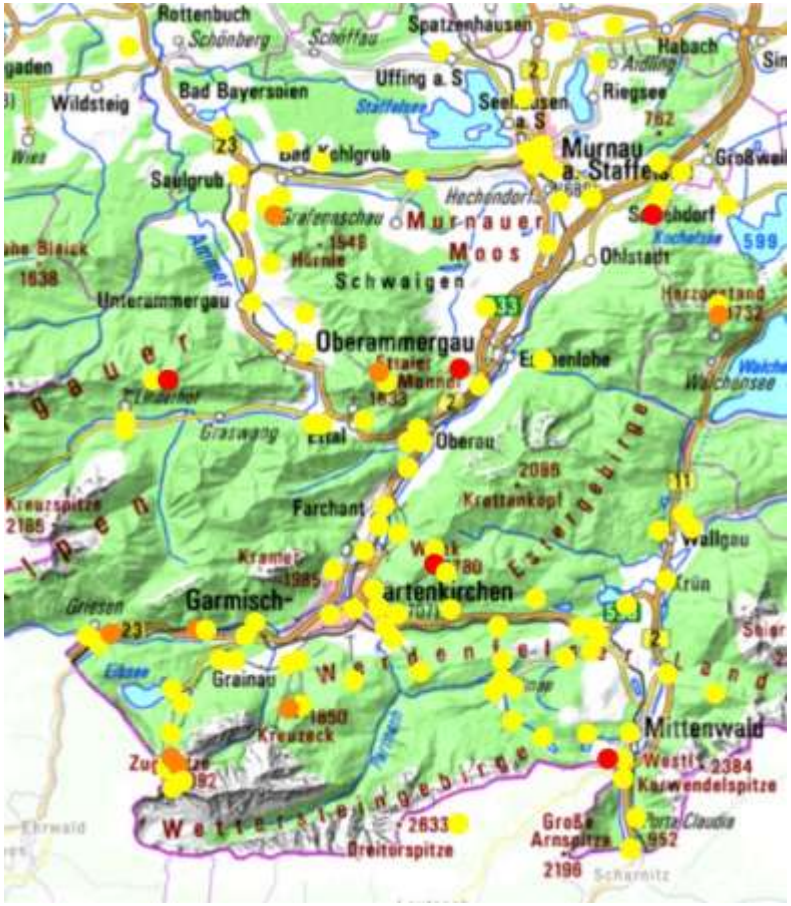
RF radiation from mobile phone base stations No. 010126 and No. 012263 converges on Breslauer Platz from the northeast and east. The uneven distribution of RF radiation is the result of focused beams, reflection from buildings, and diffraction at the edges. Consequently, each tree is exposed differently. **Documentation:** https://www.weisse-zone-rhoen.de/b%C3%A4ume-in-stadt-und-land/berlin-dokumentation-2017/

District of Garmisch-Partenkirchen, March 2024

Münchner Merkur from March 8, 2024: At Five Locations in the District: Trees Destroy Rockfall Nets on Federal Highways

https://www.merkur.de/lokales/garmisch-partenkirchen/oberau-ort60590/baeume-zerstoeren-steinschlagnetze-92878178.html

The district is located within the radiofrequency field of 136 mobile phone base stations, which have a total of 1,584 sector antennas, BOS digital radio base stations, as well as radio and television transmitters. In much of the district, there has been no decrease in precipitation in recent years.



Map, Bavarian State Office for Surveying (LDBV), 2022.
Added items: location of mobile phone base stations (yellow), other transmitters (orange), BOS digital radio (red), as of March 2024. Due to a lack of space, not all locations in Garmisch-Partenkirchen could be marked.

Photo: bartl, *Münchner Merkur*

Quote from *Münchner Merkur* from March 8, 2024:

"Some of the protective structures on federal highways in the district have been demolished. The building authority plans to repair the damage in the coming weeks and will notify drivers of any potential danger.

Oberau – It looks quite frightening. On federal highway B2, for example, a tree has fallen onto the rockfall netting between the end of the highway and Oberau North, pulling it down to the ground. According to the Weilheim State Building Authority, similar incidents have occurred at four other locations in the district."

More press releases about hazardous trees that pose a traffic safety risk in the Garmisch-Partenkirchen district from January to April 2024

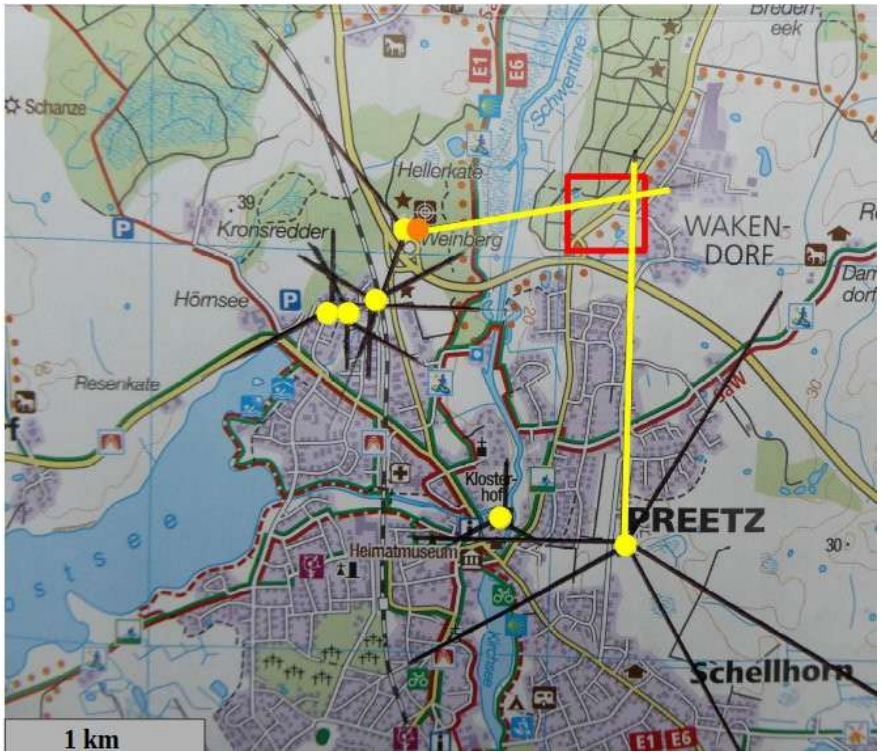
24 JAN 2024
B 23, Ettal – Oberau: CONTINUATION OF TREE MAINTENANCE WORK on ETTALER BERG between ETTAL and OBERAU
https://www.stbawm.bayern.de/service/medien/pressemitteilungen/2024/4/index.html
10 FEB 2024
Numerous trees on federal highway B23 felled – Clear-cutting met with incomprehension
https://www.merkur.de/lokales/garmisch-partenkirchen/bad-bayersoien-ort70930/kahlschlag-stoesst-auf-unverstaendnis-92824945.html
27 FEB 2024
Clear-cutting on the federal highway: Why it is a necessary evil
https://www.merkur.de/lokales/garmisch-partenkirchen/garmisch-partenkirchen-ort28711/kahlschlag-an-der-b2-ein-notwendiges-uebel-92856815
29 FEB 2024
Tree maintenance work on federal, state, and county roads within the jurisdiction of the state building authority
https://www.stbawm.bayern.de/service/medien/pressemitteilungen/2024/20/index.html
28 MAR 2024
B 23: CONTINUATION OF TREE MAINTENANCE WORK on ETTALER BERG between ETTAL and OBERAU
https://www.stbawm.bayern.de/service/medien/pressemitteilungen/2024/36/index.html
02 APR 2024
Accident on federal highway B2: Car driver (38) collides with suddenly fallen tree
https://www.merkur.de/lokales/garmisch-partenkirchen/kreisbote/unfall-auf-der-autofahrerin-38-kollidiert-mit-ploetzlich-umgestuerztem-baum-92980866.html
08 APR 2024
Rotting giants leveled to the ground: Opinions about felled trees are divided
https://www.merkur.de/lokales/garmisch-partenkirchen/mittenwald-ort29073/faulende-riesen-gefaellt-92993352.html
10 APR 2024
Life-threatening trees: Clear-cutting in the Leutaschklamm gorge "extremely necessary"
https://www.merkur.de/lokales/garmisch-partenkirchen/mittenwald-ort29073/gefahr-kommt-von-oben-92996988.html

Most of the trees that posed a threat to traffic and had to be felled or cut back were exposed to radiofrequency electromagnetic fields for several years. This damage poses a major threat to the district's mountain forest.

On August 25, 2025, the *Münchner Merkur* newspaper announced: "From September 15 to 26, the route from the outskirts of Grainau to Griesen will be closed. Tree cutting is the reason for this massive disruption to road traffic." https://www.merkur.de/lokales/garmisch-partenkirchen/grainau-ort28748/b23-nach-griesen-tagsueber-gesperrt-auch-die-bahn-faehrt-nicht-93896355.html

Preetz, District of Plön

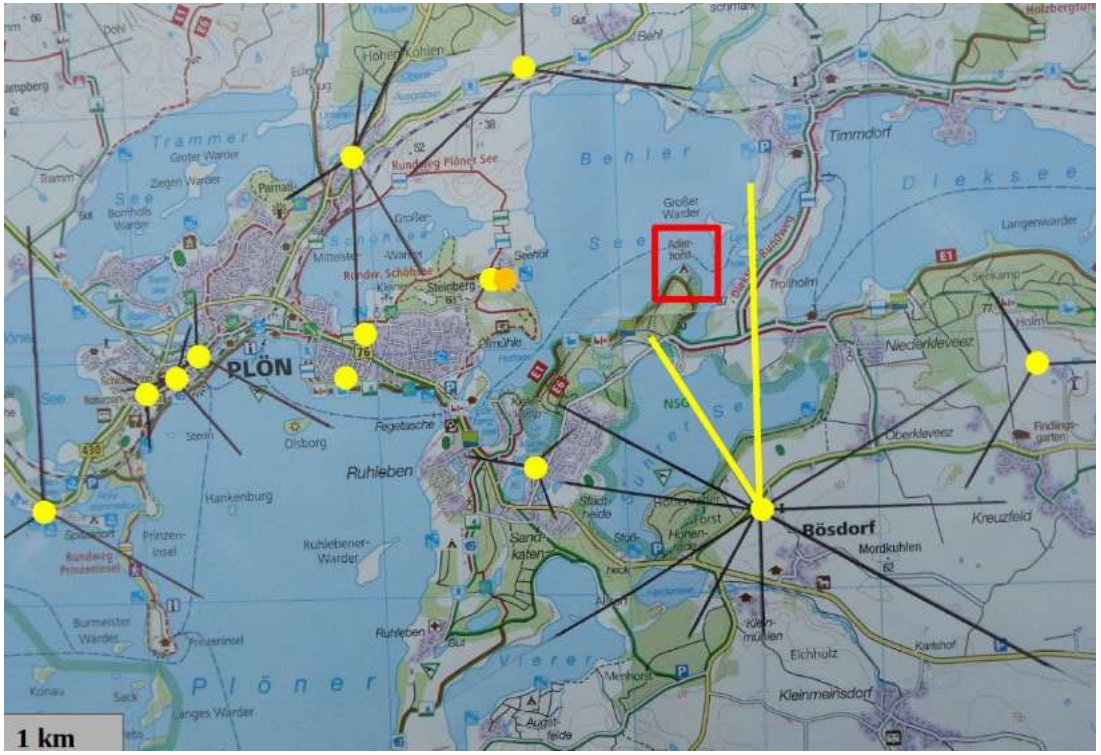
23 JUL 2025: Tree buries moving car under itself



Kompass map section 740. Added items: location of mobile phone base stations (yellow) with the main beam directions of the antennas, other transmitters (orange), and the area of the fallen oak tree (red).
Location certificate No. 87010885 from April 4, 2025: height 34.2 m (112.2 ft), **27** sector antennas (**9 x 80°,** 9 x 200°, 9 x 320°), 6 others. Location certificate No. 420285 from February 27, 2025: height 22.6–45.2 m (74.1–148.3 ft), **51** sector antennas (**8 x 0°**, 9 x 30°, 8 x 120°, 9 x 150°, 8 x 240°, 9 x 270°)

Plön, Behler Lake, Adlerhorst Campground

26 AUG 2025: Tree falls on tent and kills young woman



Kompass map section 740. Added items: location of mobile phone base stations (yellow) with the main beam directions of the antennas (for two base stations, data in the EMF database were missing; at the Steinberg Mountain, there is an omni-directional antenna), and other transmitters (orange).
Location certificate No. 420812 near Bösdorf from January 21, 2025: height 45.6–50.1 m (149.6–164.4 ft), **45 sector antennas (12 x 0°**, 2 x 60°, 90°, 12 x 120°, 2 x 180°, 210°, 11 x 240°, 280°, 2 x 300°, 330°). **The Adlerhorst Campground (red) is located in the sector of twelve 0° antennas and one 330° antenna** (yellow), which is about 1.9 km (1.2 mi) away.

July 24, 2025: https://www.ndr.de/nachrichten/schleswig-holstein/preetz-baum-stuerzt-auf-auto-jetzt-werden-weitere-baeume-gefaellt,shnews-200.html
August 27, 2025: https://www.ndr.de/nachrichten/schleswig-holstein/ploen-baum-stuerzt-auf-zelt-und-erschlaegt-junge-frau,regionkielnews-508.html

Shared-use Path to the Adlerhorst Campground at Behler Lake

There were numerous instances of clear crown damage along the shared-use path to the campground.

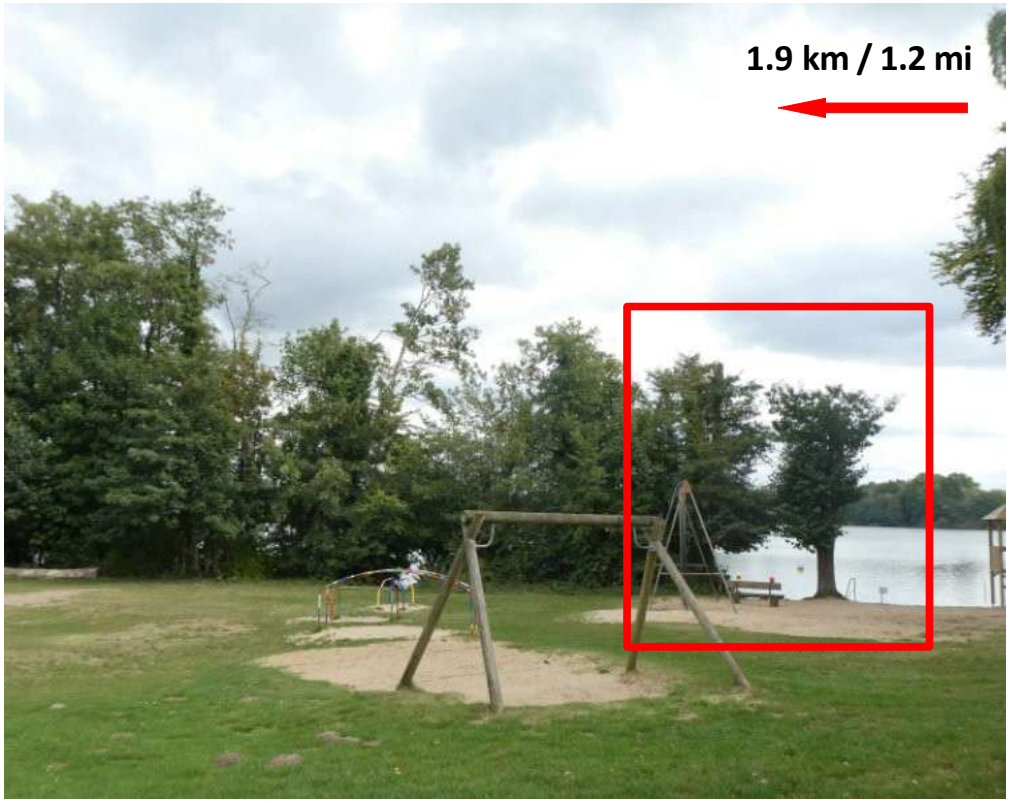
11 SEP 2025 Start of the path to the Adlerhorst Campground (view from the south). Dead branches of a red oak tree hang over the path.

11 SEP 2025 Path to the Adlerhorst Campground. Dying trees along the path

11 SEP 2025 Path to the Adlerhorst Campground. The small Lake Langensee is to the right. At a height of 1.5 meters, the measurement is **70 µW/m²**. Much higher values are expected in the treetops.

Adlerhorst Campground at Behler Lake

11 SEP 2025 Adlerhorst Campground, bathing area and playground (**view from the south**). Twelve 0° sector antennas from the mobile phone base station near Bösdorf emit RF radiation that strikes the trees on the lakeshore from the south. The two linden trees in the front (marked in red) have already been cut down. The trees on the northern shore have been trimmed. There is dead wood in their crowns.



11 SEP 2025 Adlerhorst Campground, bathing area and playground (**from the west).** On the right, to the south, stand the two topped linden trees. The riparian vegetation in the middle shows signs of damage. The riparian vegetation on the left, to the north, is shielded by the vegetation to the south. Its foliage is dense.

10 SEP 2025 Base station near Bösdorf (view from the north, from Behler Lake)

Adlerhorst Campground at Behler Lake

11 SEP 2025 Adlerhorst Campground (view from the south). Several oak trees in the southern part of the campground have already been pruned. RF radiation from the twelve 0° sector antennas of the mobile phone base station near Bösdorf strikes the trees from the south. The trees divert some of these radiofrequency electromagnetic fields into the ground through their trunks and roots.

11 SEP 2025 Adlerhorst Campground (view from the north). A large proportion of the oak trees have already been cut back. Nevertheless, the trees show clear signs of crown damage, such as sparse foliage and dead wood.

10 SEP 2025 Base station near Bösdorf (view from the north, from Behler Lake)

Closures of Bike Paths and Hiking Trails, Ban on Traveling on the Franconian Saale River

22 SEP 2022 Many "candidates" for broken branches discovered. Path to the tip of Mettnau Peninsula closed for safety reasons
https://www.wochenblatt.net/radolfzell/c-nachrichten/weg-zur-mettnauspitze-aus-sicherheitsgruenden-gesperrt_a92127

18 OCT 2023 Seehof Palace: Where in the park is there a danger from above
https://www.fraenkischertag.de/lokales/bamberg/politik/schloss-seehof-in-memmelsdorf-bei-bamberg-gefahr-durch-morsche-baeume-art-296809

21 DEC 2023 Nymphenburg Palace Park in Munich closed
https://www.abendzeitung-muenchen.de/muenchen/nymphenburger-schlosspark-in-muenchen-gesperrt-nicht-nachvollziehbar-art-947946

09 FEB 2024 A general ruling has been issued by the district of Bad Kissingen: Until further notice, the use of small, unpowered vehicles on the Franconian Saale River is prohibited throughout the district.
https://www.landkreis-badkissingen.de/media/www.landkreis-badkissingen.de/org/med_5957/33593_allgemeinverfuegung_fraenkische_saale.pdf

28 MAR 2024 Closure of the Lahntal bike path near Arnstein Monastery
https://www.vgben.de/aktuelles/archiv/sperrung-lahntalradweg-beim-kloster-arnstein/

03 APR 2024 Closure of the Lahntal bike path (between Diez and Balduinstein)
https://www.rhein-lahn-kreis.de/aktuelles/2024/sperrung-lahnradweg-zwischen-diez-und-balduinstein/

16 APR 2024 Lahntal bike path remains closed near Obernhof and Diez
https://56aktuell.de/lahntalradweg-weiterhin-bei-obernhof-und-diez-gesperrt/

20 APR 2024 Hain City Forest in Diez closed: Danger to life due to risk of falling trees!
https://ben-kurier.de/2024/04/20/diezer-stadtwald-hain-gesperrt-lebensgefahr-durch-umsturgefaehrdete-baeume/

09 APR 2024 Danger due to diseased trees: Rheinsteig hiking trail NR1 closed
https://www.nr-kurier.de/artikel/141426-bedrohlicher-zustand-der-baeume--rheinsteig-wanderweg-nr1-in-neuwied-voruebergehend-gesperrt

10 SEP 2024 Hiking trail in the former "Park Lichtensee" in Hoisdorf closed
https://www.bargteheideaktuell.de/aktuell/92838/wanderweg-im-ehemaligen-park-lichtensee-in-hoisdorf-gesperrt/

01 OCT 2024 Windfall in Dörsbachtal, between Singhofen and Obernhof permanent closure
https://www.outdooractive.com/de/condition/rhein-lahn-kreis/windbruch-im-doersbachtal-zwischen-singhofen-und-obernhof-dauerhafte/803998208/

13 JAN 2025 Nordbahntrasse path between Bracken and the Schee tunnel closed
https://www.talradler.de/nordbahntrasse-zwischen-bracken-und-scheetunnel-gesperrt/

30 JAN 2025 How safe is the bike path near Neckarsteinach? Is it actually still safe?
https://www.rnz.de/region/rhein-neckar_artikel,-Baeume-halten-Sturm-nicht-stand-Wie-sicher-ist-der-Radweg-bei-Neckarsteinach-wirklich-noch-_arid,1498250.html

02 FEB 2025 Danger for hikers in North Rhine-Westphalia (NRW): State agency closes three popular trails
https://www.ruhr24.de/nrw/gefahr-spaziergaenger-nrw-wald-landesbetrieb-sperrung-kaiser-wilhelm-denkmal-wege-freizeit-24k-93544540.html

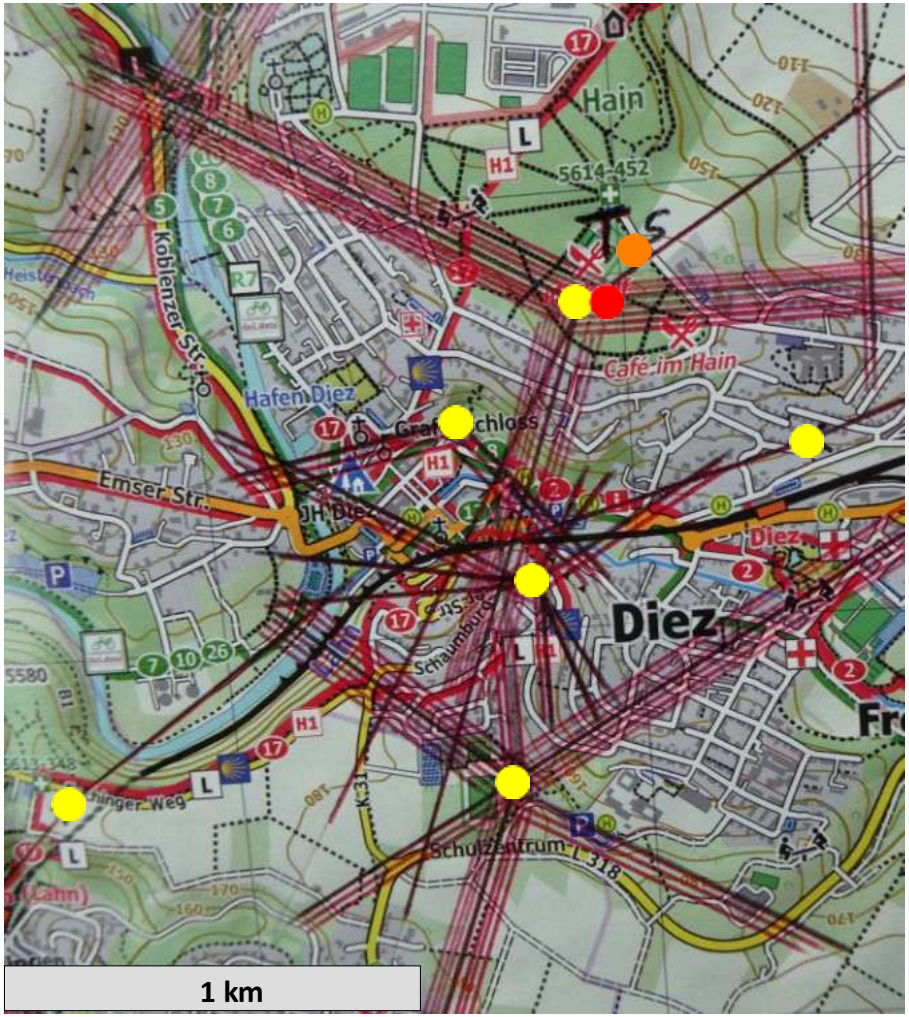
Radolfzell: “Many ‘candidates’ for broken branches discovered. Path to the tip of Mettnau Peninsula closed for safety reasons”

22 SEP 2022: Radolfzell. According to a statement from the Radolfzell press office, the nature trail running from the Mettnau Tower to the tip of the Mettnau Peninsula is closed until further notice due to an increased risk of falling branches. During a thorough inspection of the trees along the trail, the district forester discovered significant damage to some of the trees. The damage assessment revealed that the damage mainly involves dead and dried-out branches that could fall and endanger people walking by. Next, the affected trees will be evaluated for traffic safety. As this is a nature reserve, close coordination is taking place with the higher nature conservation authority, the Freiburg Regional Council. Regarding nature and species protection, they are examining whether branches can be removed and supported or if other measures can be taken to avert danger to people walking by.
https://www.wochenblatt.net/radolfzell/c-nachrichten/weg-zur-mettnauspitze-aus-sicherheitsgruenden-gesperrt_a92127#gallery=null

Section of Freizeitkarte 511, western Lake Constance, LGL, 2014. Added items: location of the mobile phone base stations (yellow) with the main beam directions of the sector antennas, as of 2022. The map shows four antennas transmitting from the federal highway B33 near Markelfingen to Mettnau Tower, as well as four antennas transmitting from Allensbach to the tip of Mettnau Peninsula.

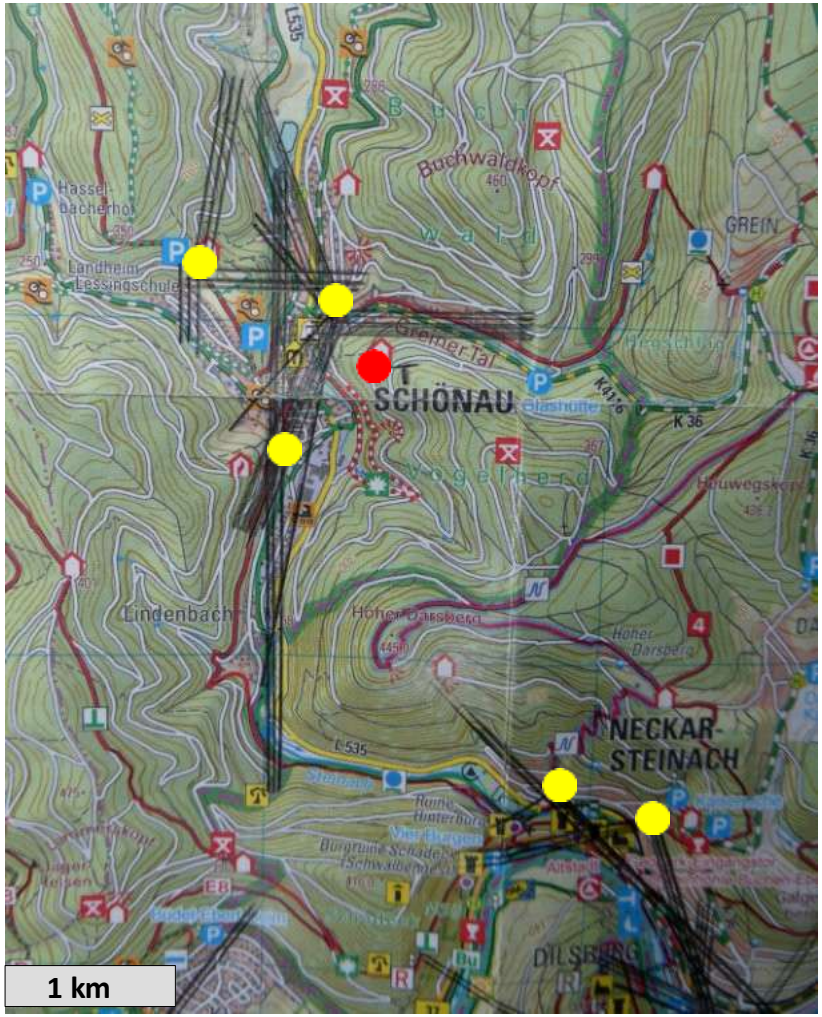
15 DEC 2022 Trees east of Mettnau Tower (view from the northwest). The mobile phone base station is 1.6 km (1 mi) away.
Measurement: **1,500 µW/m²**

Closure of the Lahntal Bike Path and Hain City Forest in Diez



Hiking map section with bike paths, 1:25 000, 43-558, NaturNavi

Closure of the Bike Path near Neckarsteinach to Schönau



Map section F 513, State Office for Geoinformation and Land Development

Added items: location of mobile phone base stations (yellow) with the main beam directions of the sector antennas, BOS digital radio (red) (accessed 4/2025)

The Hain City Forest in Diez and the bike paths along the Lahn River (from Diez to Altendiez in the west) and along the Steinach River (from Neckarsteinach to Schönau) are located in the radiofrequency field of several mobile phone and BOS digital radio base stations.

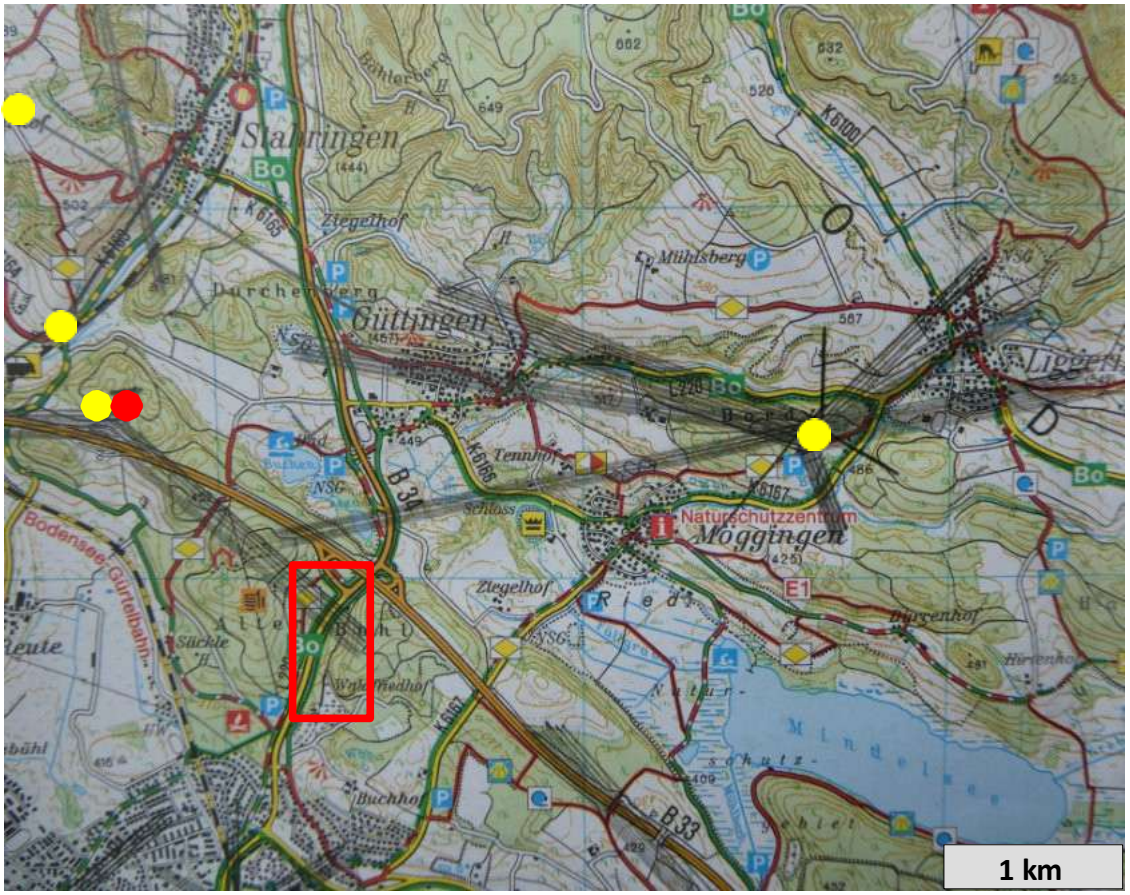
Examples of Necessary Tree Felling

20 DEC 2024 Radolfzell Forest District announces clear-cutting at forest cemetery
https://www.wochenblatt.net/radolfzell/c-nachrichten/forstervier-radolfzell-kuendig%20t-kahlschlag-am-waldfriedhof-an_a143915#gallery=null
20 DEC 2024 Tree pruning and fencing in the oak grove to maintain traffic safety
https://www.stuttgart.de/pressemitteilungen/2024/dezember/baumschnitt-und-einzaeunungen-im-eichenhain-zum-erhalt-der-verkehrssicherheit.
31 DEC 2024 Safety and construction work – More than 300 trees must be cut down in Stuttgart
https://www.stuttgarter-nachrichten.de/inhalt.sicherheit-und-bauarbeiten-mehr-als-300-baeume-muessen-in-stuttgart-gefaellt-werden.7741c970-9ec4-49d1-b7f8-590ef9b14246.html
08 JAN 2025 Storm, snow, drought: No other solution – City must cut down 60 trees
https://www.schwaebische.de/regional/oberschwaben/ravensburg/stadt-ravensburg-faellt-60-baeume-im-fruehjahr-3220721
09 JAN 2025 Closure at the lake in Mastholte due to tree felling work
https://www.die-glocke.de/kreis-guetersloh/rietberg/artikel/sperrung-am-see-in-mastholte-wegen-baumfaellarbeiten-1736441528
17 JAN 2025 In the Innenstadt-Ost district: The trees are being felled
https://www.dortmund.de/newsroom/presse-mitteilungen/im-stadtbezirk-innenstadt-ost-fallen-die-baeume.html
17 JAN 2025 Kirchhellen: Trees must be cut down
https://www.wir-lieben-bottrop.de/2025/01/17/kirchhellen-baeume-muessen-gefaellt-werden/
17 JAN 2025 Four trees are cut down at the Hövelhof Hunting Lodge gardens
https://www.nw.de/lokal/kreis_paderborn/hoevelhof/24023488_Vier-Baeume-im-Hoevelhofer-Schlossgarten-gefaellt.html
17 JAN 2025 Sick trees are being cut down
https://www.bayernwelle.de/berchtesgadener-land-und-salzburg/kranke-baeume-werden-gefaellt
19 JAN 2025 Road closure between Ehningen and Mauren Vallex due to tree felling
https://www.krzbb.de/inhalt.sperrung-zwischen-ehningen-und-mauren-im-maurener-tal-fallen-baeume.b809507b-cf01-487a-b52a-2b29acae5f8a.html
19 JAN 2025 Rotten trees in Oer-Erkenschwick. City must cut down some plants
https://www.stimberg-zeitung.de/oer-erkenschwick/morsche-baeume-oer-erkenschwick-rodung-w985579-10000873016/
19 JAN 2025 Bochum City Park: Eleven more trees are now being cut down
https://www.waz.de/lokales/bochum/article408117141/stadtpark-bochum-elf-weitere-baeume-werden-jetzt-gefaellt.html
19 JAN 2025 Trees on the meadow near the district-owned swimming pond in Geisenfeld must be cut down
https://www.donaukurier.de/lokales/landkreis-pfaffenhofen/am-landkreisweiher-bei-geisenfeld-muessen-baeume-von-der-liegewiese-weichen-17828080
20 JAN 2025 Tree work at Itzehoer Lehmwohld: Traffic disruptions on Juliengardeweg
https://www.shz.de/lokales/itzehoe/artikel/baumarbeiten-am-itzehoer-lehmwohld-am-juliengardeweg-48249855
20 JAN 2025 Cutting down diseased trees
https://www.freilassing.de/faellung-von-kranken-baeumen/
20 JAN 2025 Hundreds of trees in five hours felled: Challenge in the district
"Along the county road L214 between Stromberg and Rheinböllen, hundreds of trees that could fall onto the road must be felled in five hours over a distance of five kilometers." https://www.swrfernsehen.de/landesschau-rp/hunderte-baeume-in-fuenf-stunden-faellen-herausforderung-im-revier-100.html
20 JAN 2025 "These two trees at BKCR have to go. District announces felling and traffic disruptions."
https://www.ruhrnachrichten.de/castrop-rauxel/bkcr-wartburgstrasse-baumfaellung-ahorn-kreis-recklinghausen-kuendigt-faellung-an-und-begruendet-sie-w98585 9-2001524657/
21 JAN 2025 Many trees were cut down in Großenbaum – Replacement plantings planned
https://nordbote.de/viele-baeume-wurden-in-grossenbaum-gefaellt-ersatzpflanzungen-geplant/
21 JAN 2025 City of Werne cuts down small forest at Brinkhof – Residents stunned and furious
https://www.ruhrnachrichten.de/werne/werne-brinkhof-bahnstrecke-rodung-waeldchen-w987427-2001527440/

21 JAN 2025 Storm damage and disease – Maintenance and felling: Where in Bad Reichenhall tree work is pending
https://www.pnp.de/lokales/landkreis-berchtesgadener-land/pflege-und-faellungen-wo-in-bad-reichenhall-baumarbeiten-anstehen-17851189
22 JAN 2025 Crown safety pruning on the sidewalk at Hofgut Buckenberg
https://www.pforzheim.de/stadt/aktuelles/pressemeldungen/s1/article/detail/News/kronensicherungsschnitt-am-fussweg-hofgut-buckenberg.html
23 JAN 2025 Trees must be cut down for safety reasons
https://www.rnz.de/region/sinsheim-kraichgau_artikel,-Angelbachtal-Baeume-muessen-zur-Sicherheit-gefaellt-werden-_arid,1492688.html
23 JAN 2025 Successful tree maintenance work and safety felling in the municipal area
https://www.freigericht.de/politik-verwaltung/aktuelles/pressemitteilungen/2025-01-23-baumfaellungen/
24 JAN 2025 Several tree felling operations in the urban area in February
https://www.cottbus.de/aktuelles/mitteilungen/2025-01/mehrere_baumfaellungen_im_stadtgebiet_im_februar.html
24 JAN 2025 Traffic safety requires tree felling in Hüttenfeld
https://tip-suedhessen.de/verkehrssicherheit-erfordert-baumfaellungen-in-huettenfeld
24 JAN 2025 Pest infestation – City of Unna must cut down even more trees in a cemetery
https://www.hellwegeranzeiger.de/unna/baumfaellungen-unna-westfriedhof-sturm-bernd-schaeden-sperrung-schaedlinge-w989329-1001305900/
24 JAN 2025 Tree maintenance measures along individual roads in Lengerich
https://www.lengerich.de/de/aktuelles/meldungen/2025-01-24-Gehoelzpflegemassnamen-entlang-mehrerer-Strassen-in-Lengerich.php
24 JAN 2025 Why old oak trees in Marienfeld have to be cut down
https://www.die-glocke.de/kreis-guetersloh/harsewinkel/artikel/warum-alte-eiche-in-marienfeld-gefaellt-werden-muss-1737733457
27 JAN 2025 Mainly beech trees are affected. The city of Wuppertal is felling around 70 damaged trees.
https://www.wz.de/nrw/wuppertal/die-stadt-wuppertal-faellt-etwa-70-beschaedigte-baeume_aid-123515375
27 JAN 2025 Municipality must fell sick trees
https://www.weyhe.de/portal/meldungen/gemeinde-muss-kranke-baeume-faellen-lassen-900003153-21850.html?rubrik=9000050
27 JAN 2025 City must cut down 84 sick and dead trees
https://www.duesseldorf.de/medienportal/pressedienst-einzelansicht/pld/stadt-muss-84-kranke-und-abgestorbene-baeume-faellen
27 JAN 2025 Adieu Grüne Risen: In this district some trees must be cut down.
https://www.tag24.de/berlin/lokales/adieu-gruene-riesen-in-treptow-koepenick-muessen-etliche-baeume-abgeholzt-werden-3354658
27 JAN 2025 Forestry work in Hagenholz
https://www.salzgitter.de/pressemeldungen/2025/waldarbeiten-hagenholz-thiede.php
28 JAN 2025 Forestry work in the city area
https://www.pforzheim.de/stadt/aktuelles/pressemeldungen/s1/article/detail/News/forstarbeiten-im-stadtgebiet-1.html
28 JAN 2025 Safety risk: Once again, a huge tree is being cut down in front of a school
https://www.merkur.de/lokales/weilheim/weilheim-ort29677/sicherheitsrisiko-jetzt-faellt-der-naechste-baum-riese-vor-der-realschule-weilheim-93538314.html
28 JAN 2025 Calenberger Straße in Gestorf: Trees must be cut down
https://www.ndz.de/lokales/springe/calenberger-strasse-in-gestorf-baeume-muessen-gefaellt-werden-KOHKMS3E55GEFKJUKNPBRNCFPU.html
03 FEB 2025 Tree felling in Vaihingen, Plieningen, and Birkach
https://www.stuttgart.de/pressemitteilungen/2025/februar/baumfaellungen-in-vaihingen-plieningen-und-birkach.php
11 FEB 2025 Tree felling in the Feuerbach Valley for traffic safety with helicopter use
https://www.stuttgart.de/pressemitteilungen/2025/februar/baumfaellarbeiten-im-feuerbacher-tal-zur-verkehrssicherung-mit-helikoptereinsatz.php
18 FEB 2025 In Bad Tölz: Tree felling on Isar Promenade
https://www.sueddeutsche.de/muenchen/wolfratshausen/baumfaellungen-isar-bad-toelz-li.3204758
20 FEB 2025 Federal highway B14 near Großerlach: Once again, traffic jams due to clearing, B14 will be completely closed temporarily
https://www.stuttgarter-nachrichten.de/inhalt.bundesstrasse-14-bei-grosserlach-wieder-staus-wegen-rodungen-b14-wird-zeitweise-voll-gesperrt.42ae4a9f-47aa-4d32-853d-d530631c87cf.html

Radolfzell Forest District Announces Clear-Cutting at Forest Cemetery

The Radolfzell Forest District announced urgent timber harvesting measures in the municipal forest due to ongoing bark beetle problems. According to an announcement by the city's press office, **all trees between the forest cemetery and the salt storage facility** (near the Radolfzell Park & Ride lot) **will be cut down in January 2025.**
https://www.wochenblatt.net/radolfzell/c-nachrichten/forstervier-radolfzell-kuendigt-kahlschlag-am-waldfriedhof-an_a143915#gallery=null



Recreation map, section 511, Western Lake Constance, LGL, 2014. Added items: location of mobile phone base stations (yellow), the main beam directions of their antennas, and BOS digital radio (red), **as of 2022.** The map shows **six 130° antennas** and a **BOS digital radio** from base station No. 271164 on federal highway B33. These antennas radiate into the forest area between the forest cemetery and the B33, from a distance of 1.5 km (0.9 mi). In addition, base station radiation from the northeast reaches the forest between the L220, B33, and B34. The site certificate No. 271164 from April 23, 2025 specifies an upgrade to include twelve 130° and twelve 270° antennas.

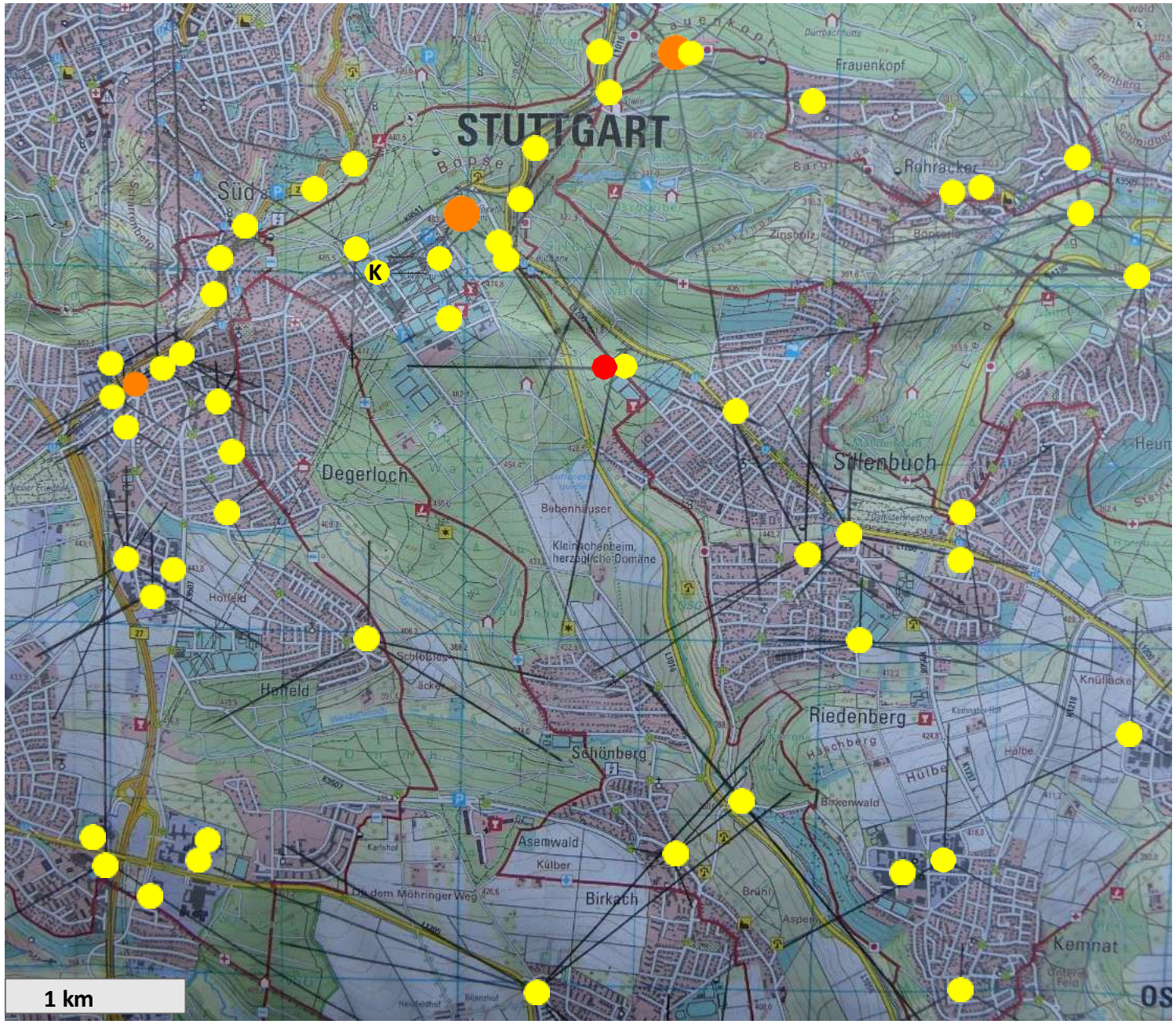
Photo: Stadt Radolfzell / Forstrevier Radolfzell

"This image shows the affected forest area between the Radolfzell Forest Cemetery and the salt storage facility at the Park & Ride lot in front of the B33 entrance. This area will be clear-cut in January." An aerial view of the town reveals the current bark beetle damage and the gaps in the forest. Aerial photographs from the LGL also reveal forest damage within the radiofrequency field of the six 270° antennas. During a visit to Radolfzell on December 15, 2022, damaged deciduous trees were found on Mettnau Peninsula.

Stuttgart

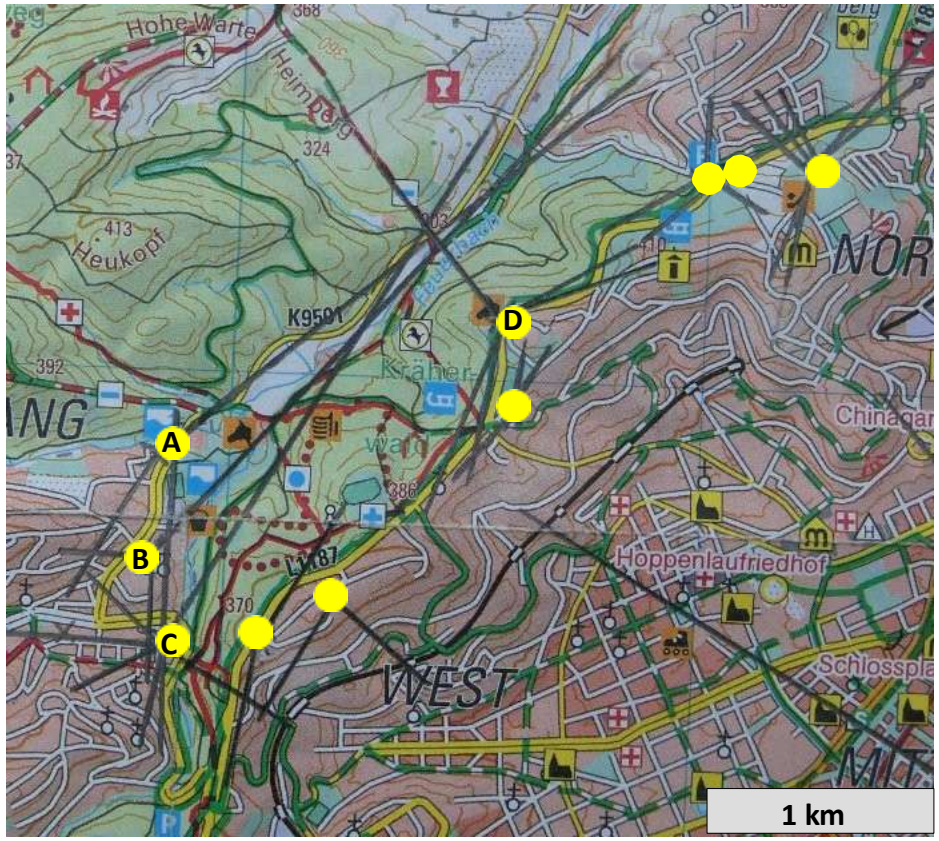
City districts Degerloch, with TV tower and GAZI Stadion, and Sillenbuch, with nature reserves Eichenhain and Birkach

Due to reports that a particularly large number of trees (77) in Degerloch had to be cut down and fencing had to be erected in the Eichenhain nature reserve for traffic safety reasons, the site certificates for the base stations in this area were retrieved. Base station No. 720576 on Keßlerweg has 85 antennas listed.
Google Street View reveals a significant number of damaged trees within the radiofrequency field of base stations, while healthy trees are found in the radio shadow of buildings.



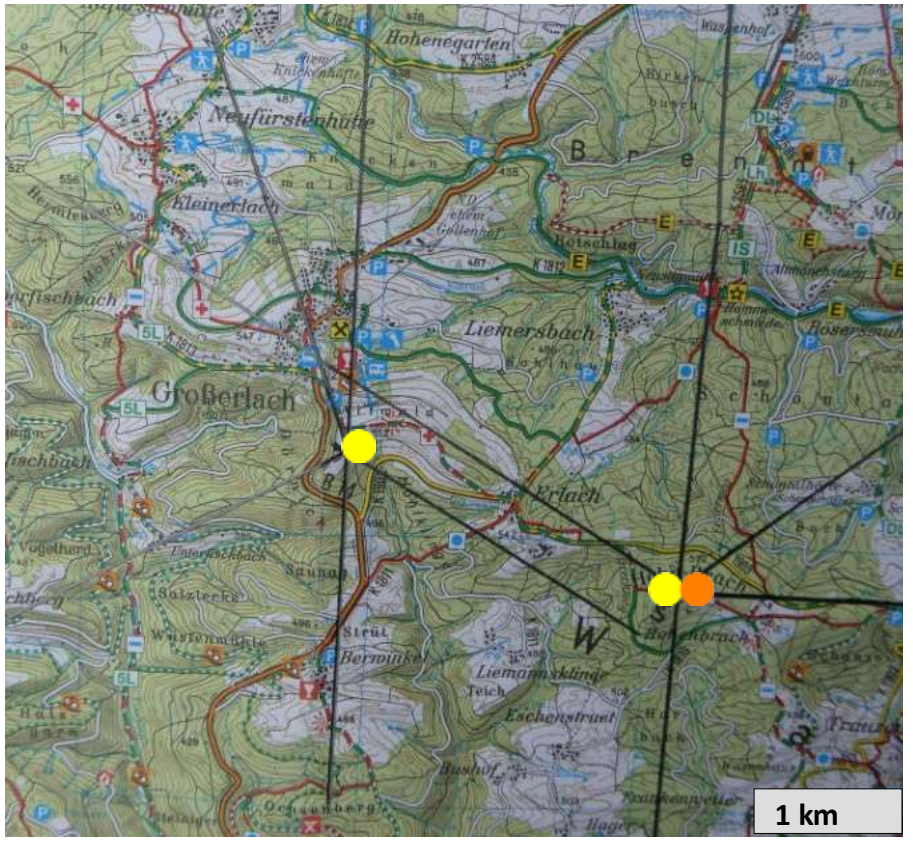
Hiking map section 228, 1: 25 000, Stuttgart, LGL, Baden-Württemberg, 2018. Added items: location of **43 mobile phone base stations** (yellow) with the main beam directions of **965 sector antennas** (several antennas transmit in the directions marked – up to 21!!!), **9 base stations** without main beam directions marked, location of radio/TV towers and other transmitters (orange) and one BOS digital radio (red), accessed in February 2025.

Stuttgart, Feuerbach Valley
For Traffic Safety with Helicopter Use



Section of recreation map 520, Stuttgart, LGL. Added items: location of mobile phone base stations with the main beam directions of the sector antennas. **Out of the four base stations A, B, C, and D, the RF radiation of 20 antennas reaches the Feuerbach Valley.**
A – No. 720806 (**5 x 50°**), B – No. 721402 (**5 x 40°**),
C – No. 770077 (**4 x 30°**), D – No. 720519 (**6 x 320°**)

Großerlach
Due to Clear-cutting: B14 Again Fully Closed Temporarily



Section of recreation map 518, Schwäbisch Hall, State Surveying Office, 2007. Added items: location of mobile phone base stations with the main beam directions of the sector antennas.
Site certificate No. 770539, south of Großerlach, from January 2, 2023: installation height 34.4–61.5 m (112.9–201.8 ft), 17 antennas (4 x 0°, 2 x 120°, 3 x 180°, 2 x 240°, 3 x 340°)
Site certificate No. 770116, Hohe Brach, from December 6, 2023: installation height 76.6–84.6 m (251.3–277.6 ft), 42 antennas (5 x 0°, 9 x 50°, 5 x 90°, 14 x 180°, 9 x 300°), and others.

Mobile Phone Base Station Upgrades, Even Though People, Animals, and Trees Were Ill

1996 Schnaitsee, District of Rosenheim: Dead cows, dead and malformed calves, headaches, sleep disorders, tree damage. Prof. W. Löscher and Prof. G. Käs described the health problems and behavioral abnormalities in 1998 (79, 5) and 2003 (84, 11) in Prakt. Tierarzt: https://www.emfdata.org/de/dokumentationen/detail?id=142 Veterinarian Wenzel et al. published in Prakt. Tierarzt in 2002 (83, 3). Prof. Löscher, University of Veterinary Medicine Hannover, planned a comprehensive study. The Federal Office for Radiation Protection rejected this project.

1996 Hohenpeißenberg, District of Weilheim: After being transferred to the German Weather Service on Hohenpeißenberg, Sohmer fell ill. The course of the illness indicates an influence on calcium metabolism. Presentation of the medical history at a technical meeting of the Federal Office for Radiation Protection on August 2, 2006: https://www.emf-forschungsprogramm.de/veranstaltungen/Internet_DMF_Protokoll_Fallbeispiele_020806_111206.pdf and in umwelt medizin gesellschaft 2/2019 (Radiofrequency-induced hypocalcemia with recurrent tetany). https://www.funkfrei.net/berichte/gesundheitsaemter.htm https://www.funkfrei.net/berichte/bericht15.htm https://www.funkfrei.net/berichte/bericht15a.htm

1997 Gaildorf-Kieselberg, District of Schwäbisch Hall: Shortly after moving in (distance to base station 50 m / 164 ft), a 13-year-old girl fell ill with severe exhaustion, swollen lymph nodes and significant changes in her blood count. Problems also affected her mother and newborn baby. Rapid recovery after moving away. https://kompetenzinitiative.de/wp-content/uploads/2025/09/2_Gefaehrdung_und_Schaedigung_von_Kindern_durch_Mobilfunk.pdf

1997–2004 Steinbach-Hallenberg, District of Schmalkalden-Meiningen: Increased breast cancer incidence in the Arzbergstraße and Gruppich area.
The mobile phone base station became operational in 1994. Between 1997 and 2004, 18 people living on the neighboring streets of Arzbergstraße and Gruppich developed cancer. On March 21, 2006, MDR (a public broadcaster) interviewed the affected individuals and Roland Stabenow for the program "Cancer in Steinbach-Hallenberg" (see YouTube).

1998 Oettingen in Bavaria, District of Donau-Ries: Sick cows, reproductive disorders, stillbirths, sick calves, lack of breeding success in ducks, disappearance of swallows and many songbirds, sleep disorders, and susceptibility to infection.

1999 Haibach, District of Aschaffenburg: 10-year-old boy, sudden onset of "ADHD," stunted growth, and massive deterioration of farsightedness (distance to transmitter 80 m / 262 ft). Symptoms receded after de-exposure, followed by shielding measures. The large bamboo planted by a gardener in March 2001 as additional shielding, which normally grows to a height of 10 m (33 ft), was planted at 4.5 m (14.8 ft) and had a height of 2.5 m (8.2 ft) in 2007. Cluster of illnesses in the neighborhood. Expansion of the base station from 3 (1999) to 18 (2018) antennas. https://www.funkfrei.net/berichte/bericht4.htm https://www.diagnose-funk.org/forschung/wirkungen-auf-den-menschen/symptome-der-elektrohypersensitivitaet

1999 Bad Königshofen, OT Merkershausen, District of Rhön-Grabfeld: 10 dead cows in 9 months out of a herd of 60 cows
On March 12, 2000, the Mainpost reported: "Mysterious deaths in the barn."

1999 Weilersbach, District of Forcheim: Schmitt fell seriously ill. Complete recovery after installation of a shielding fence.

2000 and 2003 Memmelsdorf, District of Bamberg: Sick people, sick trees
Despite illnesses at the Birkenstraße base station, the second base station at the sports field went into operation in 2003.

2001 Rosengarten, District of Schwäbisch-Hall: Noticeable increase in cancer and neurological diseases from 2001. The base station on the water tower in Rosengarten-Uttenhofen started operation in 1993. **Expansion from 6 (2006) to 42 (2025) antennas.**

2003 Burgheim, District of Neuburg-Schrobenhausen: Noticeable increase in heart and tumor diseases. **Expansion of the mobile phone base station from 8 antennas (2005) to 42 antennas (2022) (see pp. 46–47).**

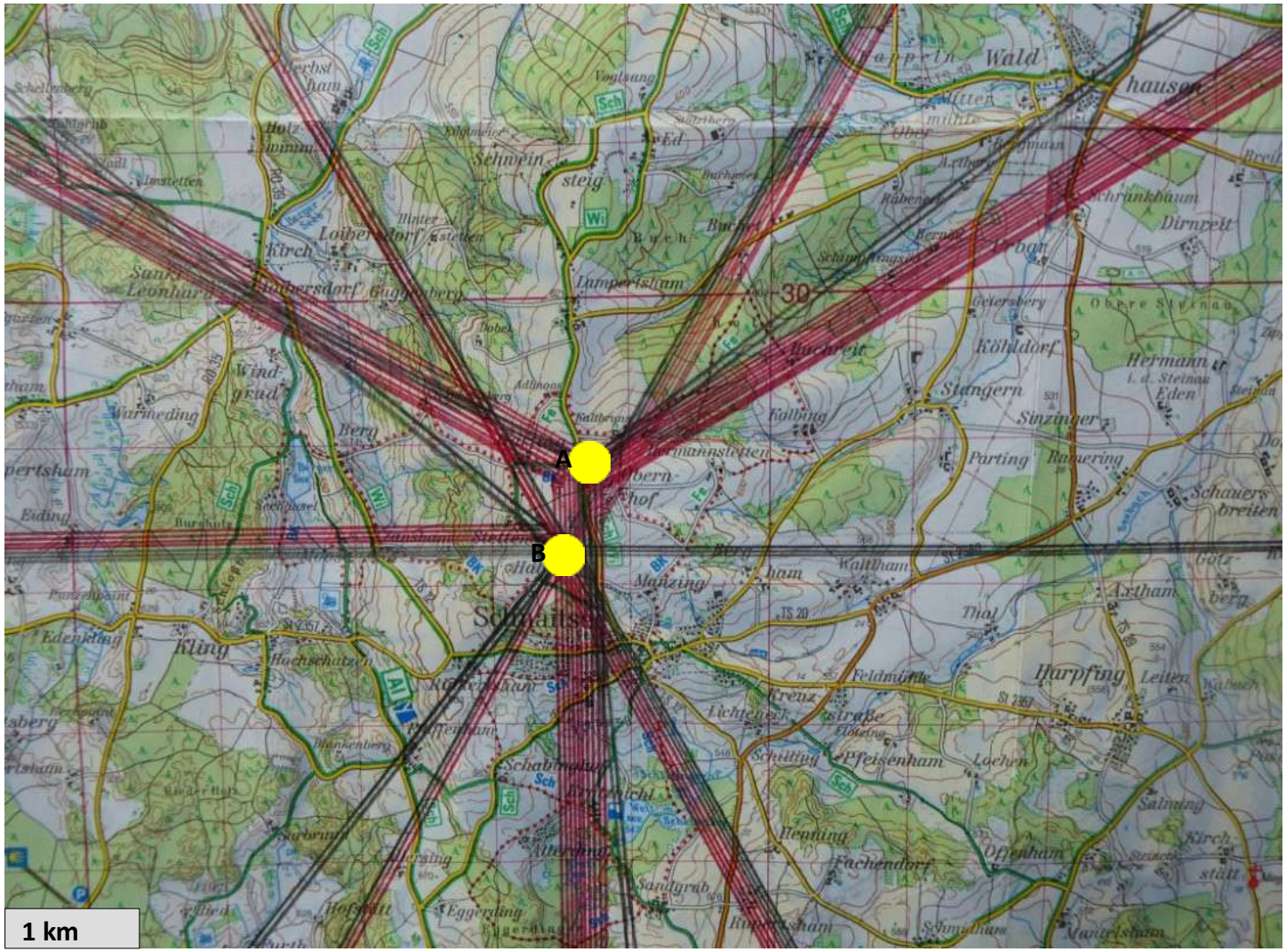
2003 Nuremberg-Reichelsdorf: Base station in the steeple of St. Philip's Church, illnesses and departure of residents as well as tree damage, **expansion of the base station to 23 antennas in 2023.**

2004 Eger, H. et al. (2004). Einfluss der räumlichen Nähe von Mobilfunksendeanlagen auf die Krebsinzidenz [The influence of being physically near to a cell phone transmission mast on the incidence of cancer]. *umg*, 17(4), 326–332. Naila Study

2007 Freiburg, Windaustraße, Transmitter on Linnéstraße, near Seepark: A doctor suffered from significant, exposure-related health problems.
He documented the decline in bird populations and tree damage and asked the city and regional council for help and an investigation.

2009 Ruhstorf, District of Passau: Reduced fertility and increase in malformations in pig breeding operations. Prof. K. Buchner, Dr. H. Eger, and master farmer J. Hopper published a report on the damage that had occurred. https://kompetenzinitiative.de/wp-content/uploads/2025/06/Ferkelstudie_Prof_Klaus_Buchner.pdf

Schnaitsee, District of Traunstein: Diseases in Cows, Calves and Humans Since 1996



Section UK50-54, Lake Chiemsee, State Office for Survey and Geoinformation, 2008. Added items: location of mobile phone base stations with the main beam directions of the sector antennas (black: as of 2011, red: as of 2024).
Base station A, No. 57012, 1982–2005 TV tower, installation height 91.4–93.6 m, upgraded from **6 (2009)** to **30 antennas (2024) +** other transmitters
Base station B, No. 570377, operation started in 1995, installation height 48.2–51.9 m, upgraded from **18 (2011**) to **30 antennas (2022)**

Gaildorf, Kieselberg, District of Schwäbisch Hall, Illness Affecting a Family in 1997

Section of hiking map W221, LGL

10 APR 2007 View from the clearcut northwest slope of Kieselberg Mountain to Kirgel Mountain with base stations (yellow)

10 APR 2007 Damaged, young beech trees

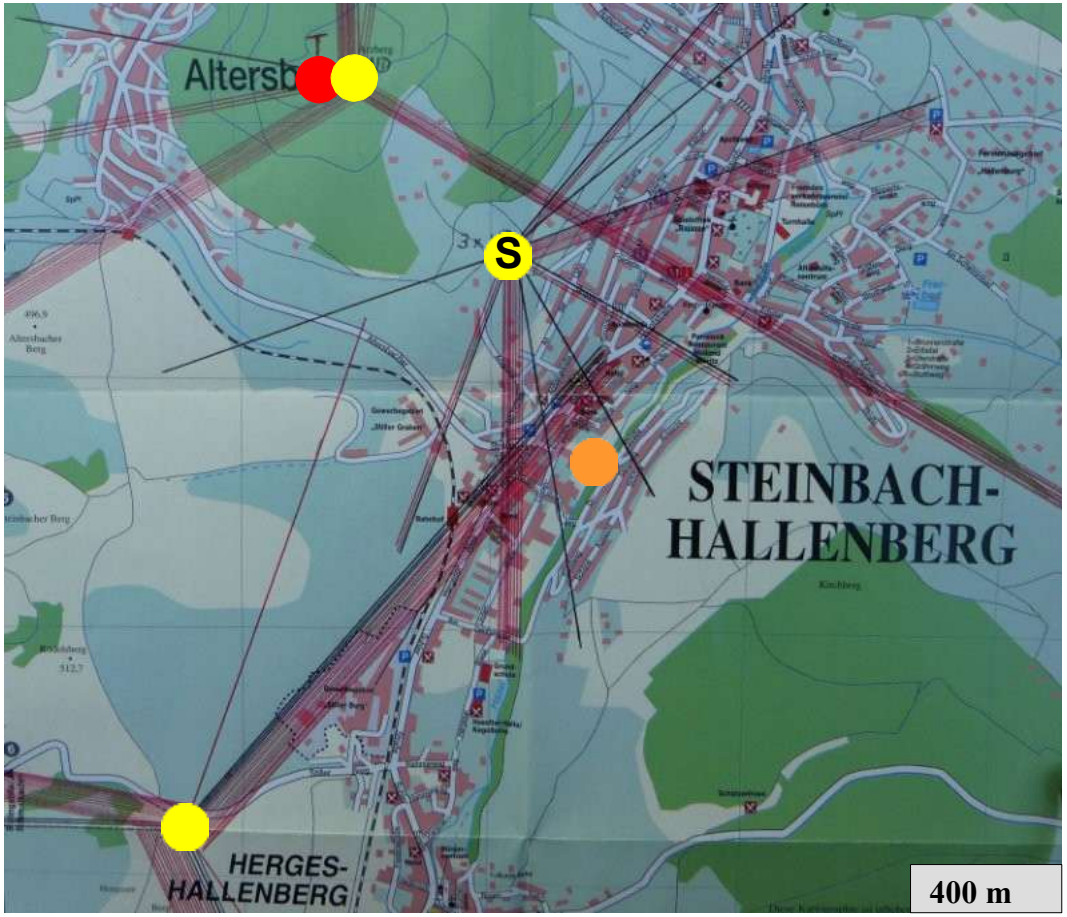
Items added to above map (left): location of mobile phone base stations (yellow) with the main beam directions of the antennas as of 2010 (black), as of 2024 (red), and BOS digital radio (red). From both base stations on Kirgel Mountain (A and B), RF radiation reached the northwest slope of Kieselberg Mountain (red). Local residents observed that the trees on this slope, including many beech trees, died within a few years. They also noticed unusual damage to the trunks. At that time, there was a transmitter with an omnidirectional antenna on Kieselberg Mountain. A family that had recently moved to the area fell seriously ill just 50 meters (164 feet) away from it.

Base station A, No. 770017: upgraded from **12 (year unknown) to 42 antennas (2022) + BOS digital radio**

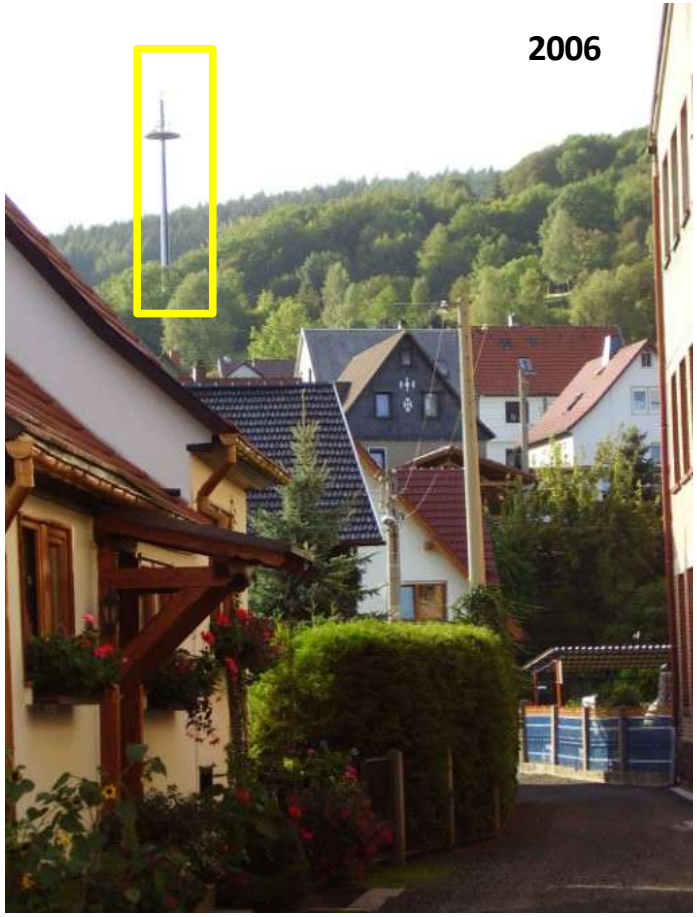
Base station B, No. 770829: upgraded from **6 (year unknown) to 18 antennas (2024)**

Base station C, No. 770096: upgraded from **1 omnidirectional antenna (year unknown) to 12 sector antennas (2020)**

Steinbach-Hallenberg, District of Schmalkalden-Meiningen, Increased Incidence of Cancer in the Arzbergstraße and Gruppich Area



Section of the Steinbach-Hallenberg city plan, Verlag Barfuß. Added items: location of base stations No. 890015, No. 890629, and No. 893090 with the main beam directions of the sector antennas (as of 2010: black, as of 2021: red)



23 AUG 2006 Mobile phone base station above Steinbach-Hallenberg

In 2010, there were 11 antennas (black) in Steinbach-Hallenberg: 40°, 50°, 70°, 93°, 120°, 150°, 200°, 250°, and 3 omnidirectional antennas.
In 2021, there were 29 antennas (red): 3 x 40°, 9 x 70°, 3 x 120°, 9 x 180°, 3 x 200°, and 2 omnidirectional antennas.

The base station began operating in 1994. Between 1997 and 2004, 18 people living on the neighboring streets of Arzbergstraße and Gruppich developed cancer. On March 21, 2006, MDR (public broadcaster) interviewed the affected individuals and Roland Stabenow for the program "Cancer in Steinbach-Hallenberg" (see “Krebs in Steinbach-Hallenberg” YouTube). Stabenow, the head of the Berlin Joint Cancer Registry, proposed conducting a new analysis on-site in collaboration with the Suhl Tumor Center.

On September 6, 2006, at an event in Steinbach-Hallenberg, Stabenow – **head of the registration office of the Joint Cancer Registry Berlin** – **presented the results of the official investigation: seven cases were reported instead of the expected one**. Medical Officer Olk planned to investigate the situation in Steinbach-Hallenberg in detail using a questionnaire. People from Steinbach-Hallenberg who had cancer also spoke at the event. Two representatives of the mobile network operator were present. During the visit, damage and growth disorders in trees were observed in Steinbach-Hallenberg.

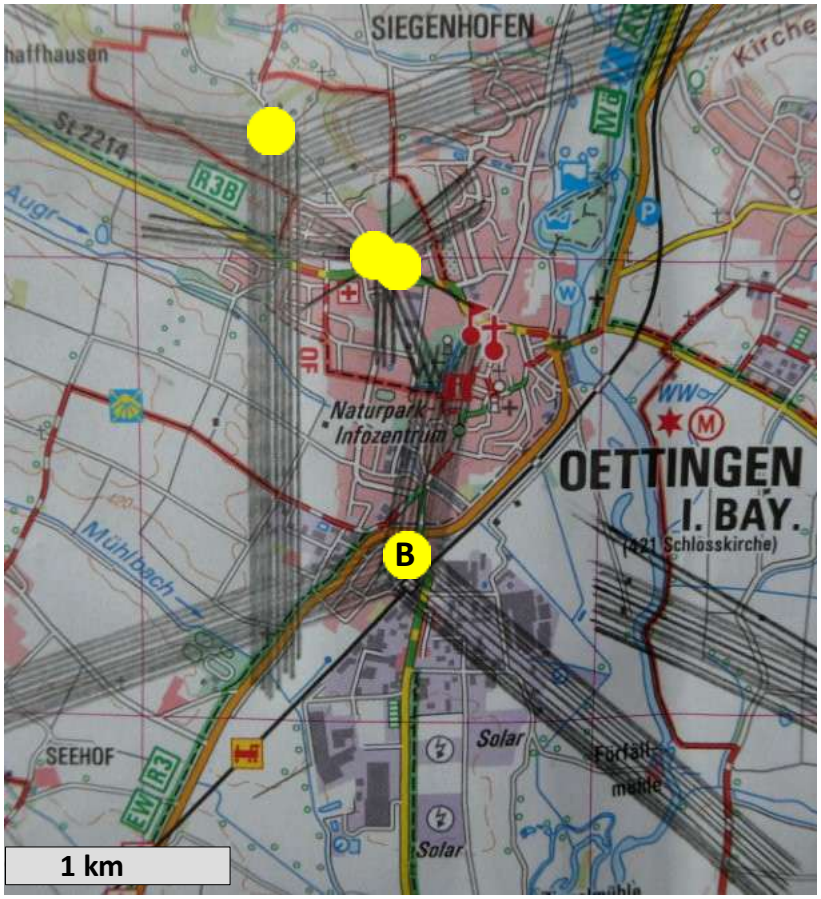
23 AUG 2006 Mobile phone base station with microwave radios in the municipality (see map, orange)

23 AUG 2006 Crown damage on one side

Mobile phone base station No. 890015, above Steinbach-Hallenberg

Despite an increased incidence of breast cancer in Steinbach-Hallenberg, the base station was upgraded from 11 to 29 antennas.

Oettingen, District of Donau-Ries: Sick cows, reproductive disorders, stillbirths, sick calves, lack of breeding success in ducks, disappearance of swallows and many songbirds, sleep disorders, and susceptibility to infection



Section UK50-21, Ries, Bavarian State Office for Surveying (LDBV), 2018. Added items: location of mobile phone base stations (yellow) with the main beam directions of the sector antennas.

17 AUG 2007 The farm and pastures were located near the base station at the train station.

Mobile phone base station No. 540789 at the train station, site certificate from September 19, 2023: installation height 27.7–29.1 m (91–95.5 ft), 30 antennas (10 x 10°, 10 x 130°, 10 x 250°)

Weilersbach, Illness in 1999

Forty-four-year-old Schmitt, a machine fitter and amateur musician, fell seriously ill. He experienced itching, dizziness, joint pain, shoulder stiffness, allergic reactions accompanied by shortness of breath and palpitations, and total exhaustion. A mobile phone base station had been erected 110 m (360 ft) away. It was not until **2001** that he learned about illnesses caused by RF radiation from base stations. After measurements in his living room showed **4,500 µW/m²**, he obtained a building permit and erected a protective fence (9 m x 24 m) made of a double layer of chicken wire in 2003. A control measurement confirmed the successful shielding effect. **After a few weeks, he was completely healthy again.**
In **2007**, the symptoms reappeared. The base station had been upgraded, expanded, and raised. He then reinforced and raised the fence (13 m x 30 m).
He was healthy again for a second time.

09 AUG 2007 Weilersbach, Am Hetzenhof, a protective fence against RF radiation made of two layers of chicken wire (9 m x 24 m / 30 ft x 79 ft)

In 2003, the newspaper reported: https://www.nordbayern.de/franken/forchheim/schutzgitter-halt-strahlung-fast-vollig-ab-1.700435
In 2007, Schmitt wrote a report: https://www.diagnose-funk.org/aktuelles/artikel-archiv/detail?newsid=670

Despite this suspicious illness, why did the health department, the State Office for Health and Food Safety, and the StMUGV remain inactive in 2003? In 2004, the general practitioner in Forchheim-Burk, located only 6.5 km (4 mi) from Weilersbach, expressed concern about the cluster of illnesses near the base station at the Fischer furniture store. On January 18, 2005, Dr. A. Böttger (BMU) and Dr. E. Vogel (StMUGV) were informed of this on site. They were presented with affected patients.

19 JAN 2008 Mobile phone base station No. 670909 (view from the southwest). The protective fence against RF radiation was raised (13 m x 30 m / 43 ft x 79 ft)

Despite repeated urgent requests from doctors, the relevant authorities have not opened an investigation into the long-term exposure of residents living near base stations.

Memmelsdorf, District of Bamberg, Illness in 2000 (Birkenstraße) and in 2003 (Filzgasse)

She had to give up her gardening business due to life-threatening heart arrhythmia, headaches, fatigue, and joint and limb pain.

Section of the Bamberg City Plan, Falk.
Added items: mobile phone base stations No. 671442 (**s**ports field) und No. 671091 (**B**irkenstraße) with the main beam directions of the sector antennas.

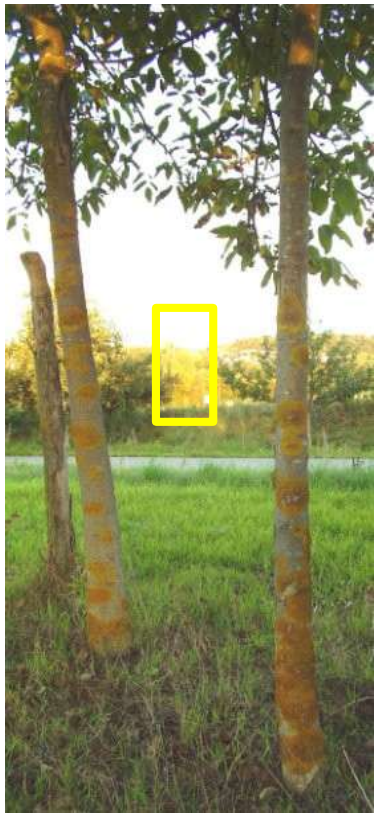
17 AUG 2008 Parking lot at the sports field, damaged hornbeam trees (view from the north)

24 JUN 2008 Mobile phone base station at sports field

In **2009,** the base station at the sports field had **15 antennas** (black): 2 x 25°, 2 x 90°, 93°, 2 x 145°, 2 x 200°, 213°, 2 x 265°, 2 x 290°, 333°.
In **2023,** there were **36 antennas** (main beam directions marked in red): 3 x 25°, 9 x 95°, 3 x 145°, 9 x 215, 3 x 265°, 9 x 335°.

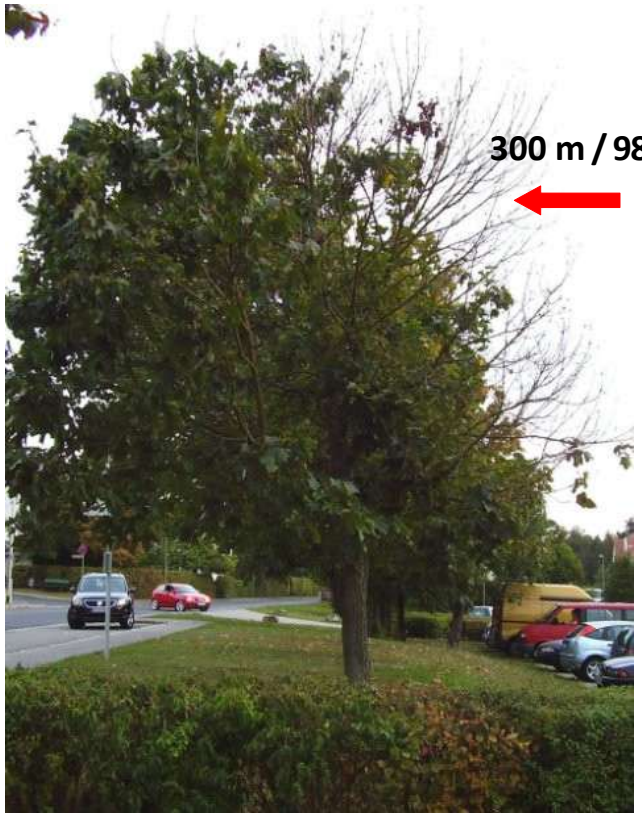
There was extensive damage to trees in the area around the base station: in gardens, at the sports field, by the stream, at the school, at the cemetery, in the large nursery, and in the castle park. Lichens proliferated. Cracks appeared in the trunks and branches of the trees.

17 AUG 2008 Bamberger Straße. Maple tree (view from the southwest). The mobile phone base station is 170 m (558 ft) away.



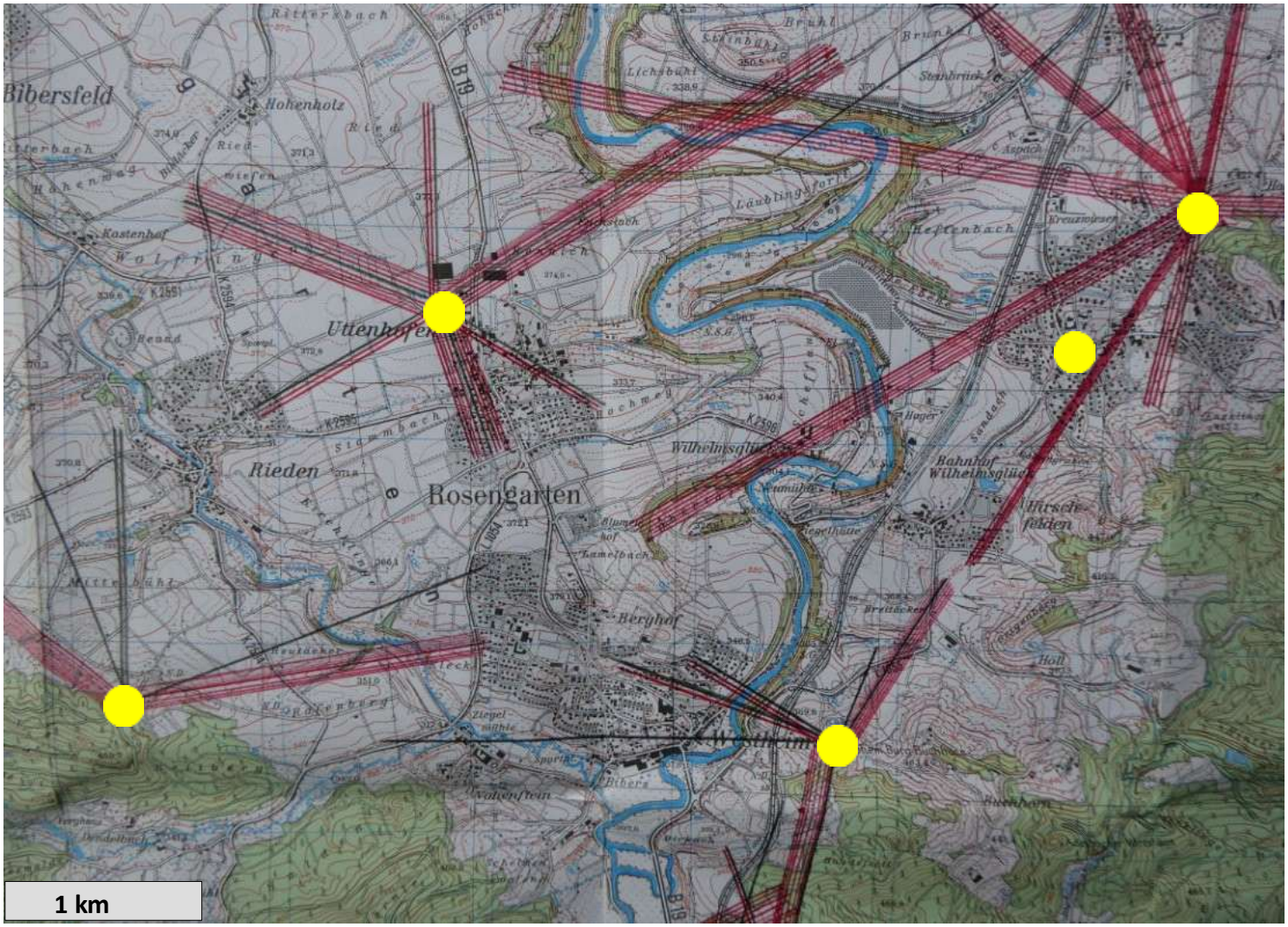
12 SEP 2007 Lichens spread across many young trees.

17 AUG 2008 During the same period, cracks appeared on the trunks and branches of apple trees and other tree species.



28 SEP 2009 Intersection of Pödeldorfer Straße and Seehofhalle. Maple tree (view from the north). The RF radiation from the base station comes from the west.

Rosengarten, District of Schwäbisch-Hall, 2007



10 JUL 2007 Uttenhofen, water tower with base station. Since 1993, residents of Uttenhofen and Westheim have been exposed to RF radiation from this base station and have suffered the consequences.

Section of Gaildorf topographic map 6924, State Office for Geoinformation and Land Development , 2010.
Added items: location of base stations with the main beam directions of the sector antennas (as of 2007: black, as of 2024: red)
Site certificate No. 770306, **Uttenhofen water tower, from 06 APR 2006**: installation height 30.8–32.6 m, **7 antennas** (0°, 60°, 120°, 160°, 240°, 290°, ND),
went into operation in 1993 **from 05 OCT 2020**: installation height 34.7 m, **36 antennas** (3 x 0°, 9 x 60°, 3 x 120°, 9 x 160°, 3 x 240°, 9 x 290°)
On March 14, 2007, Dr. Th. Gritsch, TÜV South, carried out RF measurements on behalf of the municipality Rosengarten.
Example: At Im Häuslesäcker 12, which is 650 m (2,133 ft) away from the water tower, the measurement was **440 µW/m²**.

Due to the alarming increase in illnesses in Rosengarten, citizens, district councilors, and doctors first reached out to the health department in Schwäbisch Hall and the district administrator. After doctors of the Bamberg Appeal, a doctor's initiative, visited residents affected by mobile phone base stations in 15 towns and municipalities in Baden-Württemberg, they contacted Minister Dr. Monika Stolz of the Ministry of Labor and Social Affairs on **July 17, 2007**.**The letter stated the following about Rosengarten: "Well-founded suspicion of serious health issues due to RF radiation exposure in a large number of people well below current exposure limits; need for help for these people; immediate on-site investigation required due to imminent danger; request to halt the expansion of mobile phone networks, digital radio, and television; and urgent suspicion of serious damage to trees due to RF radiation exposure.** In Rosengarten, including the districts of Uttenhofen, Westheim, and Rieden, the population is extremely concerned about the unusually high number of tumor diseases that have occurred in recent years, including among children and young adults. Many people there also suffer from headaches, sleep disorders, tinnitus, concentration problems, extreme fatigue, forgetfulness, psychological changes, unexplained neurological disorders, paralysis, cardiac arrhythmia, and blood pressure fluctuations. Many conifers, deciduous and fruit trees south of the water tower in the district of Uttenhofen are severely damaged or have been cut down. The 'bursting' of the trees is visible in Schönbühl, Im Ghai, and Fasanenweg, among other places ..."

The ministry's response, dated October 8, 2007, states: "There is no question that the fears and concerns of the population must be taken seriously. As stated in our February 14, 2006, letter to you, national and international scientific commissions unanimously agree that **no health impairments from mobile phone base station radiation are to be expected if current exposure limits are complied with ..." However, doctors have observed illnesses with a temporal and spatial connection to RF radiation exposure.**

The ministry did not respond to the observation of tree damage.

The health department and the ministry refused to conduct an on-site investigation to clarify the cluster of illnesses. On December 14, 2007, two doctors contacted the district attorney's office in Schwäbisch Hall and requested an investigation. The doctors presented evidence pointing to a causal link between the cluster of illnesses and RF radiation exposure.

- Too many people, including young individuals, are experiencing a variety of symptoms for which no organic cause has been identified.
- Several members of one family and a number of neighbors suffer from similar symptoms. Some streets are particularly affected: Neue Straße, Gartenstraße, Haller Straße, Im Schönbühl, Im Ghai, Biberstraße, and Hauptstraße.
- Despite various treatment attempts, there has been no lasting therapeutic success.
- However, the symptoms subside or disappear completely when RF sources (e.g. DECT phones, Wi-Fi, and mobile phones) are removed and when the affected individuals move to areas with low RF radiation levels.
- The observed symptoms have been described in the scientific literature for 70 years in connection with RF radiation exposure in workplaces and among radio operators (see Prof. Dr. K. Hecht, Dr. U. Warnke, Dr. G. Oberfeld, and Dr. H. Eger in the conference proceedings). As wireless communication technologies have become more widespread, many doctors have observed these symptoms in an increasing number of their patients. Please investigate this serious suspicion.

10 JUL 2007 Uttenhofen, water tower with base station. Damaged fruit tree (view from the south). Many trees were damaged.

Main beam direction 120°

New Mobile Phone Base Station in Uffing, District of Garmisch-Partenkirchen, Started Operation in 2024

Aerial photograph, Bavarian State Office for Surveying (LDBV), 2024. Added items: three main beam directions (0°, 120°, 240°) of a total of 57 sector antennas.
Site certificate No. 6901921 from January 5, 2024: installation height 40–42.5 m (131–139.4 ft),
57 sector antennas (19 x 0°, 19 x 120°, 19 x 240°)

Main beam direction 0°

Main beam direction 240°

The condition of the trees near the new mobile phone base station should be investigated immediately and monitored regularly.

Conclusion

Trees make the impact of RF radiation from mobile phone base stations visible.

The following observations and findings suggest that radiofrequency electromagnetic fields may affect trees, in addition to the influencing factors considered thus far:

- Documented observations have been made at over 1,500 mobile phone base stations since 2005.
- Distribution of tree damage in the field
- Evaluation of aerial photographs
- Scientific findings since 1930
- The study “Radiofrequency Radiation Injures Trees Around Mobile Phone Base Stations,” 2016, and
- The study “The Effects of Base Station as an Electromagnetic Radiation Source on Flower and Cone Yield and Germination Percentage in Pinus brutia,” 2021

Damage to trees on only one side, differences between trees within rows, increased horizontal growth, and damage to trees near bodies of water cannot be explained by climate change.

Research has found that tree damage near mobile phone base stations occurs well below current exposure limits. However, these limits were set without considering plants.

This serious suspicion requires an immediate scientific investigation in the field.

Until the concern has been disproven, installing new mobile phone base stations and upgrading existing ones should be strictly forbidden.

Review of Previous Studies and Experiments

Life on Earth has evolved under the influence of naturally occurring electromagnetic fields and waves. These fields and waves include static electric and magnetic fields, cosmic radiation, sferics, and extremely low frequency electromagnetic resonances, also known as Schumann resonances.

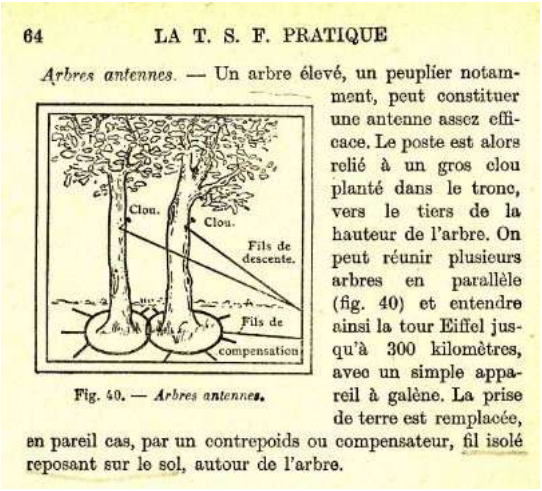
Technically produced electromagnetic fields have existed for the past 100 years, superimposing and interfering with natural electromagnetic fields. This interference affects genetic, biochemical, and physiological processes in humans, animals, and plants.

Prof. Dr. J. Zenneck, a physicist at the Technical University of Munich and a radio pioneer, describes how water jets sprayed upward by a pump can serve as receiving and transmitting antennas for radiofrequency electromagnetic waves with a range of 160 km (99 mi) at a height of 40 m (131 ft).

Zenneck J (1916). Lehrbuch der Drahtlosen Telegraphie [Textbook of Wireless Telegraphy], 4th edition, published by Ferdinand Enke, Stuttgart.

The 1924 French manual *La T.S.F. Pratique* explains that a tall poplar tree can serve as an effective radio antenna. A poplar tree can enable radio reception from the Eiffel Tower, which is located 300 km (186 mi) away.

Coustet E, Weiss EH (1924). La T.S.F. pratique, Telegraphie, Telephonie, Librairie Hachette.



64 LA T. S. F. PRATIQUE

Arbres antennes. — Un arbre élevé, un peuplier notamment, peut constituer une antenne assez efficace. Le poste est alors relié à un gros clou planté dans le tronc, vers le tiers de la hauteur de l'arbre. On peut réunir plusieurs arbres en parallèle (fig. 40) et entendre ainsi la tour Eiffel jusqu'à 300 kilomètres, avec un simple appareil à galène. La prise de terre est remplacée, en pareil cas, par un contrepoids ou compensateur, fil isolé reposant sur le sol, autour de l'arbre.

Fig. 40. — *Arbres antennes.*

In 1932, F. Ludwig and J. von Ries of the Engeried Clinic Laboratory in Bern discovered that soaking beans in water for a short time and then exposing them to the bipolar radiofrequency field of a Tesla coil for 25 or 240 seconds greatly inhibited their germination and growth.

Ludwig F, von Ries J (1934). Wachstumsvorgänge und Hochfrequenz (Versuche an Pflanzen und Tieren). Zeitschrift für Krebsforschung, *40.*
Krajevoij S J, (1936). Der Einfluss der Ultrakurzwellen auf Pflanzenchromosomen. Comt. rend. de l'acad. d. sciences de l'URSS, *2, 149.*

H. Köhler observed increased germination rates in experiments using shortwaves with wavelengths of 4 m (13 ft) and 6 m (20 ft) and an exposure time of 10 seconds.

Köhler H (1944). Untersuchungen über den Einfluss von Kurzwellen auf Keimfähigkeit und Wachstum von Pflanzen. Inaugural Dissertation, Ernst-Moritz-Arndt Universität Greifswald.

Research at the Institute for Forest Botany of the University of Freiburg

Around 1950, damage to forests was observed near radio transmitters and microwave radio relay links. In response, forest botanists **I. Brauer** and **C. Harte,** along with physicist **K. O. Kiepenheuer** – who was the director of the Fraunhofer Institute, later renamed the Kiepenheuer Institute for Solar Physics – studied the biological effects of ultrashort waves (with a wavelength of 1.5 m / 5 ft) on plants.

The researchers found that division growth in horse beans increased significantly at extremely low field strengths and decreased at stronger ones. Since there was no heating, the researchers discovered a non-thermal physiological effect at the lowest radiation intensities. The ability of extremely low field strengths to produce effects is significant.

Studies on the effects of ultrashort waves on meiosis in evening primrose pollen mother cells revealed that **low field strengths (1.5 V/m)** and **short exposure periods (15 minutes)** are potent mutagenic agents. These effects occurred well below current exposure limits.

Harte: **"The mutagenic effect of ultrashort waves continues to be of considerable significance because this radiation occurs naturally at intensities at which mutations are to be expected. These studies are significant given the increased use of very high frequencies (VHF) for radio and television broadcasts because plants near transmitters may sustain severe damage. This has already been observed in forests near directional antennas, known as radio corridors, and in the death of plants near TV towers."**

In 1972, Harte – who was a professor at the Institute for Developmental Physiology at the University of Cologne at the time – conducted field trials with evening primrose in collaboration with NDR, a public radio and television broadcaster for Northern Germany. The results confirmed the 1950 findings.

Kiepenheuer KO, Brauer I, Harte C, Botanisches Institut, Universität Freiburg (1949). Über die Wirkung von Meterwellen auf das Teilungswachstum der Pflanzen, Naturwissenschaften*, 36, 27–28.*

Brauer I (1950). Experimentelle Untersuchungen über die Wirkung von Meterwellen verschiedener Feldstärke auf das Teilungswachstum der Pflanzen. Chromosoma*, 3(1), 483–509. https://doi.org/10.1007/BF00319492*

Harte C, Botanisches Institut, Universität Freiburg (1950). Mutationsauslösung durch Ultrakurzwellen. Chromosoma*, 3, 440–447.*

Harte C (1972). Auslösung von Chromosomenmutationen durch Meterwellen in Pollenmutterzellen von Oenothera. Chromosoma *36, 329–337.*

Research by the Federal Biological Research Centre for Agriculture and Forestry (BBA), Braunschweig, and the National Research Center for the Environment and Health (GSF), Neuherberg

Dr. H. Bortels of the Institute for Bacteriology and Serology at the Federal Biological Research Center for Agriculture and Forestry in Braunschweig-Gliesmarode suspected **that natural atmospheric electricity influences the proliferation of bacteria and fungi** based on a large number of microbiological experiments.

Bortels H, Institut für Bakteriologie und Serologie der biologischen Bundesanstalt für Land- und Forstwirtschaft, Braunschweig-Gliesmarode (1951). Beziehungen zwischen Witterungsablauf, physikalisch-chemischen Reaktionen, biologischem Geschehen und Sonnenaktivität – Unter besonderer Berücksichtigung eigener mikrobiologischer Versuchsergebnisse. Naturwissenschaften*, 38, 165–176.*

Grundler, Society for Radiation and Environmental Research, Neuherberg, **Keilmann**, Max Planck Institute for Solid State Research, Stuttgart, and **Fröhlich**, Department of Physics, Liverpool, found frequency-dependent growth in yeasts.

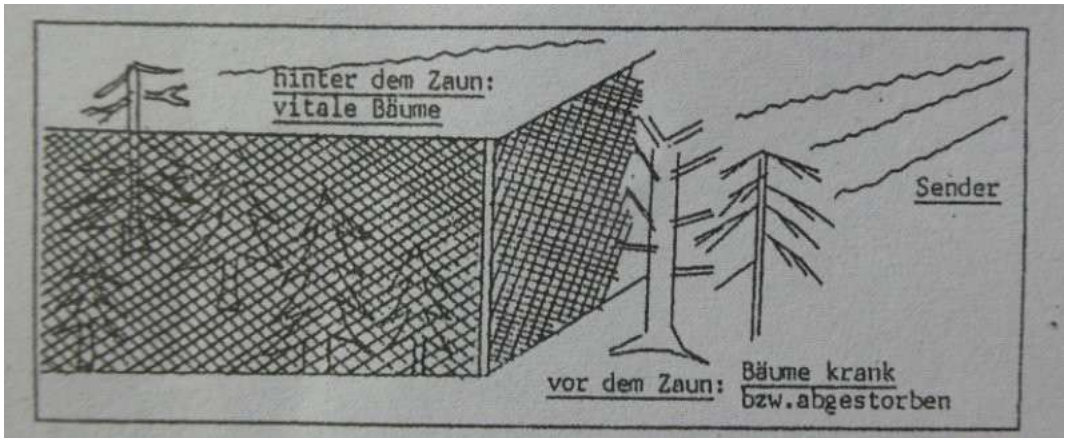
Grundler W, Keilmann F, Fröhlich H (1977). Resonant growth rate response of yeast cells irradiated by weak microwaves. Physics Letters A*, 62(6), 463–466.*

Observations of Tree and Forest Damage since 1980

Since 1980, people in various regions have observed tree damage near radar, microwave radio, radio and television transmitters: **Dipl.-Ing. K. Ermer from Bayreuth; Dipl.- Forstwirt C. Schulte-Uebbing from Munich; Dipl.-Ing. H. Hommel from Karlsruhe, Fraunhofer Institute ICT; Dipl. hort. Dr. phil. nat. A. Bernatzky, a garden architect from Frankfurt; G. Käs, a professor of electrical engineering and radar technology at the University of the German Armed Forces in Neubiberg; Dr.- Ing. W. Volkrodt, an electrical engineer and physicist from Neustadt/Saale.**
In 1980, **Ermer** observed that trees in the radio shadow of buildings and in gardens surrounded by metal fences were not damaged, unlike trees with a line of sight to transmitters. He also noted the development of clear corridors of forest damage along microwave radio relay links.
Schulte-Uebbing observed the difference between exposed and shielded trees at Munich-Riem Airport, among other places.

He presented his observations for discussion:
"Trees standing in the beam path of microwave transmitters become diseased and die from stress and resilience deficiency syndrome." If **a fine mesh wire fence** higher than the tree is present between the transmitter and the tree, the tree does not exhibit symptoms of stress. However, as soon as the tree grows above the fence, crown restructuring and needle drop begin, affecting the branches growing in the direction of the transmitter first.

Recommendation: Walk around the outer fence of an airport (e.g. Munich-Riem Airport).



Schulte-Uebbing, Illustration from “Stress- und Resistenzmangelsyndrom durch technische Mikrowellen?”

Bernatzky observed that the damage to the crown began on one side and noted the difference between the exposed trees and those shielded by buildings in his garden (see the illustration on page 11). There was a direct line of sight to a TV tower.

Bernatzky A (1985). Garten und Landschaft*, 7.*
Bernatzky A (1986). Elektromagnetischer Smog – Feind des Lebens. Naturarzt*, 11, 22–25.*

At the Fraunhofer Institute ICT in Pfinztal, **Hommel** conducted field strength measurements at high altitudes in Hagenschieß near Pforzheim and Mautzenberg/Bernstein near Rastatt. He also conducted conductivity measurements on pine needles. Based on the observed changes in conductivity as a function of frequency, field strength, and season, Hommel drew conclusions about electrical activity on membranes.
In December 1985, Hommel gave a lecture at the German Environment Agency (UBA) symposium titled “Neue Ursachen-Hypothesen” [New Causal Hypotheses]. In his lecture, he urgently called for measurements of field strength distribution in damaged areas, investigations of annual conductivity variation in conifers, and research into the effects of RF radiation on plant metabolism.

Professor Käs, University of the German Armed Forces in Neubiberg, was familiar with the research results from the United States and the Soviet Union. In a 1986 report, he wrote, "Research results that have become known in recent years show that biological systems are influenced by microwave radiation, such as that emitted by radar systems, even at very low levels. For example, calcium release from brain cells changes at a power density of only 10^{-9} mW/cm² [0.01 µW/m²]. Calcium ions play an essential role in controlling electrical pulses, which are important for transmitting information through the nervous system ..." Quoted from *Bernatzky (1994). Baumkunde und Baumpflege.*

Dr.-Ing. W. Volkrodt was an electrical engineer and physicist who served as the head of development at Siemens for many years. A versatile inventor, he held over 150 patents. His experience with ferromagnetic materials in his roles as head of the electronics and radio interference suppression laboratories led him to focus on radiofrequency radiation technology. His observation of stunted spruce trees in front of his house and healthy spruce trees behind it prompted years of intensive research. The damaged trees had a direct line of sight to the transmitters on Kreuzberg Mountain and Heidelstein Mountain in the Rhön Mountains. To investigate a potential link, Volkrodt traveled throughout Germany, documenting forest damage. Every area of forest damage he encountered was located within the radiofrequency field of radar, microwave radio, radio, or television transmitters. He suspected that the reception of radiofrequency electromagnetic fields through the antenna function of trees and their subsequent transmission to the roots affected the fine roots and the charge state of ions in the soil.

„Elektromagnetischer Smog"

BAYREUTH. – Mit seiner These „Die Fernsehwellen bringen unsere Bäume um" sorgte kürzlich Dr. phil. nat. Aloys Bernatzky aus Frankfurt für großes Aufsehen. Bernatzky ist kein Außenseiter mit entsprechendem Geltungsbedürfnis, sondern Mitglied der Deutschen Akademie für Städtebau und Landesplanung. Zuvor war er Bezirksbeauftragter für Naturschutz der Regierungsbezirke Wiesbaden und Darmstadt. Der Baumfachmann wurde im vergangenen Jahr von der Bonner Universität mit der Alexander-von-Humboldt-Medaille in Silber ausgezeichnet.

Bernatzky sowie andere Wissenschaftler haben kürzlich in einem Forschungsbericht dargelegt, daß sie Fernsehwellen, Radaranlagen, Satelliten und andere mikrowellenabstrahlende Geräte in Verdacht haben, entscheidende Ursache für das Baumsterben zu sein. Sie verweisen unter anderem auf ganze Schneisen von braunen Bäumen in Richtstrahlenbereichen von Fernsehumsetzern. In relativ sauberen und industriearmen Gebieten wie Harz, Rhön, Bayrischer Wald und Schwarzwald treten – so die Forscher – die größten Baumschäden auf, dort stehen allerdings auch überdurchschnittlich viele Radaranlagen, zivile Flugleitsysteme sowie militärische Sendeeinrichtungen, die Tag und Nacht Mikrowellen ausstrahlen.

Bernatzky zeigt in seinem Bericht die Verdichtung von Rundfunk- und Fernsehumsetzern auf und findet seine Theorie auch durch Beobachtungen im Ausland bestätigt. So färben sich rund um die riesigen Radaranlagen im nördlichen Kanada die Wälder trotz reiner Luft braun, und das Baumsterben in Skandinavien stimmt örtlich mit dem Strahlungsbereich der größten Radarstation auf der russischen Halbinsel überein. Nach Bernatzkys Aussagen gibt es in der Bundesrepublik jetzt 250 Fernseh-Großsender, 5500 kleinere Füllsender, 400 UKW-Sender, 80 Kurz-, Mittel- und Langwellen-Sender sowie 250 ausländische Sender.

Die Diplomingenieure H. Hommel, Mitarbeiter am Frauenhoferinstitut für Chemie in Pfinztal, und G. Käs, Professor für Elektrotechnik und Radar an der Hochschule der Bundeswehr Neubiberg, weisen in ihrem im Februar dieses Jahres veröffentlichten Forschungsbericht ebenfalls auf mögliche Zusammenhänge zwischen elektromagnetischen Strahlungen und dem Waldsterben hin. Ihrem Bericht liegen fundierte Messungen über Sendefrequenzen und Frequenzbereiche zugrunde, in der Elektronik spricht man dabei bereits von „elektromagnetischem Smog".

Die Wissenschaftler machen deutlich, daß „im Rätselwettsteit um den oder die dominierenden Streßfaktoren, die für das Waldsterben verantwortlich zu machen sind, der Einfluß elektromagnetischer Wellen auf Pflanzen weitestgehend unbeachtet geblieben ist, die Einwirkungsmöglichkeiten auf Pflanzen wurden bislang fast völlig ignoriert." Sie betrachten ihre Ergebnisse als einen Ansporn für weitere Untersuchungen und sehen darin zugleich den Beweis der Relevanz einer Einwirkung elektromagnetischer Wellen auf Pflanzen. Bislang allerdings wird eine Einwirkung auf Pflanzen immer noch bestritten und Forschungsvorhaben auf diesem Gebiet „mangels Relevanz" kaum gustiert. **pl.**

From *Frankenpost*, 4/5 MAY 1985, Waldsterben durch Mikrowellen, H.-J. Platthaus

Hommel H, Käs G (1985). Elektromagnetische Verträglichkeit des Biosystems Pflanze. **Allgemeine Forst- und Jagdzeitung,** ***156(8), 172–174.***

Hommel H (1985). Elektromagnetischer Smog – Schadfaktor und Stress? Frequenzganganalyse am Koniferen-Nadelkollektiv. Forstarchiv*, 56, 227.*

Homme, H (1987). Electromagnetic smog – a damage and stress factor? Bioelectrochemistry and Bioenergetics*, 17, 441–456.*

Volkrodt W (1988). Electromagnetic pollution of the environment. In Robert Krieps (Ed.), Environment and health: A holistic approach (pp. 71–76)*, Luxembourg Ministries of Environment and Health, the Commission of the European Communities and the World Health Organization.*

Maes W (1993). Waldsterben durch Fernsehsender? Wohnung und Gesundheit*, 69.*

“Electromagnetic Smog“

Bayreuth — Dr. phil. nat. Aloys Bernatzky of Frankfurt recently caused quite a stir with his latest thesis, "Television waves are killing our trees." Bernatzky is not an outsider seeking recognition; he is a member of the German Academy for Urban and Regional Planning. Previously, he served as the district commissioner for nature conservation in the administrative districts of Wiesbaden and Darmstadt. Last year, the tree expert received the Alexander von Humboldt Medal in Silver from the University of Bonn.

Bernatzky and other scientists recently published a research report suggesting that television waves, radar systems, satellites, and other microwave-emitting transmitters are the main cause of tree death. They point to entire swaths of brown trees in the beam path of television transmitters, among others. They claim that the greatest damage to trees occurs in relatively clean areas with little industry, such as the Harz Mountains, the Rhön Mountains, the Bavarian Forest, and the Black Forest. These areas also have an above-average number of radar installations, civil air traffic control systems, and military transmitters that emit microwaves day and night.

In his report, Bernatzky highlights the concentration of radio and television transmitters and finds his theory confirmed by observations abroad. For example, despite the clean air, the forests around the large radar installations in northern Canada are turning brown. In addition, the tree dieback in Scandinavia corresponds with the RF radiation range of the largest radar station on the Russian peninsula. Bernatzky reports that Germany now has 250 large television transmitters, 5,500 smaller fill-in transmitters, 400 FM transmitters, 80 shortwave, medium wave, and longwave transmitters, and 250 foreign transmitters. In a research report published in February of this year, H. Hommel, an engineer at the Fraunhofer Institute for Chemical Technology in Pfinztal, and G. Käs, a professor of electronic engineering and radar technology at the University of the Federal Armed Forces in Neubiberg, also point to possible links between electromagnetic radiation and forest dieback. Their report is based on well-founded measurements of operating frequencies and frequency ranges. In electronics, this phenomenon is already referred to as "electromagnetic smog."

The scientists emphasize that "in identifying the dominant stress factors responsible for forest dieback, the influence of electromagnetic waves on plants has largely been overlooked and their potential impact has been almost completely ignored." They regard their findings as an incentive for further research and as proof of the relevance of the impact of electro-magnetic waves on plants. However, their impact on plants is still disputed, and research projects in this field are not welcomed due to a "lack of relevance.“

H.-J. Platthaus

Frankenpost, May 4/5, 1985

This is the English translation of the German newspaper article found on page 272.

Experiments with Faraday Cages in the Bayreuth Area, on Wendelstein Mountain, and in the Nahe Hunsrück Region

In June 1984, Konrad **Ermer**, an engineer from Bayreuth, fenced in four damaged spruce trees with grounded wire mesh. **Two months after the experiment began, the yellow-brown needles of the fenced-in trees turned green again** (see the image on the right). A fifth spruce tree that was not fenced in was completely damaged. Ermer suspected that trees absorb radio waves and conduct them into the ground through their trunks and roots. This would destroy the fine roots.

He therefore conducted a second experiment. This time, he connected the trunk of an ailing birch tree to an iron rod to divert the radio waves before they could reach the roots. The birch tree then recovered.

Platthaus HJ (1985, May 4–5). Waldsterben durch Mikrowellen. Frankenpost.

Ermer K (1989). Waldsterben durch Elektrosmog.
https://www.youtube.com/watch?v=5xbDJNFxAjU

Figure 173: Spruce trees that were fenced in with wire mesh in 1984. Their needles have turned completely green again.
Photo: Ermer, from: Bernatzky (1994). Baumkunde und Baumpflege.

In May 1984, Dipl.- Forstw. Dipl.- Geol. **C. Schulte-Uebbing,** a forestry expert and geologist, shielded damaged spruce trees near the Wendelstein transmitter with a fine mesh wire fence. **Within six to eight weeks, 11 of the 15 spruce trees began to recover.** He recommended repeating the simple Faraday cage experiments in larger test areas. On the occasion of the 1985 symposium titled “Neue Ursachen-Hypothesen” [New Causal Hypotheses], organized by the German Environment Agency (UBA), Schulte-Uebbing published his experiments and working hypotheses about the pathophysiology of the phenomenon.

Schulte-Uebbing C (1982). Radaranlagen – Mögliche Ursachen des Waldsterbens?
Schulte-Uebbing C (1985, December 16–17). Pathophysiologische Arbeitshypothesen zum Waldsterben: Stress- und Resistenzmangelsyndrom durch technische Mikrowellen? [Symposium presentation]. German Environment Agency Symposium, Berlin, Germany.

Horst **Horne** repeated the experiments in Nockenthal, Nahe-Hunsrück region. He was also successful. The diseased trees recovered.

Knaudt K (1987, October 14). Töten Mikrowellen die Bäume? Nahe-Zeitung.

The recovery of the trees after shielding them from radiofrequency electromagnetic fields proved a causal connection.

Tree Damage Caused by Radar – Wasserkuppe in the Rhön Mountains and Würmberg in the Harz Mountains

In spring 1984, nearly all the spruce trees on Stirnberg Mountain in the Hessian Rhön Mountains **suddenly died despite the ideal, nutrient-rich basalt soil.** The forest manager could not explain what had happened. Volkrodt discovered that a new type of radar system had been installed on Wasserkuppe Mountain, about 5 km (3 mi) west of Stirnberg Mountain, at the end of 1983. Only the western side of Stirnberg Mountain was affected!

Image 10: This view from Stirnberg Mountain in the Rhön region looks west toward the Wasserkuppe radar domes, about 5 km (3 mi) away. Within a few months of the trial operation of the newly installed radar systems on Wasserkuppe Mountain in 1984, the Stirnberg forest was completely destroyed. Similar cases are already known to the military from Canada. Why won't they publicly admit their complicity in the forest dieback?

„Mit einem Schlag waren die Fichten tot"

Auch Buche und Eiche sind jetzt geschädigt / Nicht nur in der Rhön sterben die Wälder

EHRENBERG. Der 902 Meter hohe Stirnberg liegt auf der Grenze zwischen Hessischer und Bayrischer Rhön oberhalb der Gemeinde Ehrenberg-Wüstensachsen. Eine kalte, eine zugige Ecke. Bis vor wenigen Jahren war der Stirnberg bis hinauf zur Kuppe dicht bewaldet. Heute sind an seinem Südwesthang fast alle Fichten tot. Eine Öde mit kahlen, nackten Stämmen, mit nadellosen Zweigen. Nur ganz wenige der knapp 100 Jahre alten Bäume haben noch ein paar Nadeln. Der Bestand zeigt deutlich: Das Waldsterben ist in Hessen Realität.

Rudolf Maurer, Staatssekretär im Landwirtschafts- und Forstministerium bei Ministerin Irmgard Reichhardt, kennt ähnliche Bilder aus dem Riesengebirge. Bei einem privaten Besuch vor zwei Jahren besichtigte er die wüsten Gebirge. Wohin das Auge blickte, statt Wald nur Gras. „Dagegen ist das hier ein Klacks", sagte Maurer bei einer Ortsbesichtigung in der Rhön. Und doch: Ist der Stirnberg erst der Anfang eines flächenhaften Waldsterbens in der Republik?

Walter von Keudell, Forstamtsleiter von Hilders in der Rhön, erinnert sich an das Frühjahr 1984. „Mit einem Schlag", und das war das Alarmierende, starben fast alle Fichten auf diesem Hang ab." Die Bäume waren damals 96 Jahre alt. Von Altersschwäche konnte also keine Rede sein. Nur ganz wenige der Bäume überlebten. „Das zeigt uns, daß einzelne Bäume stärker sind als andere." Aber auch die „Rest-Fichten" sind mehr kahl als benadelt. Und: Von Keudell kennt noch mehr solcher Flächen in der Rhön. Nur am Stirnberg allerdings ist das Waldsterben derart plastisch zu besichtigen. Nur dort ließen die Waldarbeiter die toten Hölzer stehen.

Der Demonstrationswald bei Wüstensachsen ist knapp zehn Hektar groß. Dorthin führt von Keudell Besuchergruppen. Ende vergangener Woche besichtigten Forstministerin Reichhardt und ihr Staatssekretär die verwüsteten Flächen. Auf einem Waldrundflug mit dem Hubschrauber betrachteten die beiden Forstpolitiker die Schäden aus der Luft. Und zumindest für die Ministerin waren der Bericht der Forstbeamten und die Ortsbesichtigung in der Rhön überraschend: „Das war so nicht zu vermuten", sagte sie staunend.

Dabei stehen die Rhön-Fichten am Stirnberg auf durchaus idealem Waldboden. Es handelt sich um nährstoffhaltigen Basalt, auch der Säurewert ist nach Meinung der Fachleute in Ordnung, es liegt keine Übersäuerung vor. Vom Boden also kommt es nicht, daß binnen weniger Monate die Fichten ihre letzten Nadeln fallen ließen.

Das eigentlich Überraschende für den Forstamtsleiter war, mit welchem Tempo in diesem Fall der Bestand geliefert worden war. Noch Monate zuvor, im Herbst 1983, hatten die Förster geglaubt, sich um diesen Bestand gar nicht groß kümmern zu müssen. „Wir waren überzeugt, daß wir keine Probleme bekämen." Mittlerweile aber ist der Stirnberg längst kein Einzelfall mehr.

STEPHAN BÖRNECKE

From *Frankfurter Rundschau*, July 20, 1987, by Stephan Börnecke

In the mid-1990s, the radar installations on Wasserkuppe Mountain were dismantled. In the years that followed, the forest on Stirnberg Mountain grew back.

Würmberg Mountain in the Harz Mountains

Image 11: Würmberg Mountain is the highest point on the West German side of the Harz Mountains. It is within sight of Brocken Mountain, which is slightly higher and located in East Germany. Both peaks are topped by military radio installations that have destroyed the forest. In the event of war, the two sides could destroy each other in minutes. Even the military itself does not know what purpose such installations would serve in a war.

Photos and captions by W. Volkrodt

"The spruce trees died all at once.“

Now, the beech and oak trees are damaged, too. It's not just the forests of the Rhön Mountains that are dying.

EHRENBERG. Stirnberg Mountain is 902 m (2,959 ft) high and lies on the border between the Hessian and Bavarian regions of the Rhön Mountains, above the municipality of Ehrenberg-Wüstensachsen. It is a cold, drafty place. Until a few years ago, the Stirnberg Mountain was densely forested all the way up to the summit. Today, nearly all of the spruce trees on its southwestern slope are dead. The area has become a wasteland of bare trunks and branches without needles. Only a few of the nearly 100-year-old trees still have needles. This forest clearly demonstrates that forest dieback is a reality in Hesse.

State Secretary Rudolf Maurer of the Ministry of Agriculture and Forestry, under Minister Irmgard Reichardt, witnessed similar scenes in the Giant Mountains of the Czech Republic. During a private visit two years ago, he toured the deserted mountains. As far as the eye could see, there was only grass, no forest. "Compared to that, this is a piece of cake," Maurer said during a site visit in the Rhön Mountains. Nevertheless, is Stirnberg Mountain just the beginning of widespread forest dieback in Germany?

Walter von Keudell, the head of the Hilders forestry office in the Rhön Mountains, remembers the spring of 1984. "In one fell swoop," he said, "almost all the spruce trees on this slope died." The trees were 96 years old at the time. So old age was not the cause. Only a few trees survived. "This shows us that some trees are stronger than others." However, even the surviving spruce trees have fewer needles. And: Von Keudell knows of more areas like this in the Rhön Mountains. The forest dieback is most clearly visible on Stirnberg Mountain, though. There, the forest workers left the dead wood standing.

The demonstration forest near Wüsten-sachsen covers almost ten hectares. Von Keudell takes groups of visitors there. Last week, Forestry Minister Reichhardt and her state secretary visited the devastated areas. During a helicopter tour, the two officials viewed the damage from above. For the minister, at least, the report from the forestry officials and the site visit in the Rhön Mountains were surprising. "That was not to be expected," she said in amazement.

The spruce trees on Stirnberg Mountain in the Rhön Mountains grow in ideal forest soil. It is nutrient-rich basalt, and experts believe the acidity level is appropriate and not overly acidic. Therefore, the soil is not the reason the spruce trees dropped their needles within a few months.

The forest manager was surprised by how quickly the stand of trees died. Just months earlier, in fall 1983, the foresters believed they wouldn't have to worry about this stand. "We were convinced that we would have no problems." In the meantime, however, Stirnberg Mountain is no longer an isolated case. *Stephan Börnecke*

Frankfurter Rundschau, July 20, 1987

This is the English translation of the German newspaper article found on page 274.

Tree Damage Caused by Microwave Radio

Source: *Bernatzky (1994). Baumkunde und Baumpflege.*

Figure 178: Cleared corridor due to directional electromagnetic waves from microwave radio, television, and radar transmitters (Photo by Ermer)

In schnurgerader Linie

Wanderer von „Waldblößen" durch Mikrowellen beeindruckt

KREIS BIRKENFELD. Das Ausmaß vermutlicher Richtfunkschäden führte der LUB-Kreisverband bei einer Waldbegehung auch an Ort und Stelle vor. Die Wanderung, an der etwa 20 Interessenten teilnahmen, war als Ergänzung zu Dieter Mays Dia-Vortrag über „Waldschäden durch Mikrowellen" gedacht.

Der Weg führte entlang eines Abschnitts der Richtfunkstrecke Ellerspring/Kahlheid von der Asbacher Hütte durch den Mörschieder und Kempfelder Wald nach Kempfeld. Fichten-Windwurfflächen und abgestorbener Laubholzbestand waren zu sehen. Etwa parallel zur Trasse der Post läuft eine zweite Schadens-Trasse von der Hellheck im Idarbachtal über die Steinbachtalsperre bis zum Schmelzer Berg an der Asbacher Hütte, berichtete May. Sie [illegible]zist in schnurgerader Linie zum Teil recht große Windwurfflächen auf, die auf der direkten Verbindungslinie zwischen zwei Nato-Richtfunkstationen liegen. Die Exkursionsteilnehmer waren beeindruckt von der Größe der „Waldblößen", die sich da in den letzten Jahren aufgetan haben.

An zahlreichen Einzelbeispielen erläuterte May die typischen Merkmale von Mikrowellenschäden: starke Kronenverlichtungen, abgestorbene Wipfel und Senkwurzeln, letztere besonders bei Altbeständen in Höhenlagen. Die wurzelgeschädigten Bäume, in erster Linie Fichten, aber zunehmend auch Buchen und Eichen, fielen dann leicht den Winterstürmen zum Opfer, berichtete May. Dabei entstünden meist Doppelschneisen, in denen zunächst eine schmale Baumreihe stehen bliebe. Im Laufe der Jahre erweitern sich die Schneisen bis zu einer Breite von 300 Metern. Schadensflächen wie bei Kempfeld, so May, seien auch bei Dambach, Hattgenstein, Hüttgeswasen, Frauenberg, Hottenbach, Weitersbach-Krummenau und Berschweiler sowie im Soonwald kartiert und festgestellt.

Nahe-Ztg. 22.10.87

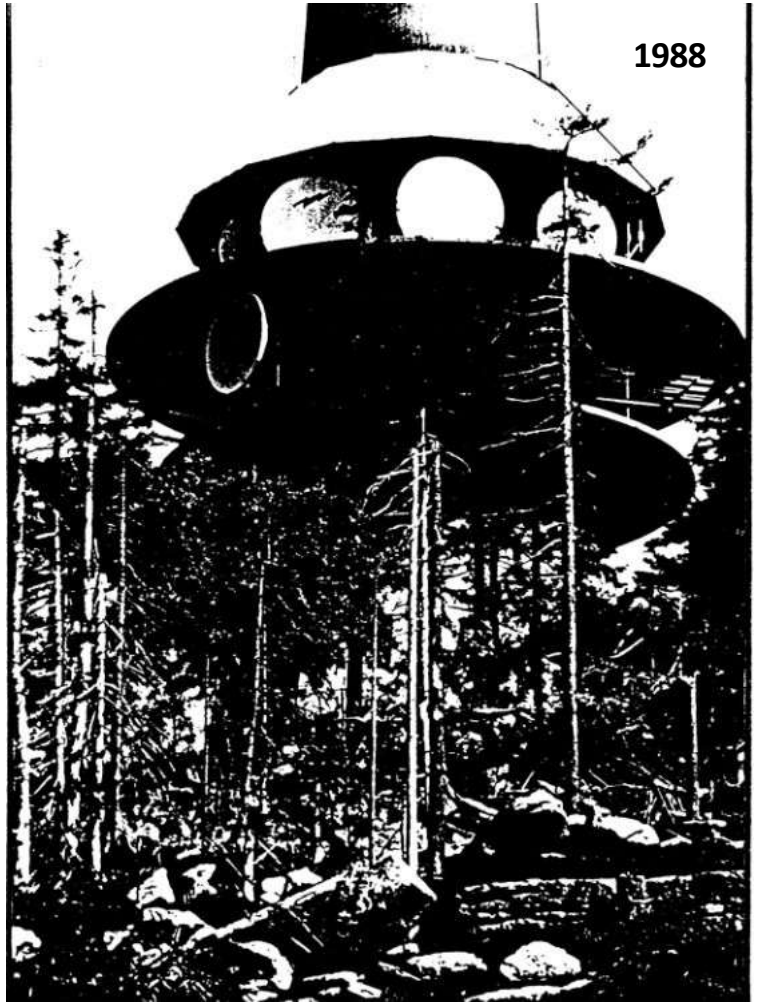


Photo and text by W. Volkrodt

Image 2: Microwave radio antennas at the Ochsenkopf Tower in the Fichtel Mountains. These antennas transmit audio and video for radio and television stations, among others. The forest is dead in the immediate vicinity of the antenna dish. Has no one noticed the connection between "new types of forest damage" and the nearby transmitters? Or are those "in the know" sworn to silence?

Around 1990, **Dipl.-Ing. F. Mayerhofer** documented forest damage along the microwave radio relay links of the Ochsenkopf, Oschenberg, and Tannfeld transmitters. In the fifth edition of his textbook *Baumkunde und Baumpflege* [Tree Ecology and Preservation], **Bernatzky** added a chapter on the electromagnetic spectrum, the propagation characteristics of microwave radio, current research reports, shielding experiments, and documented radio corridors from Ermer. *Bernatzky A (1994). Baumkunde und Baumpflege.* Bernhard Thalacker Verlag Braunschweig.

Hikers Impressed by Microwave-Induced "Forest Clearings"

Birkenfeld District. During an on-site forest inspection, the LUB party district association showed the extent of the suspected microwave damage. Around 20 interested individuals participated in the hike, which served as a supplement to Dieter May's slide presentation titled “Forest Damage Caused by Microwaves.”

The route led along a section of the Ellerspring/Kahlheid microwave radio relay link from Asbacher Hütte through the Mörschieder and Kempfelder forests to Kempfeld. They saw areas of windthrown spruce trees and dead deciduous trees. May reported that a second damaged area runs roughly parallel to the postal route from Hellbeck through the Idarbachtal Valley and past the Steinbach Dam, to Schmelzer Mountain at Asbacher Hütte. This area has large swaths of windthrow in a straight line and lies directly between two NATO microwave radio transmitters. Participants were impressed by the size of the "forest clearings" that have opened up there in recent years.

May provided numerous examples to illustrate the characteristics of microwave damage, including severe crown thinning, dead treetops, and sunken roots, particularly in old stands at high altitudes. According to May, trees with damaged roots, primarily spruce trees but increasingly beech and oak trees as well, easily fell victim to winter storms. This usually results in double aisles where initially a narrow row of trees remains standing. Over the years, these aisles have widened to 300 m (984 ft). Similar areas of damage to those in Kempfeld were mapped and identified in Dambach, Hattgenstein, Hüttgeswasen, Frauenberg, Hottenbach, Weitersbach-Krummenau, and Bersch-weiler, as well as in the Soonwald Forest.

Nahe Newspaper, October 22, 1987

This is the English translation of the German newspaper article found on page 275.

On **March 30, 1987,** the Federal Minister of Post and Telecommunications requested research on the following topic: "How do the power, frequency, modulation type, and pulse rate of modulated microwave radiation affect exposed tissue and plant cells?“

In **October 1989**, Volkrodt presented a poster titled "Forest Damage Caused by Microwave Radio and Radar" at the **International Congress on Forest Damage Research.** The poster showed the devastating consequences in the Ochsenkopf and Schneeberg (Fichtel Mountains), Wasserkuppe and Stirnberg (Rhön Mountains), and Würmberg (Harz Mountains) areas, as well as the dense network of microwave radio relay links in the Düsseldorf administrative district. Volkrodt traced the development of microwave radio, included quotes from Prof. Bernhardt of Neuherberg, and provided statistics on the increase in hospital cases between 1975 and 1985.
Volkrodt then sent his **inventory of 32 radiofrequency transmitters, along with the question, "Where is the worst forest damage?"** to ministries, universities, and the Petitions Committee of the German Bundestag. He stated, "The fact that forest damage is more prevalent in the vicinity of microwave radio and radar installations only became clear during the 6,000-km-long excursions. Such installations are usually not marked on maps. However, due to their exposed location, they can usually be seen while driving on the road. What can be found in places where our forests are most severely damaged? Are there any clues as to the causes?“
Volkrodt W (1989). Bestandsaufnahme an 32 Hochfrequenzsendern [Inventory of 32 Radiofrequency Transmitters].
https://www.diagnose-funk.org/download.php?field=filename&id=1369&class=NewsDownload

In 1989, the Deutsche Bundespost (DBP), Germany's federal postal and telecommunications service, **issued a research contract.**

On May 10, 1990, the Nuremberg headquarters informed Volkrodt: "The DBP-TELEKOM is addressing the potential environmental impact of electromagnetic waves, particularly on forests. **Therefore, last year, the Deutsche Bundespost commissioned the Hessian Forest Research Institute in Hannoversch Münden to investigate the effects of directional microwave radio relay links on forest stands. Unfortunately, the results are not yet available.“**

However, in 1990, the Federal Minister of Research and Technology rejected to launch an investigation.

Dear Dr. Volkrodt,

Thank you for your letter to Minister Dr. Riesenhuber dated January 21, 1990.

Even after your last letter, the Federal Minister of Research and Technology sees no reason to launch a large-scale research program on the effects of non-ionizing radiation on our forests. Neither Professor Hövermann nor Professor Ulrich have approached us with any such proposals to date.

On February 28, 1990, Federal Minister of Research and Technology Dr. Riesenhuber rejected the investigation. This, coupled with the lack of interest from forestry scientists, meant the end for further research.

Statement from the German Commission on Radiological Protection (SSK): "Radiofrequency radiation from microwave, radio, and radar installations does not cause forest damage.“ 1990

On September 27, 1990, the SSK released the statement “Richtfunk- und Radarwellen rufen keine Waldschäden hervor” [Radiofrequency radiation from microwave radio and radar installations does not cause forest damage] without conducting any studies on forest damage in areas influenced by radiofrequency transmitters in Germany. The SSK referenced studies by Joos, Masumy, Schweingruber, and Stäger in the statement. However, these Swiss studies did not address microwave radio or radar transmitters. The authors investigated low-exposure forest areas within the range of radio and television transmitters. The power density level in sample areas B, exposed to the Bantiger transmitter, was 30 µW/m². In sample areas A, which were shielded, the power density level was between one-hundredth and one-thousandth of 30 µW/m².

Strahlenschutzkommission (1990). Richtfunk- und Radarwellen rufen keine Waldschschäden hervor. Published in BAnz No. 1 from January 3, 1991. https://ssk.de/fileadmin/documents/en/1990/Richtfunk_und_Waldschaeden.pdf (without references included in the original document)
Joos K, Masumy S, Schweingruber FH, Staeger C (1988). Untersuchung über mögliche Einflüsse hochfrequenter elektrischer Wellen auf den Wald. Technische Mitteilungen PTT*, 66(1), 1–23.*
Staeger C (1989). Felduntersuchung über eventuelle Schadenwirkungen von Mikrowellen auf den Wald. Technische Mitteilungen PTT, *67 , 517–526.*

Workshop on "Mechanisms of Electromagnetic Interaction with Cellular Systems," 1991

The workshop, **sponsored by the German Research Foundation (DFG)**, took place in September 1991 at the Max Planck Institute for Solid State Research in Stuttgart. The results to date were published by W. Grundler (GSF Research Center for Environment and Health, Neuherberg), F. Kaiser (Institute for Applied Physics, Technical University, Darmstadt), F. Keilmann (Max Planck Institute for Solid State Research, Stuttgart), and J. Walleczek (Research Service, Jerry L. Pettis Memorial Veterans Hospital, Loma Linda, CA 92357, USA).
The introduction states: "**We emphasize that, in certain situations, non-thermal interactions occur between electromagnetic fields and cellular systems."**

Grundler W, Kaiser F, Keilmann F, Walleczek J (1992). Mechanisms of Electromagnetic Interaction with Cellular Systems. Naturwissenschaften*, 79(12), 551–559.*

Petition by Communications Engineer Dipl.-Ing. H. Seidel, 1992

Dipl.-Ing. H. Seidel, a communications engineer from Munich, was aware of the damage to trees, as well as the health problems suffered by his colleagues, including headaches, insomnia, eye problems, psychological changes, and tumors. A striking number of his colleagues who had worked on microwave transmitters died before reaching retirement age. Therefore, on November 11, 1992, Seidel submitted a petition regarding electrosmog to the Bavarian Parliament. In it, **he requested an analysis of the illnesses and causes of death of the specialist group "Sendertechnisches Personal”** [Transmitter Technical Personnel] **since 1960, university research into the long-term effects, training for doctors and lawyers on radiofrequency illnesses, the hiring of independent occupational health experts, and a reduction in exposure limits.**
On January 17, 1994, the Bavarian Parliament rejected the petition after consulting with the Federal Office for Radiation Protection.
https://www.funkfrei.net/berichte/seidel.htm

The installation of the D and E mobile phone networks (900 MHz and 1800 MHz, respectively) began in Germany in 1992. People have fallen ill at locations and times when mobile phone stations were put into operation.

120 m / 400 ft

In August **1993**, **Dr. Josef Schildt** observed crown damage developing on one side of a maple tree at Postweg 40 in Kaarst-Büttgen. A mobile phone base station had been installed on the Küppers silo tower 120 m (400 ft) away. The tree was cut down that winter.

Wolfgang Maes, a journalist and building biology expert, observed that the leaves and needles of trees on wooded hills facing microwave radio, television, and military transmitters turned brown in several locations in Germany, northern Italy, and Switzerland.
Maes W (1993). Waldsterben durch Fernsehsender? Wohnung und Gesundheit*, 69.*
Maes W (2013). Stress durch Strom und Strahlung. Institut für Baubiologie + Ökologie Neubeuren.
Dr. H.U. Hertel and **Hans-U. Jakob** observed and documented forest damage in **Switzerland.**
In the **1994 Forest Damage Report from Bavaria**, the authors admit their helplessness regarding the damage to oak trees: "Yet, only about 10% of the lost foliage can be attributed to pest damage." The foliage of unaffected oak trees has also significantly deteriorated.
Despite their broad ecological amplitude, the poor performance of oak trees remains unexplained.

Investigations at the Skrunda radar station in Latvia contradict the statement made by the German Commission on Radiological Protection (SSK) in 1990.

In **1996**, **Balodis et al.** demonstrated that the growth of pine trees had been stunted since the Skrunda radar station became operational in 1970. The researchers analyzed tree growth retrospectively in 29 areas based on growth rings from 1959 to 1988. **Pine tree growth was inhibited in all exposed areas.** This effect began after 1970 when the Skrunda radar station started operating and continued throughout the subsequent study period. Numerous environmental and anthropogenic factors were considered, but none had a significant impact on tree growth.

Fewer than half of the seeds from the exposed pine trees germinated. Around the Skrunda radar station, **Selga** found radiation-induced cell dysfunction and non-specific stress reactions, which led to accelerated resin production and aging of the pine trees, among other things.

Balodis V, Brumelis G, Kalviskis K, Nikodemus O, Tjarve D, Znotina V(1996). Does the Skrunda Radio Location Station diminish the radial growth of pine trees? Science of the Total Environment, *180(1), 57–64.*
Selga T, Selga M (1996). Response of pinus sylvestris L. needles to electromagnetic fields. Cytological and ultrastructural aspects. Science of the Total Environment, *180(1), 65–73.*
Kalnins T, Krizbergs R, Romancuks A (1996). Measurement of the intensity of electromagnetic radiation from the Skrunda radio location station, Latvia. Science of the Total Environment*, 180(1), 51–56.*

Schmutz et al. studied four-year-old spruce trees and three-year-old beech trees for three and a half years while exposing them to a frequency of 2450 MHz (**not pulsed**) and a power density ranging from 0.007 to 300 W/m² (7,000 to 300,000,000 µW/m²). Despite significant differences in chlorophyll concentration in some cases, they found no visible damage, effect on crown thinning, or impact on photosynthetic functionality. However, calcium and sulfur concentrations in the beech trees decreased significantly during the first two years as power density levels increased. In the third year, calcium concentrations did not differ significantly between exposure groups, though they continued to decrease in absolute terms compared to previous years. The sulfur concentration decreased in all three years with increasing power density levels.
In their 1996 publication, Schmutz et al. concluded that a risk assessment would only be possible after further research.
Schmutz P, Siegenthaler J, Staeger C, Tarjan D, Bucher JB (1996). Long-term exposure of young spruce and beech trees to 2450-MHz microwave radiation. Science of the Total Environment, *180(1), 43–48.*

On January 1, 1997, the Federal Pollution Control Ordinance (26th BImSchV) established legal exposure limits in Germany. However, scientific studies on the effects of electromagnetic fields on plants were not taken into account.

Urgent Call for Research Projects in 1999

At the 1999 conference titled "Effects of Electromagnetic Fields on the Living Environment," which was convened by the WHO, ICNIRP, and Federal Office for Radiation Protection, there was an urgent call for research projects: “By comparison, influences of these fields on plants, animals, birds and other living organisms have not been properly examined. Given that any adverse impacts on the environment will ultimately affect human life, it is difficult to understand why more work has not been done. There are many questions that need to be raised: ... it seems that research should focus on the long-term, low level EMF exposure for which almost no information is available. ... **Specific topics that need to be addressed include: ... EMF influences on agricultural plants and trees.”** (Quote from Conference Proceedings)
Matthes R, Bernhardt JH, Repacholi MH (2000, October 4–5). Effects of electromagnetic fields on the living environment. Proceedings of the International Seminar on Effects of Electromagnetic Fields on the Living Environment*, Munich, Germany, International Commission on Non-Ionizing Radiation Protection (ICNIRP).*

However, the Federal Office for Radiation Protection did not commission any projects of this kind.

Between 1999 and 2001, the Ministry of Science in North Rhine-Westphalia (NRW) funded **studies on the effects of 383 MHz (the TETRA signal**, later used for BOS digital radio). Scientists from the universities of Wuppertal and Karlsruhe examined 451 one-year-old seedlings of three conifer species. From October 1999 to May 2000, the plants were exposed to a pulsed 383 MHz frequency (equivalent to the TETRA signal). The plants were watered as needed. Accelerated growth and a reduction in the chlorophyll a/b ratio were observed in Pinus pumila. **The number of dead plants was significantly higher in the exposed groups of all three species of conifers**. A summary was published in 2000. **Despite repeated requests, the complete study and a second study from 2001, which also found effects on conifer seedlings, have not been published to date.** The announced studies to verify the results were not carried out. However, a nationwide network of TETRA base stations was set up for BOS digital radio (for authorities and organizations with safety- and security-related tasks).

Lerchl D, Lerchl A, Hantsch P, Bitz A, Streckert J, Hansen V (2000, June 11–16). Studies on the effects of radio-frequency fields on conifers. Brief Announcement at the Bioelectromagnetics Society (BEMS) Annual Meeting in Munich, Germany. https://www.emfdata.org/de/studien/detail?id=88
https://de.scribd.com/doc/35928188/Studies-on-the-effects-of-radio-frequency-fields-on-conifers

Starting in **2000**, Spanish biologist **A. Balmori** observed changes in trees in Valladolid, Spain, that were within the radiofrequency field of mobile phone base stations. He reviewed existing studies on the subject.

Balmori A (2003). The effects of microwaves on the trees and other plants.
https://ehtrust.org/wp-content/uploads/THE-EFFECTS-OF-MICROWAVES-ON-THE-TREES-AND-OTHER-PLANTS-2003.pdf
Balmori A (2004). ¿Pueden afectar las microondas pulsadas emitidas por las antenas de telefonía a los árboles y otros vegetales? Ecosistemas, *13(3), 79–87.*

In 2001, **Dr. Götz, Prof. Dr. Matyssek, and Prof. Dr. Käs** published a study **on three partially shielded 18-year-old trees** (two spruce trees and one European beech tree). The trees were **exposed to a radar detection system** (frequency: 9.4 GHz; pulse repetition frequency: 920 Hz; pulse duration: 0.5 µs; pulse power: 30 kW) **from May to August for three years.** The researchers found no effects on the three test trees when exposed to this radar system. **However, this result could not answer the question, "Does year-round exposure to GSM 900 MHz, GSM 1800 MHz, and the upcoming UMTS 2000 MHz affect trees?"**

Götz G, Matyssek R, Käs G (2001). Fichte und Buche unter dem Einfluss von Radarbestrahlung. Allgemeine Forst- und Jagdzeitung*, 172(4), 74–78.*

Starting in 2003, UMTS was installed as the third generation of mobile phone networks.

In 2004, reports of unexplained tree damage spread rapidly throughout Europe: crown thinning, leaf browning, premature leaf drop, bulges on the trunk, rapid horizontal growth, tearing and flaking of the bark, and the severe spread of fungi, lichens, and mosses. Changes in fructification were also observed, and in some cases, the fruit had a reduced shelf-life.

Niek van't Wout, from the parks department in Alphen aan den Rijn, the Netherlands, was extremely concerned about the large number of new cases of trunk and crown damage. He documented the damage and asked scientists at Wageningen University to conduct studies.

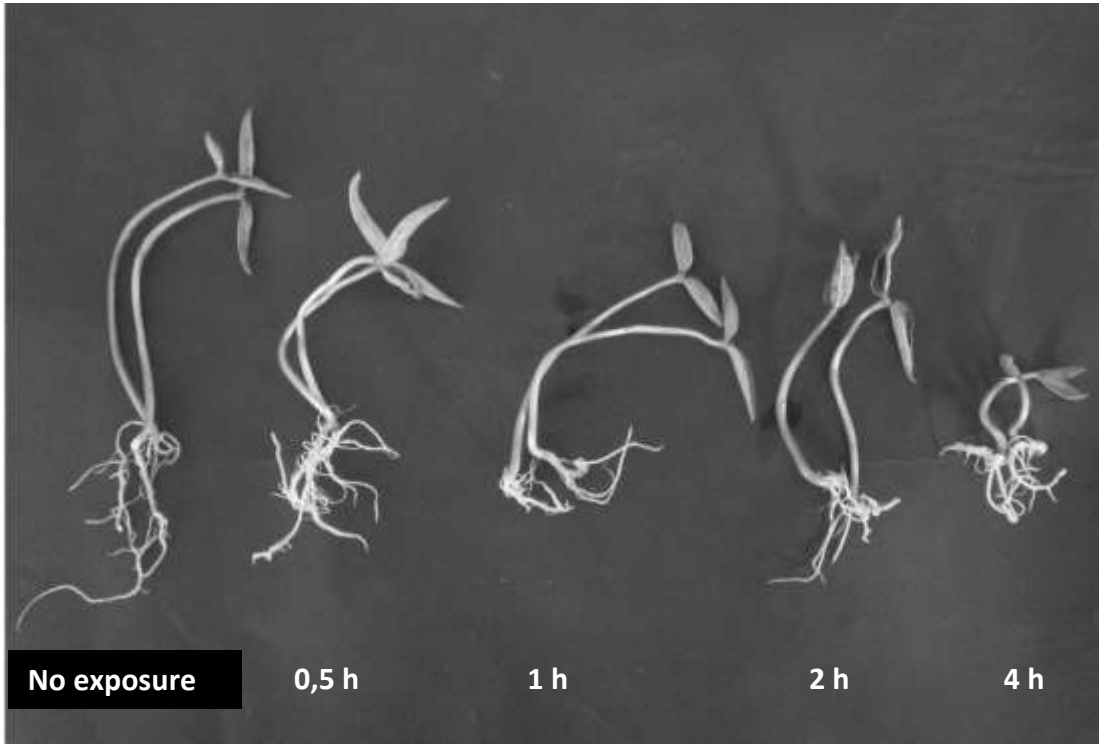
Van't Wout N (2006). Unknown tree damage: bulbs, burst, coloring, leaf reduction.
Van Lammeren A (Laboratory of Plant Cell Biology at Wageningen University), van Kuik F (Laboratory of Crop Protection at Wageningen University) (2007). Phloem nodes deface trees and shrubs in urban environments. https://www.youtube.com/watch?v=KPLh_VWj80k

Laboratory Studies since 2004

Since 2004, laboratory studies have examined the effects of radiofrequency electromagnetic fields, such as those used in mobile phone networks, on plants. Research groups from France, the Netherlands, India, Greece, and other countries have conducted these experiments. These studies, numbering over 200, have revealed effects on germination, development, root and shoot growth, morphology, cell membranes, and cell metabolism. Many different plant species have been studied. Elevated levels of reactive oxygen species (ROS), which can damage cell membranes or DNA, were often observed. This is a sign of oxidative stress. The observed and measured effects varied depending on frequency, pulse sequence, modulation, polarization, exposure duration, field strength, and plant species. These effects occurred below current exposure limits. A summary of 17 plant studies can be found at EMF:data: *https://www.emfdata.org/de/studienueberblick*.

Seven examples of laboratory studies

1 In 2010, Sharma, Singh, Batish, and Kohli from India published a study titled "Cell Phone Radiations Affect Early Growth of Vigna Radiata (Mung Bean) Through Biochemical Alterations." The study examined the effects of mobile phones on the germination and growth of mung beans, as well as the concentration of proteins, carbohydrates, and enzymes. After exposure times of 0.5, 1, 2, and 4 hours, the length and dry weight of the seedlings decreased. In addition, the concentration of proteins and carbohydrates decreased. Alpha-amylase, beta-amylase, polyphenol oxidase, and peroxidase enzyme activities increased in the exposed seed roots. These enzymes counteract oxidative stress.



The effect of a mobile phone on seedling growth in mung beans

Sharma VP, Singh HP, Batish DR, Kohli RK (2010). Cell phone radiations affect early growth of Vigna radiata (mung bean) through biochemical alterations. Zeitschrift für Naturforschung C*, 65(1–2), 66–72.*

2 Botanists and biophysicists Stefi, Margaritis, and Christodulakis of the University of Athens in Greece investigated the effects of a DECT base station on the model plant Arabidopsis thaliana. The researchers exposed the young plants continuously to a DECT base station operating in pulsed transmission mode at 1882 MHz for two, three, or four weeks. The maximum measured field strength was 27.46 V/m (ca. 2,000,000 $\mu W/m^2$), with an average of 2.072 V/m (ca. 11,400 $\mu W/m^2$). The control group was not exposed. After two, three, and four weeks, biomass production was significantly reduced in the exposed group. There were fewer leaves, and the leaves were smaller and thinner. The mesophyll tissue was disturbed. The number of chloroplasts in the mesophyll cells decreased, and the cells contained fewer photosynthetic pigments.
Stefi AL, Margaritis LH, Christodoulakis NS (2016). The effect of the non ionizing radiation on cultivated plants of Arabidopsis thaliana (Col.). Flora*, 223, 114–120.*

3 The Greek scientists exposed cotton plants to a DECT base station for three weeks. Fewer seeds germinated in the exposed group. Growth was delayed, with fewer and smaller leaves. Biomass decreased. The content of photosynthetic pigments decreased. The structure of the chloroplasts was significantly altered.
Stefi AL, Margaritis LH, Christodoulakis NS (2017). The effect of the non ionizing radiation on exposed, laboratory cultivated upland cotton (Gossypium hirsutum L.) plants. Flora*, 226, 55–64.*

4 Another study by Stefi et al. was published in 2017. Aleppo pine seedlings were exposed to a DECT base station for 50 days. Compared to the low (but not zero) exposure controls, the exposed plants showed reduced growth, reduced fresh weight and dry weight (root and shoot), reduced pigments for photosynthesis, and increased levels of reactive oxygen species. Many cells of the exposed plants had deformed chloroplasts.
Stefi AL, Margaritis LH, Christodoulakis NS (2017). The aftermath of long-term exposure to non-ionizing radiation on laboratory cultivated pine plants (Pinus halepensis M.). Flora*, 234, 173–186.*

5 From 2010 to 2012, electrical engineers at Wageningen University in the Netherlands measured the electrical potential of three ash trees and one chestnut tree, both with and without radiofrequency exposure, at the request of the municipality of Alphen aan den Rijn. The electromagnetic radiofrequency fields altered the trees' natural electrical potential.

6 Scientists from Darmstadt University and the Forschungsring – N. T. Tran, L. Jokic, J. Keller, J. U. Geier, and R. Kaldenhoff – investigated the effects of 1800 to 1900 MHz (DECT) and 2.4 and 5 GHz (WLAN) frequencies on lettuce plants that had been exposed and grown in greenhouses and outdoors. The exposed lettuce plants grown in the open field showed a significant decrease in photosynthetic performance and accelerated flowering compared to the control plants. Analysis of protein biosynthesis revealed a significant decrease in two stress-related enzymes, violaxanthin epoxidase (VDE) and zeaxanthin epoxidase (ZEP), after exposure. When these enzymes are present in lower concentrations, the plant is more susceptible to stress. Light stress significantly accelerated the decline in photosynthesis compared to the controls. Had these experiments been conducted only in the greenhouse, the significant differences between the exposed and non-exposed control plants would not have been detected. These results demonstrate the need for future studies under real exposure conditions. The authors: “the potential interaction between RF-EMF and other stressors requires further, more thorough investigation. Such connections, if verified, would have major consequences. We could expect in the near future both, the massively increased applications of wireless devices as well as a significant upsurge in weather extremes and insect outbreaks because of climate change. These two factors and their interconnections might have significant impacts for plants and endanger both our food security and the stability of our ecosystems.”
Tran NT, Jokic L, Keller J, Geier JU, Kaldenhoff R (2023). Impacts of radio-frequency electromagnetic field (RF-EMF) on lettuce (Lactuca sativa) – evidence for RF-EMF interference with plant stress responses. Plants, *12(5), 1082. https://doi.org/10.3390/plants12051082*

7 In 2024, Sharma et al. published a field study. The researchers exposed onion bulbs for seven days at five locations near mobile phone base stations operating at 800, 1800, and 2300 MHz with different power densities ranging from 10,500 µW/m² to 129,000 µW/m². The power density at the control site was 0 µW/m². The researchers examined root length, fresh weight, dry weight, relative water content, the concentration of antioxidant enzymes and proteins, and chromosomes in root tip cells. They observed significant changes in morphology and in the concentration of antioxidant enzymes and proteins. Genotoxicity studies showed that RF radiation exposure caused high levels of damage to root tip cells.
Sharma A, Sharma S, Bahel S, Katnoria JK (2024). A study on effects of cell phone tower – emitted non-ionizing radiations in an Allium cepa test system. Environmental Monitoring and Assessment*, 196(3), 261.* https://doi.org/10.1007/s10661-024-12435-2

Observations Presented at a Technical Discussion of the Federal Office for Radiation Protection (BfS) in August 2006 – BfS Takes No Action

On August 2, 2006, Dr.-Ing. Dipl.-Phys. Volker Schorpp presented observations at a technical discussion held by the German Federal Office for Radiation Protection (BfS) in Oberschleißheim/Neuherberg. The shown examples indicated a causal link between damage to trees and forests and chronic radiofrequency exposure from sources such as mobile phone base stations, radar, microwave radio, radio and television transmitters.
http://www.puls-schlag.org/download/Schorpp-BfS-02-08-2006.pdf

Federal Office for Radiation Protection (BfS) in 2007: Possible Effects of Radiofrequency Fields on Plants Are Not a Priority

On November 13, 2007, in response to an inquiry, Dr. A. Dehos at the BfS stated: “There is currently no clear scientific evidence of possible effects of radiofrequency fields on plants. Therefore, I do not consider this issue to be a priority.”

This statement contradicted the urgent call made by the World Health Organization (WHO), Federal Office for Radiation Protection (BfS), and International Commission on Non-Ionizing Radiation Protection (ICNIRP) in 1999.

Between 2006 and 2016, a large number of new transmitters were put into operation: DVB-T, BOS digital radio, DAB+, WIMAX, LTE, and others.
One technical detail is significant: In Germany, DVB-T (Digital Video Broadcasting Terrestrial) uses orthogonal frequency division multiplex modulation. This process distributes information across several thousand adjacent carrier frequencies. A channel's bandwidth is 7.8 MHz. The amplitude also changes constantly.
In several countries, people documented tree damage in the area of influence of transmitters: Ö. Hallberg in Sweden, C. v. Deschwanden in France, and Dr. F. Ruzicka and H. Huemer in Austria.

Haggerty examined trembling aspen tree seedlings. The shielded plants had shoots that were 74% longer and leaf surfaces that were 60% larger (with the same number of leaves) than the mock-shielded plants. The leaves of the shielded plants had no necrosis and showed fall colors and anthocyanin production.
Haggerty K (2010). Adverse influence of radio frequency background on trembling aspen seedlings: preliminary observations. International Journal of Forestry Research*, 7 pages.* https://doi.org/10.1155/2010/836278

International Symposium on "The Effect of Electromagnetic Radiation on Trees," 2011

On February 8, 2011, the international symposium on "The Effect of Electromagnetic Radiation on Trees" was held in Baarn, the Netherlands. The speakers were: N. van't Wout, H. Horlings, A. van Lammeren, R. Roos, L. Steel, V. Schorpp, A. Goldsworthy, and H.G. in't Wout.
https://vimeo.com/25270604 *http://www.puls-schlag.org/download/effect-of-emf-on%20trees-2011-02-18.pdf* *http://www.puls-schlag.org/download/Schorpp-2011-02-18.pdf*

In September **2013**, the **doctors' initiative** presented **key observations regarding trees and examples from the literature**.
Waldmann-Selsam C, Eger H (2013). Baumschäden im Umkreis von Mobilfunksendeanlagen. umwelt medizin gesellschaft*, 26, 193–208.*

Cucurachi et al. published a review in 2013. The scientists emphasized that research on this important topic is insufficient. Of the 16 studies and 29 experiments in the small number of English-language plant studies considered, **75% identified effects due to radiofrequency electromagnetic fields. The authors concluded that it was not possible to assess whether current exposure limits adequately protect animals and plants.**
Cucurachi S, Tamis WLM, Vijver MG, Peijnenburg WJGM, Bolte JFB, de Snoo GR (2013). A review of the ecological effects of radiofrequency electromagnetic fields (RF-EMF). Environment International*, 51, 116–140.*

In **2016**, the study **"Radiofrequency Radiation Injures Trees Around Mobile Phone Base Stations"** on unilateral crown damage was published by two biologists, a forestry expert, and a physician.
Waldmann-Selsam C, Puente A, Breunig H, Balmori A (2016). Radiofrequency radiation injures trees around mobile phone base stations. Science of the Total Environment*, 572, 554–569. https://doi.org/10.1016/j.scitotenv.2016.08.045*
https://www.diagnose-funk.org/download.php?field=filename&id=1336&class=NewsDownload (free download of complete paper)

In **2017, Dipl.-Forstw. Helmut Breunig**, a forestry expert, published his **observation guide "Baumschäden durch Mobilfunkstrahlung" [Tree Damage Caused by Radiofrequency Radiation].** https://www.diagnose-funk.org/forschung/wirkungen-auf-tiere-pflanzen/pflanzen/wirkungen-auf-baeume/beobachtungsleitfaden

Between 2017 and 2025, numerous transmitters were upgraded, converted, or newly built to increase the data transfer rate and improve mobile phone reception:
- Addition of LTE advanced, 5G-like systems, and 5G to mobile phone base stations
- Switchover from DVB-T to DVB-T2
- Consolidation of networks for digital audio broadcasting and switchover to DAB+

In 2019, examples from the 2016 study were presented at the international **workshop, "Environmental Effects of Electric, Magnetic, and Electromagnetic Fields on Flora and Fauna,"** which was organized by the Federal Office for Radiation Protection. These examples included cases of unilateral crown damage in Berlin, Darmstadt, Munich, Göttingen, Freiburg, and Brussels, as well as developmental disorders in young trees and the formation of clearings in forests within radiofrequency fields. **Despite the documented progression over 12 years, including evidence from various cities and developmental disorders in young trees, the Federal Office for Radiation Protection did not take action.**

In **2021**, **Prof. Dr. A. Thielens**, University of Ghent, provided reasons for the necessity of scientific research concerning animals and plants in his **statement to the European Parliament** titled "Environmental Impacts of 5G – A Literature Review of Effects of Radiofrequency Electromagnetic Field Exposure of Non-Human Vertebrates, Invertebrates, and Plants."

Thielens A (2021). Environmental Impacts of 5G – A literature review of effects of radiofrequency electromagnetic field exposure of non-human vertebrates, invertebrates and plants. *Written at the request of the Panel for the Future of Science and Technology (STOA) and managed by the Scientific Foresight Unit, within the Directorate-General for Parliamentary Research Services (EPRS) of the Secretariat of the European Parliament.*

In **2021, forestry scientists** published a study on the flower and cone yields, as well as the seed germination rates, of Calabrian pine trees after 14 years of exposure to a mobile phone base station that began operating in 2005. In 2019, the number of female and male flowers, as well as one- and two-year-old cones, was counted on thirty 27-year-old trees at distances of 100, 200, 300, 400, 500, 600, 700, and 800 m from the base station. Proximity to the base station significantly reduced the number of flowers and cones. Example of female flowers: 502 flowers at a distance of 800 m; 44 flowers at a distance of 100 m. Example of male flowers: 2,868 flowers at a distance of 800 m; 248 at a distance of 100 m. The germination rate was 91% at a distance of 800 m and 33% at a distance of 100 m.

Ozel HB, Cetin M, Sevik H, Varol T, Isik B, Yaman B (2021). The effects of base station as an electromagnetic radiation source on flower and cone yield and germination percentage in Pinus brutia Ten. Biologia Futura*, 72, 359–365. https://doi.org/10.1007/s42977-021-00085-1*
https://www.emfdata.org/de/studien/detail&id=635 (short review of the paper)

Statement by the Federal Office for Radiation Protection from January 4, 2023

The introduction states: "According to current scientific knowledge, there is **no robust scientific evidence of a risk to animals and plants from radiofrequency electromagnetic fields below the exposure limits.** However, high-quality research is still lacking. The only scientifically proven mechanism by which radiofrequency electromagnetic fields affect organisms is heating due to energy absorption."
However, the study results from scientists at the Institute for Forest Botany at the University of Freiburg from 1950 refute this statement. Results from research conducted over the past 90 years, cited in the reference section in Part 2 of Levitt, Lai, and Manville's three-part review, demonstrate the effects of radiofrequency electromagnetic fields on animals and plants below current exposure limits.

Levitt BB, Lai HC, Manville AM (2021). Effects of non-ionizing electromagnetic fields on flora and fauna, Part 2 impacts: how species interact with natural and man-made EMF. Reviews on Environmental Health*. 37(3), 327–406. https://doi.org/10.1515/reveh-2021-0050*

From 2006 to 2025, the doctors' initiative repeatedly approached relevant authorities, ministries, scientists, and politicians, requesting that they conduct studies on trees exposed to radiofrequency radiation under real-world conditions.

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Link to the webinar on February 11, 2022, on diagnose:funk.org:
https://www.diagnose-funk.org/aktuelles/artikel-archiv/detail&newsid=1764

Link to the first print version of the English edition:
https://ehtrust.org/wp-content/uploads/Tree-Damage-From-Cell-Towers-and-Radiofrequency-Radiation-English.pdf

Dear readers:

I would greatly appreciate it if you could walk around mobile phone base stations
and report back to me with your observations.

Contact:
Cornelia Waldmann-Selsam waldmannselsam@posteo.de

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Translated from German by Katharina Gustavs, April 2026

In many countries, scientists and citizens are sounding the alarm about the harmful effects of electromagnetic radiation on people, animals, and trees.

International Commission on the Biological Effects of Electromagnetic Radiation https://icbe-emf.org/

BioInitiative Report 2012–2022 https://bioinitiative.org/

ElektrosmogReport https://www.emf-portal.org/de/article/62961

Australia

EMFacts Consultancy https://www.emfacts.com/

EMR Australia https://emraustralia.com.au/

Stop Smart Meters Australia https://stopsmartmeters.com.au/2019/01/04/have-you-seen-dead-or-dying-trees-near-towers-or-other-emf-emitters/

Austria

Vienna Resolution 1998 https://www.icems.eu/docs/resolutions/Vienna_Resolution_1998.pdf

Salzburg Resolution 2000 https://www.icems.eu/docs/resolutions/Salzburg_res.pdf

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Selbsthilfegruppe Elektrosmog Salzburg https://gruppen.selbsthilfe-salzburg.at/elektrosmogsalzburg/

Belgium

Association pour la Reconnaissance de L'Electro Hyper Sensibilité https://www.arehs.be/

Beperk De Straling https://beperk.dobs.com/

Collectif Stop 5G https://stop5g.be/

ELECTROSMOG.be https://electrosmog.be/

My Life in Airplane Mode https://www.youtube.com/@MaVieenModeAvion

Vereniging ElektroHyperSensitiviteit Vlaanderen https://vehs.be/

Canada

Canadians for Safe Technologies https://c4st.org/

Electromagnetic Pollution Illnesses Canada Foundation (EPIC) https://iexistworld.org/

Electromagnetic Radiation Health Alliance (BC) https://emrabc.ca/?page_id=12096

Dr. Magda Havas, PhD https://magdahavas.com/ and https://magdahavas.com/category/from-zorys-archive/

Denmark

VIDENSCENTRET FOR ELEKTRO-FORURENING https://nejtil5g.dk/

EHS-FORENINGEN https://www.ehsf.dk/memberportal/frontpage

Straaling https://straaling.dk/index_en

Europe

Europeans for Safe Connections https://esc-info.eu/

Finland

Dariusz Leszczynski, PhD https://betweenrockandhardplace.wordpress.com/

Chronic Exposure https://www.chronicexposure.org/

The Finnish Electrosensitivity Foundation https://sahkoherkkyyssaatio.fi/en/the-finnish-electrosensitivity-foundation/

Sähköherkät ry:n https://www.sahkoherkat.fi/ and https://www.youtube.com/watch?v=Y8fK1gDzcYo

France

Association Zones Blanches https://asso-zonesblanches.org/

Coeurs d'EHS http://coeursdehs.fr/

P.R.I.A.R.T.EM https://www.priartem.org/spip.php

Phonegate https://phonegatealert.org/en/

Germany

Diagnose Funk e.V. https://www.diagnose-funk.org/

EMF:data https://www.emfdata.org/de

ElektrosmogReport https://www.emfdata.org/en/elektrosmogreport

gesund verNETZt e.V. https://gesund-vernetzt.de/

Kompetenzinitiative e.V. https://kompetenzinitiative.de/

Verein für Elektrosensible und Mobilfunkgeschädigte https://www.elektrosensibel-muenchen.de/

Weisse Zone Rhön e.V. https://www.weisse-zone-rhoen.de/

Greece

Birds and Trees of Northern Greece https://www.cellphonetaskforce.org/files/wp-content/uploads/2021/10/birdstreesnorthgreece.pdf

International

Safe Tech International https://safetechinternational.org/ and https://safetechinternational.org/equinox-elephant-in-the-ecosystem-dying-plants-and-trees-vs-wireless-antennas/

Italy

Associazione AMICA https://www.infoamica.it/

Associazione Italiana Elettrosensibili https://www.elettrosensibili.it/

Associazione Per la Prevenzione e la Lotta all'ELETTROSMOG https://www.applelettrosmog.it/

International Society of Doctors for the Environment Italy (ISDE) https://www.isdenews.it/category/ambiente-e-salute/inquinamento-elettromagnetico-e-radioattivo/

Alleanza Italiana Stop 5G https://www.alleanzaitalianastop5g.it/

Ireland

Alliance for Irish Radiation Protection http://www.eirewaves.com/

Electromagnetic Sense Ireland https://es-ireland.com/environment-wildlife/

Israel

No Radiation For You https://www.norad4u.com/ and https://www.tnuda.org.il/

Japan

Society for the Study of Electromagnetic Waves https://dennjiha.org/

Netherlands

Stichting EHS https://stichtingehs.nl/

Eerlijk over Straling https://eerlijkoverstraling.nl/

Stop UMTS! https://www.stopumts.nl/

New Zealand

Stop 5G before it stops YOU https://5g.org.nz/

Norway

Einar Flydal https://einarflydal.com/

Folkets Strålevern https://www.folkets-stralevern.no/

Foreningen for el-overfølsomme (FELO) https://www.felo.no/

Portugal

Antenas Aqui Não https://antenasaquinao.blogspot.com/

MOVIMENTO PORTUGUÊS DE PREVENÇÃO DO *ELECTROSMOG* https://electrosmogportugal.weebly.com/

Slovakia

Elektrosmog a Zdravie https://www.elektrosmogazdravie.sk/

South Africa

EMFSA https://www.emfsa.co.za/ehs/

South America

Unidos por Tecnologia Responsable https://uxtr.org/

Spain

Asociación Vallisoletana de Afectad@s por las Antenas de Telecomunicaciones (AVAATE) https://www.avaate.org/

Ecologistas en Acción https://www.ecologistasenaccion.org/areas-de-accion/digitalizacion-y-contaminacion-electromagnetica/

Electro y Quimico Sensible por el Derecho a la Salud (EQSDS) https://electroyquimicosensibles.org/

Sweden

Lennart Hardell's blog https://lennarthardellenglish.wordpress.com/

Strålskyddsstiftelsen – Swedish Radiation Protection Foundation https://www.stralskyddsstiftelsen.se/

Elöverkänsligas Riksförbund https://eloverkanslig.org/

Miljöföreningen Vågbrytaren https://en.vagbrytaren.se/

Switzerland

Gigaherz e.V. – Schweizerische Interessengemeinschaft Elektrosmog-Betroffener https://www.gigaherz.ch/

Schutz vor Strahlung e.V. https://schutz-vor-strahlung.ch/

Medecins en Faveur de l'Environnement https://www.aefu.ch/fr/category/themen-fr/pollution-electromagnetique-fr/

United Kingdom

Electrosensivity UK https://www.es-uk.info/

EM Radiation Research Trust https://radiationresearch.org/

Legal Action Against 5G https://actionagainst5g.com/

Mast Sanity https://www.mastsanity.org/

RF INFO https://rfinfo.co.uk/ecological-studies/

Powerwatch https://www.powerwatch.org.uk/

USA

Cellular Phone Task Force https://www.cellphonetaskforce.org/

Electromagnetic Radiation Safety by Joel Moskowitz, PhD https://www.saferemr.com/

Environmental Health Trust https://ehtrust.org/, https://ehtrust.org/tree-damage-caused-mobile-phone-base-stations-observation-guide-helmut-breunig/ and https://www.wildlifeandwireless.org/

Environmental Health Sciences https://ehsciences.org/doctors-and-scientists-on-cell-phone-radiation-health-effects/

EMF Safety Network https://emfsafetynetwork.org/

Frequency Free Fairbanks https://5gfrequencyfreefairbanks.org/

Microwave News https://www.microwavenews.com/

Physicians for Safe Technology https://mdsafetech.org/

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University of Göttingen: The pine tree grows horizontally to stay below the main beams of the sector antennas.