

Trees in Bamberg and Hallstadt in the radiation field of 65 mobile phone base stations

Examples from a documentation about 700 trees (2006-2016)

A Tree Damages beginning on one side

The trees of the Bamberg-Documentation are numbered from 1 to 700.

Those trees which are part of the study „Radiofrequency radiation injures trees around mobile phone base stations“ (Science of the Total Environment 572 (2016) 554-569) have a second, red number.

Tree names	Tree species	No	No.	Addresses	Years of document.	fel led	pa ge
Maple	Acer platanoides	1	71	Railway station	2009-2013		3
Maple	Acer platanoides	2	56	Hauptsmoorstr. 26a	2008-2012		4
Maple	Acer platanoides	3	234	Berliner Ring	2013-2015		5
Maple	Acer platanoides	4	150	Katzenberg	2010-2011		6
Maple	Acer platanoides	5	304	P&R Heinrichsdamm	2008-2016		7
Maple	Acer platanoides	12	658	Hallstadt, LichtenfelserStr.	2008-2015		9
Maple	Acer platanoides	14	642	Hallstadt, Cemetery	2008-2016		11
Hornbeam	Carpinus betulus	17	181	Hauptsmoorstr. 85	2011-2012		12
Lime tree	Tilia sp.	28	673	Hotel Residenzschloss	2010-2015		13
Lime tree	Tilia sp.	38	668	Hallstadt, Marktplatz	2009-2015		14
Chestnut	Aesculus hippocast.	35	240	Franz-Ludwig-Straße	2008-2012		15
Locust tree	Robinia pseudoacacia	36	290	Gutenbergstraße	2008-2015		16
Mountain ash	Sorbus occuparia	38	158	Hezilostraße	2010-2016	X	17
Box elder maple	Acer negundo	39	193	Kindergarten St. Heinrich	2012-2014		18
Walnut tree	Juglans regia	41	675	Garden of St. Michael	2012-2015		19
Tree of life	Thuja occidentalis	47	118	Cemetery Gaustadt	2009-2012		20
Tree of life	Thuja occidentalis	48	309	Ottostraße	2011-2013	X	21
Douglas fir	Pseudotsuga menziesii	56	24	B22/Strullendorfer Straße	2007-2014		22
Lime tree	Tilia sp.		13	Am Kranen	2006-2011		23
Lime tree	Tilia sp.		534	Klosterhof St. Michael	2007-2012		24
Chestnuts	Aesculus hippocast.		533	Altenburg Castle	2007-2009		26
Lime tree	Tilia sp.		203	Am Hahnenweg	2007-2013		27
Birch	Betula pendula		204	Am Hahnenweg 16	2007-2016		28
Chestnut	Aesculus hippocast.		51	Schützenstraße	2008	X	29

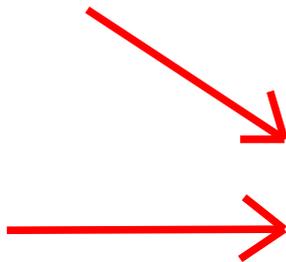
Mountain ashes	<i>Sorbus occuparia</i>		14	Breitäckerstraße	2008-2014	X	30
Spruce trees	<i>Picea</i>		538	Zollnerstraße	2008-2016	X	32
Maple	<i>Acer platanoides</i>		59	Robert-Bosch-Straße	2008-2013	X	34
Maple	<i>Acer platanoides</i>		60	Hauptsmoorstr. 67	2008-2011	X	35
Conifer	Conifer		165	Dr.-Rattel-Straße	2008-2016		37
Lime tree	<i>Tilia sp.</i>		226	Residenzstraße/Ottoplatz	2008-2013		38
Poplar	<i>Populus nigra</i>		95	Am Regnitzufer	2008-2016	X	40
Oak	<i>Quercus</i>		94	Bridge in Bug	2008-2014		41
Birch	<i>Betula pendula</i>		252	Grounds of horticult. show	2009-2015	X	42
Birches	<i>Betula pendula</i>		203	Am Hahnenweg	2009-2016	X	43
Walnut	<i>Juglans regia</i>		186	Schoolyard Gangolfschool	2009-2014	X	44
Lime tree	<i>Tilia sp.</i>		355	Garden Heidelsteigschool	2009-2013		45
Birches	<i>Betula pendula</i>		231	Bank of the river Regnitz	2009-2013	X	46
Hornbeam	<i>Carpinus betulus</i>		535	Hainstraße/Sodenstraße	2009-2014		47
Alders	<i>Alnus</i>		143	Campsite in Bamberg-Bug	2009-2013	X	48
Maple	<i>Acer platanoides</i>		145	Playground at the hospital	2010-2014		49
Silver maples	<i>Acer saccharinum</i>		146	Meadow at the hospital	2010-2014		50
Locust tree	<i>Robinia pseudoacacia</i>		164	Don-Bosco-Straße	2010-2013	X	51
Lime tree	<i>Tilia sp.</i>		275	Campsite in Bamberg-Bug	2010-2014	X	52
Pine	<i>Pinus</i>		170	Babenbergerring	2011-2012	X	53
Chestnut	<i>Aesculus hippocast.</i>		410	Beer garden Mahr's-Bräu	2011-2014	X	54
Beech	<i>Fagus sylvatica</i>		254	Grounds of horticult. show	2012-2016		55
Lime tree	<i>Tilia sp.</i>		217	Schönleinspl./Promenade	2013-2014		56
Maple	<i>Acer platanoides</i>		427	Babenbergerring	2014-2016		58

Maple, parking-lot at the railway station (2009-2013)



View from the east

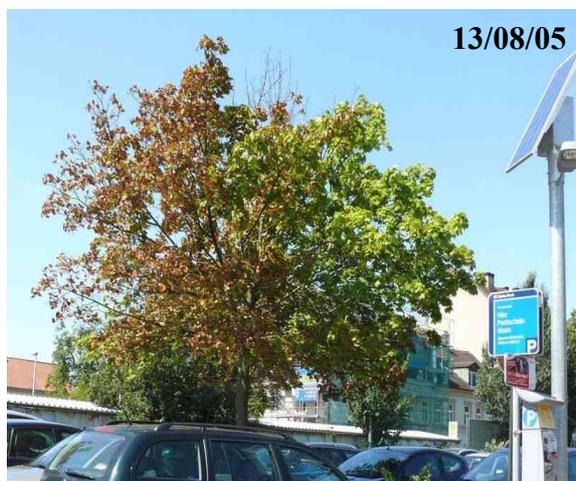
On 27 July 2009 the difference between the two sides was striking. The leaves on the left side had brown margins, the leaves on the right side were green.



In 2010 the side difference was visible already on 3 July. Southwards (left) visual contact to phone masts Ludwigstr. 2 (275 m) und Ludwigstr. 25 (190 m). Phone mast Heiliggrabstr. 15 (280 m) westwards was hidden behind trees at that time.



970 $\mu\text{W}/\text{m}^2$
Measurement on the left side in a height of 3 m



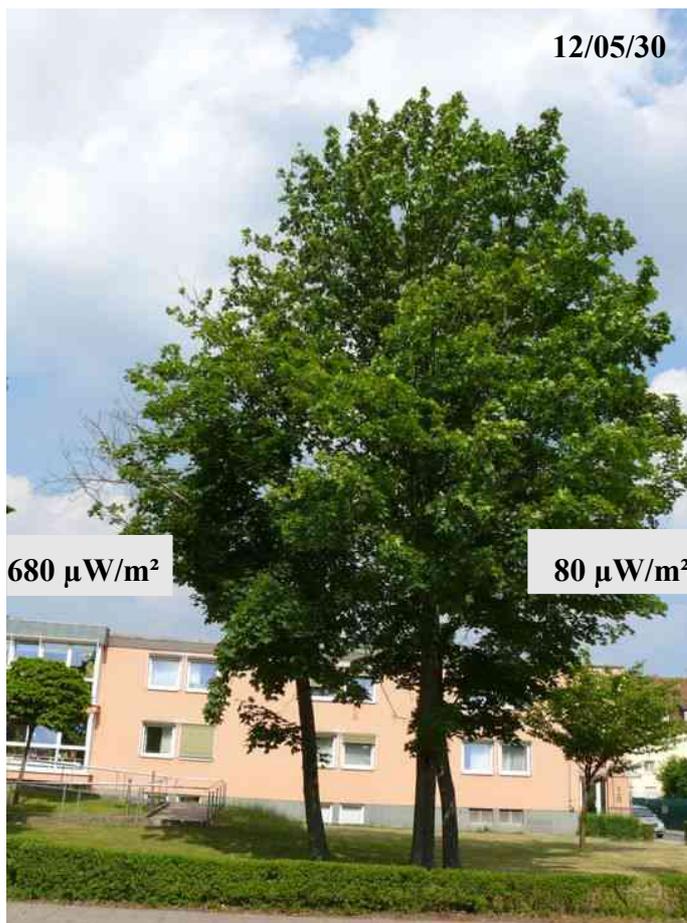
130 $\mu\text{W}/\text{m}^2$
Measurement on the right side in a height of 3 m

Measurements on 30 May 2012 standing at the top of a ladder: south side 970 $\mu\text{W}/\text{m}^2$ (0.60 V/m), north side 130 $\mu\text{W}/\text{m}^2$ (0.22 V/m). On 5 Aug. 2013 the maple had already lost leaves on the left side.

Maple, Hauptsmoorstr. 26a (2008-2012)



On 8 June 2008 it was noticed, that the northern side of a group of maples (on the right) was damaged. It was the side facing the mobile phone antennas situated on the building. Side beams of the sector antennas reach the maples.



View from the west

In May 2012 the damage had increased on the left side. The right side showed no damage.



On 30 May 2012 measurements were carried out with the EMF-broadband analyzer HF 59B (27 MHz – 3300 MHz), UBB27_G3, from Gigahertz Solutions (measurement of the sum, peak values of power flux density in $\mu\text{W}/\text{m}^2$). Value left side: 680 $\mu\text{W}/\text{m}^2$, value right side: 80 $\mu\text{W}/\text{m}^2$. This difference can be explained by attenuation within the tree. A part of the RF-EMF is absorbed from the leaves, a part is reflected, scattered and diffracted.

Maple, Berliner Ring (2013-2015)



View from the east

On 13 May 2013 crown transparency was observed in the upper left section.
Phone mast Pödeldorfer Straße 144 (height 23 m, 18 sector antennas) in a distance of 77 m.

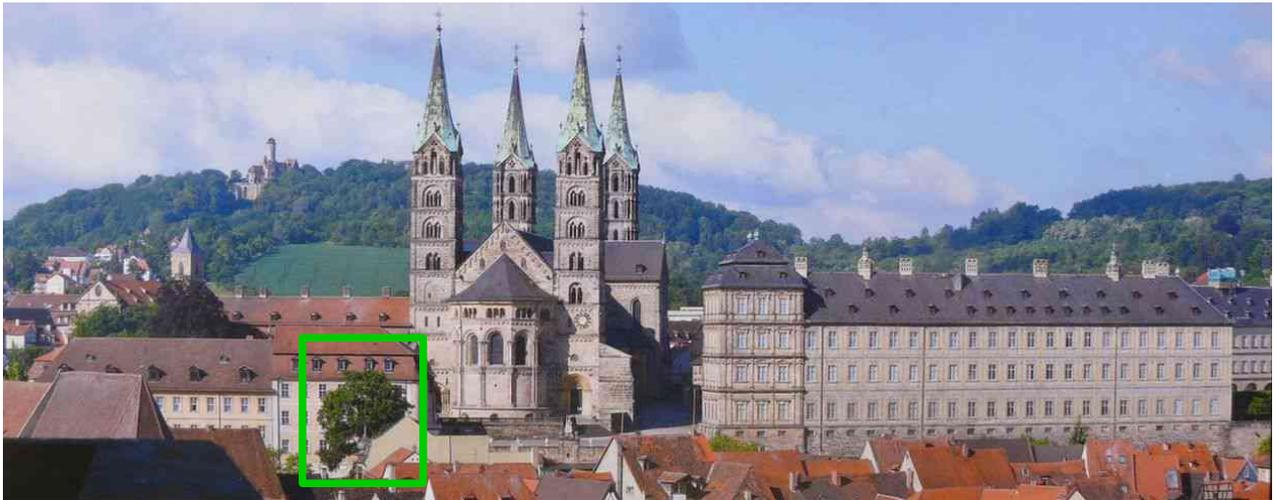


On 7 June 14 dead branches were seen in the upper left section. Leaves on the left side were brown.



On 4 June 15 the damage had increased. Measurements were carried out on 14 June 2015.

Maple at the Cathedral square (2010-2011)



Postcard: View from St. Martin to the Cathedral, the New Residence, Altenburg and the maple



Since 2008 early browning on the eastside.



Since 2011 severe crown damage.



Visual contact to phonemast Grüner Markt 23 (440 m).



Broken branches besides passing tourists.

Maple, P&R-Heinrichsdamm (2008-2016)

304

08/08/29



View from the west

On 29 August 2008 crown transparency in the upper right section was remarked. Visual contact to phone mast Heinrichsdamm 33 a (height 17 m, 6 sector antennas) in a distance of 177 m was given.



On 25 September 2009 the maple had lost its leaves in the upper right section too early in the year.



On 25 August 2010 some little branches were dead.



On 23 July 2014 more branches died off. Birch with crown transparency in the background.



On 30 July 2015 dead branches on the south side had been cut. The birch had already lost leaves. The phone mast had been enlarged (12 antennas). Measurements with the help of a telescopic rod.



On 1 July 2016 the dead birch had been felled. The injury to the maple will go on.

Maple, Hallstadt, Lichtenfelser Straße (2008-2015)



View from the west

The lime tree on the left is shielded, the maple on the right is exposed. Damage on the exposed side.

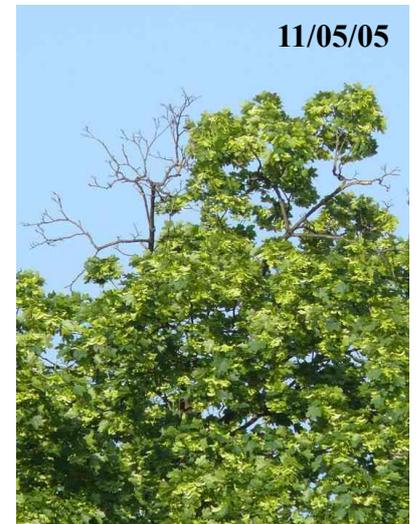


View from the east



View from the west

In May 2011 the situation was similar.



View from the northwest

Dead twigs and branches on the top.



View from the west

In September 2015 the lime tree has dense, green foliage but the maple is brown and has lost leaves.

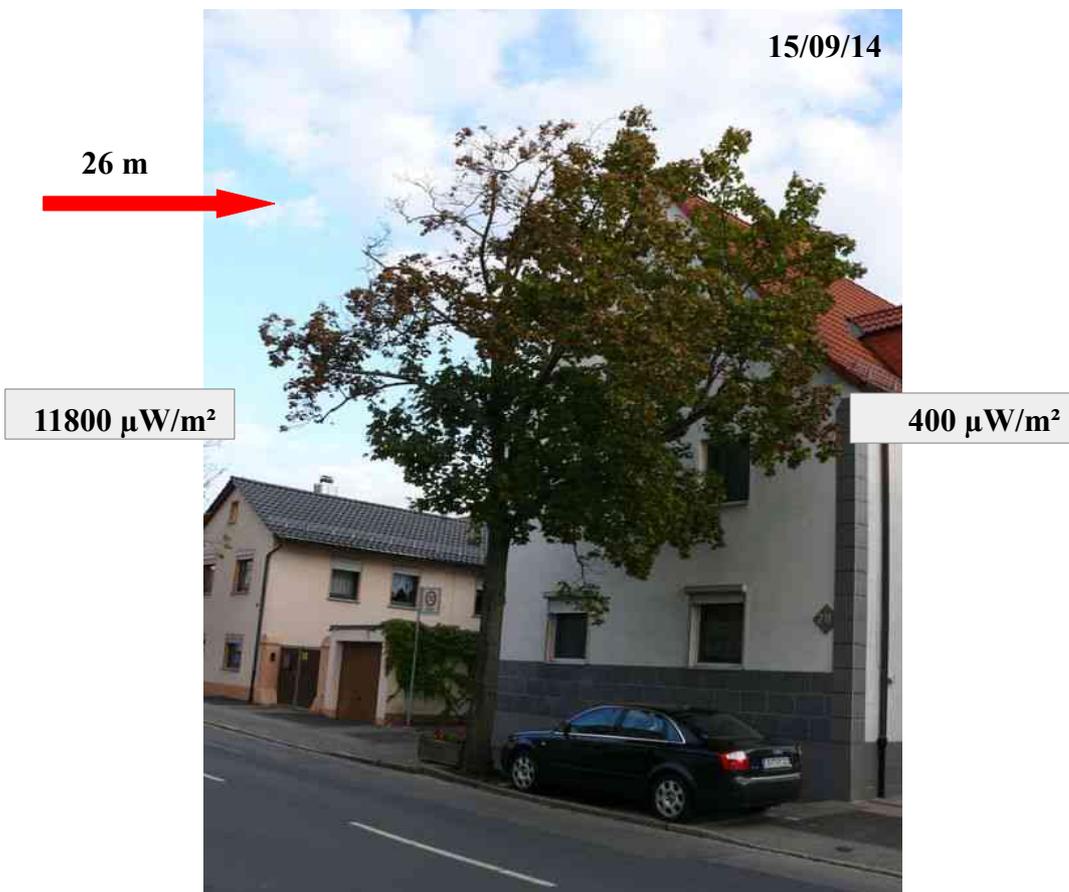


View from the northwest



View from the north

In May 2011 dead twigs and branches on treetop and on the northeast side, facing the antenna.



View from the northwest

On 14 September 2015 the difference between the northeast side and the southwest side is considerable. The measurements were done with the help of a telescopic rod.

Maple, Hallstadt, cemetery (2008-2016)



View from the southeast

On 27 June 2008 dead branches were observed on the left side of the maple. Visual contact was given to phone mast Landsknechtstr. 23 (height 14-17 m, 6 sector antennas) in a distance of 142 m.



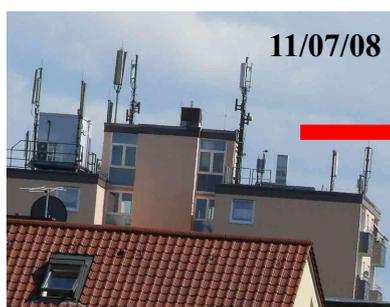
View from the west

On 5 October 2015 parts of the left side had been cut off. In the middle the tree was transparent and brown. The right side had dense, green foliage. Measurements with the help of a telescopic rod.



Numerous trees in and around the cemetery have been felled in the last years - again in winter 2015.

Hornbeam, Hauptsmoorstr. 85 (2011-2012)



Mobile phone site
Hauptsmoorstr. 26 a
with 18 sector antennas



View from the northeast



Detail from the upper crown



On 8 July 2011 leaves on the left (southeast) side of the hornbeam had brown margins. Visual contact was given to phonemast Hauptsmoorstr. 26a in a distance of 450 m.



View from the northwest
Scale $\mu\text{W}/\text{m}^2$
Measurement on the southeast side,
visual contact to the phonemast.

On 23 May 2012 measurements were carried out

Measured value southeast side: $1100 \mu\text{W}/\text{m}^2$, northwest side: $0 \mu\text{W}/\text{m}^2$.

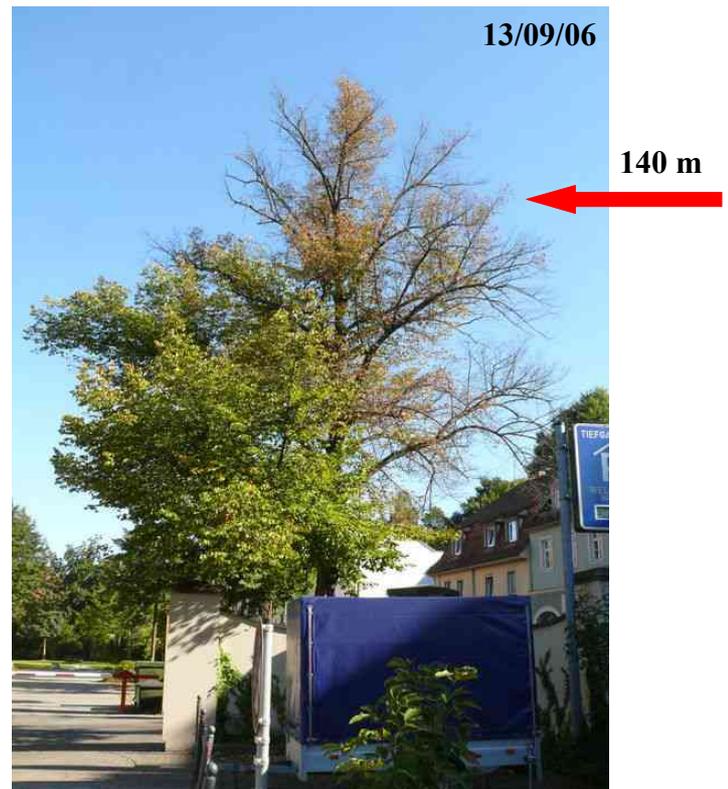


Scale $\mu\text{W}/\text{m}^2$
Measurement on the northwest side,
no visual contact to the phonemast.

Lime tree, Hotel Residenzschloss (2010-2015)



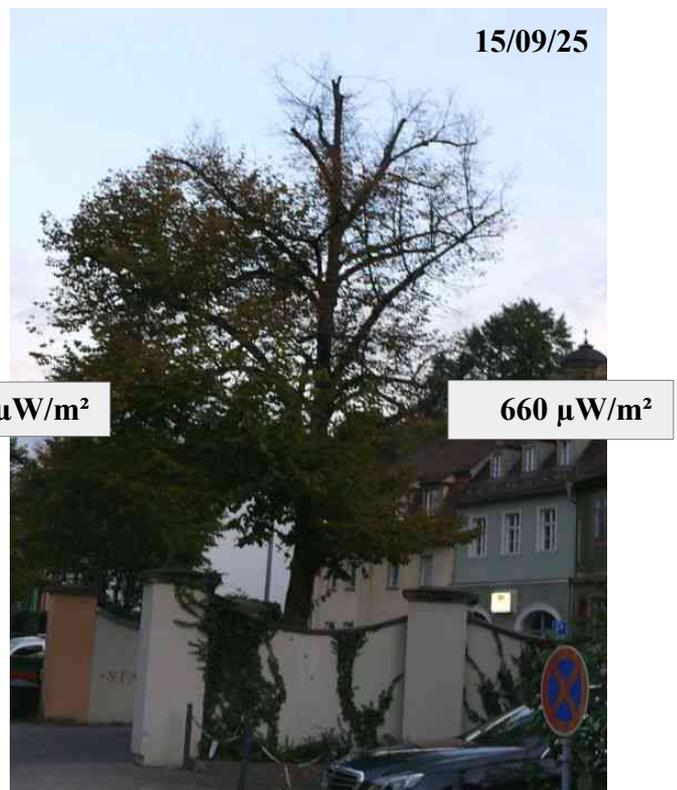
View from northeast over lime to the former Monastery St. Michael with phonemast



Looking from northwest the difference between the left and the right side was sharp.



On 20 August 2014 the left side was green. The right side and the top were brown or leafless



In 2015 the situation was similar. Measurements were done on 25.09.15.

Lime tree, Hallstadt, Marktplatz (2009-2015)



View from the south
On 26 September 2009 the lime tree was brown on its right (east) side.



View from the southwest
From the east side visual contact to phone mast Lichtenfelser Str. (height 16 m, 6 antennas) in a distance of 354 m

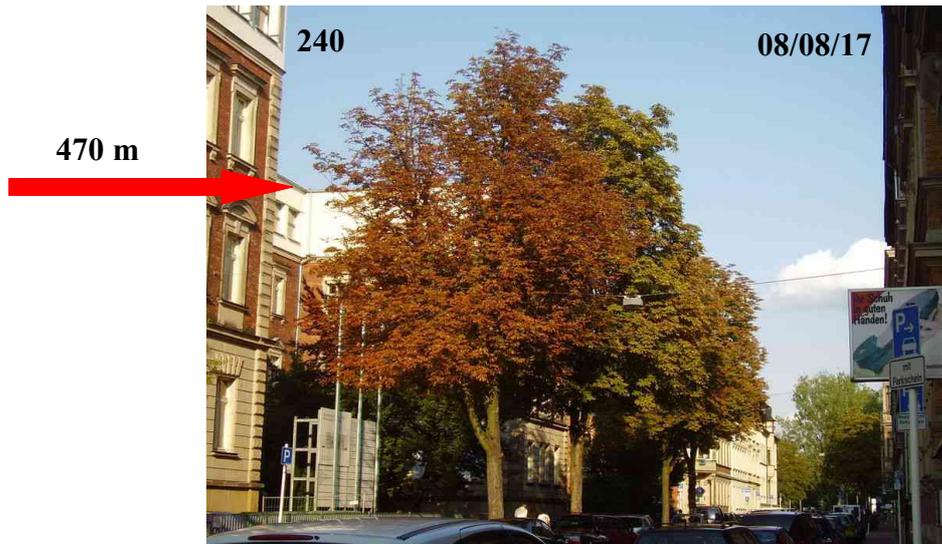


On 24 September 2015 the right side was brown and had already lost leaves. .



On 9 October 2015 the right side was leafless. The phone mast had now 18 sector antennas.

Chestnuts, Franz- Ludwig- High school (2008-2012)



View from the west

In August 2008 the first chestnut was brown and on treetop leafless; the second chestnut was green.



In 2010 the first chestnut had lost already many leaves. The browning began at the leaf margins.



Measurements on 30 July 2015 in front (west) of chestnut 1: $400 \mu\text{W}/\text{m}^2$, behind (east): $20 \mu\text{W}/\text{m}^2$. Visual contact from the first chestnut to phone mast Grüner Markt 23 (height 35 m, 23 antennas).

Locust tree, Gutenbergstraße (2008-2015)

290

08/08/29



332 m



View from northeast

On 29 August 2008 the beginning difference between the left (southeast) and the right side (north-west) was observed. Visual contact to phone mast Gutenbergstraße (height 39-46 m, 22 antennas).



12/08/01

On 1 August 2012 branches in the upper part of the right side were dead



15/07/14

40 mW/m²

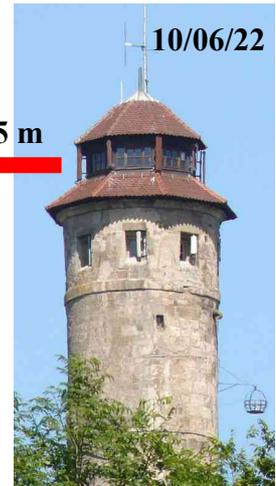
1300 µW/m²

On 14 July 2015 measurements in a height of 3 m had been carried out with the help of a ladder.

Mountain ash, Hezilostraße (2010-2016)



View from the east



Altenburg Castle with
Visual contact to the Altenburg Castle in the north was given (distance 555 m). 17 sector antennas

555 m

In August 2010 the remarkable side difference was noticed.



Measurement on the
left side: 8.2 $\mu\text{W}/\text{m}^2$
(scale $\mu\text{W}/\text{m}^2$)



Measurement on the
right side: 83.9 $\mu\text{W}/\text{m}^2$
(scale $\mu\text{W}/\text{m}^2$)

In 2012 the side difference was seen already in May. The left (southern) half had dense foliage. The right (northern) half showed defoliation. Measurements were carried out on 29 May 2012.



In 2014 the whole mountain ash was transparent and partly leafless already in July. Damages at other trees in this southwestern part of Bamberg had increased also.



In May 2016 the tree had been cut down.

Box elder maple, Kindergarten St. Heinrich, Pödeldorfer Straße (2012-2014)

193

12/05/31



View from the northwest

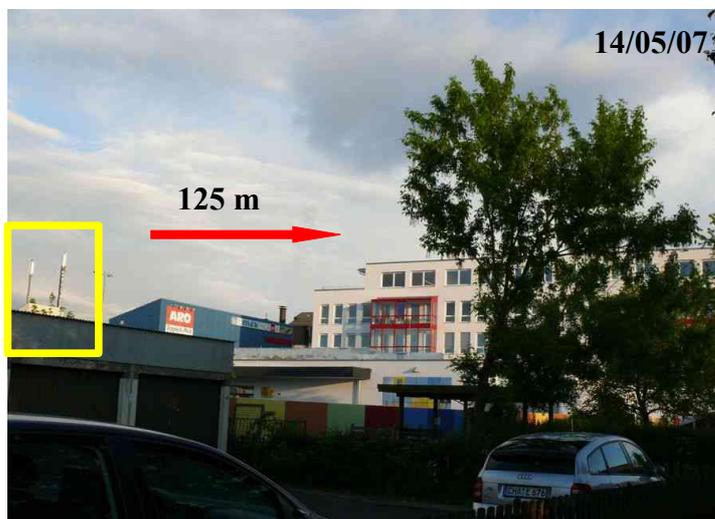
Measurement on the side of the tree, which is facing the phone mast.

This Box elder maple in the garden of Kindergarten St. Heinrich had severe damage on the left side.

Measurement on the opposite side.

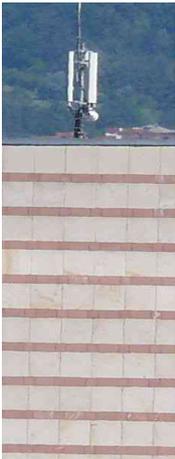


In summer and in autumn 2013 the gardener had cut off several branches.



Visual contact was given to phonemast Pödeldorfer Str. 144 in a distance of 125 m.

Walnut tree, Garden of the former Benedictine monastery of Michelsberg (2012-2015)



190 m



View from the southwest

On 12 July 2012 the walnut tree showed severe crown transparency.

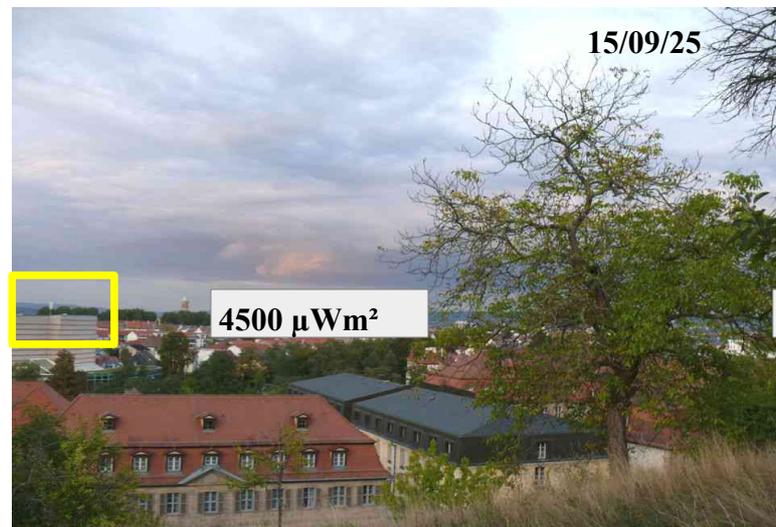
Concert and Congress Hall of the „Bamberg Symphony Orchestra“ with phone mast



On 6 June 2014 many branches on the north and on the east side were dead.



16/07/06



15/09/25

4500 $\mu\text{W}/\text{m}^2$

590 $\mu\text{W}/\text{m}^2$

On 25 September 2015 the walnut tree had leaves only on its southwest side. On the Concert and Congress Hall the number of sector antennas had increased from 6 up to 21.

Tree of life, Cemetery Gaustadt (2009-2012)

118

09/08/25



108 m

10/08/13



View from the southwest
On 25 August 2009 the unilateral damage of the tree of life was observed. From the right side visual contact is given to phone mast Breitäckerstr. 9 (height 27 m, 12 antennas).

On 13 August 2010 the damage was similar. On the cemetery and in the surrounding gardens numerous trees and shrubs with severe crown damage were found.

12/04/25



30 $\mu\text{W}/\text{m}^2$

12/04/25



12/04/25



910 $\mu\text{W}/\text{m}^2$

On 25 April 2012 the power flux density on the left side was in the range between 30 and 130 $\mu\text{W}/\text{m}^2$, on the right side between 360 und 1600 $\mu\text{W}/\text{m}^2$. The tree attenuates the radiation.

Pine tree, tree of life and maple, Ottostraße (2011-2013)



Leaves of the maple

View from the southwest to pine tree, tree of life and maple. On 16 June 2011 the leaves on the south side of the maple had brown margins, the south side of the tree of life was leafless and the south side of the pine tree had lost many needles.

Visual contact was given to phone mast Hainstr. 39 (height 18 m, 6 antennas) in a distance of 395m.



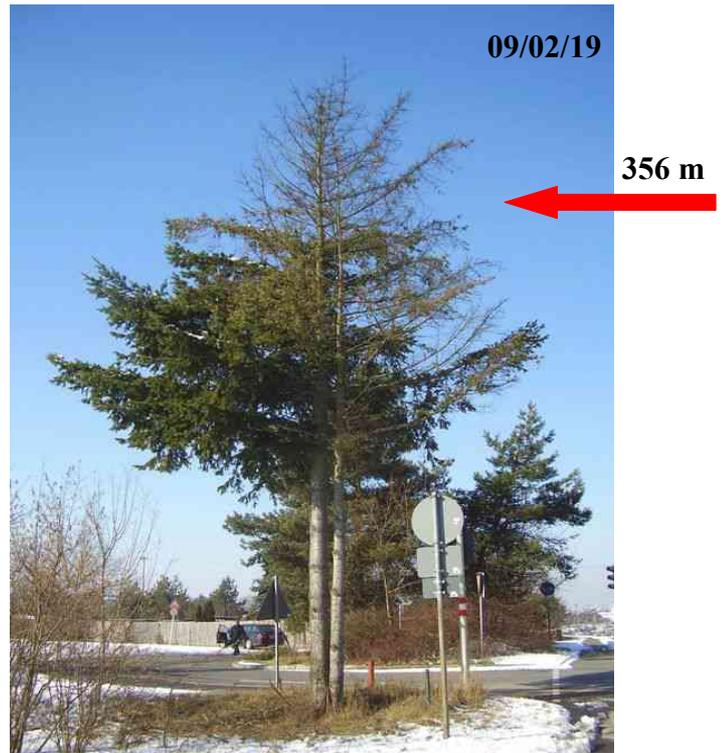
View from the trees to the phone mast in the south

On 11 September 2013 the damages of the tree of life and of the maple had increased. The phone mast had been enlarged up to 21 sector antennas. Measurements were carried out at the tree of life in 2015. South side: $120 \mu\text{W}/\text{m}^2$, north side $10 \mu\text{W}/\text{m}^2$.

Douglas fir, B22/Strullendorfer Straße (2007-2014)



View from the south to the Douglas fir and phone mast Gutenbergstr. 20. On 24 July 2007 an unusual distribution of damage was seen.

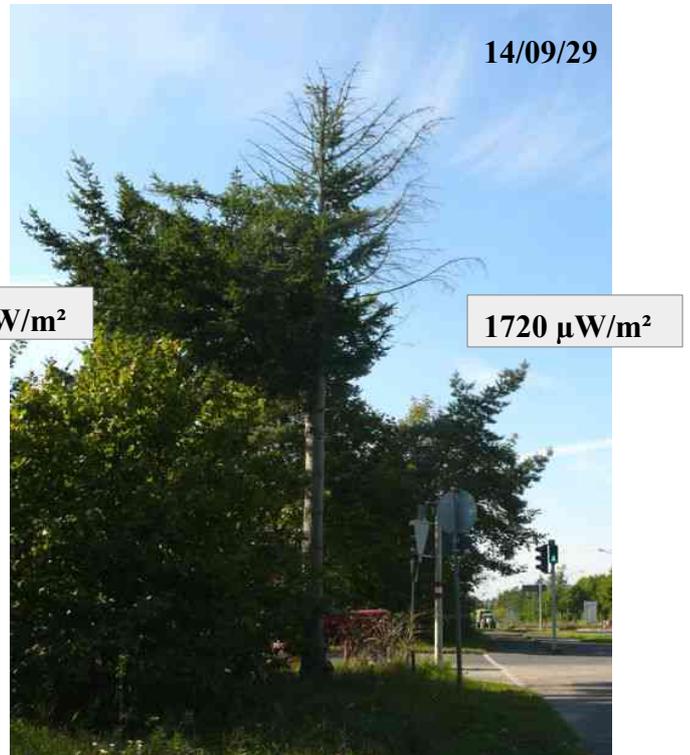


View from the southeast to the Douglas fir. The tree had lost its needles in the upper part and on the right side.



Increase of needle loss.

Heat, frost, drought, compaction and sealing of the soil, road salts, air and soil pollutants, diseases or pests cannot explain this “three-quarter-illness”. RF-EMF from phone mast Gutenberstr. 20 (height 39- 46 m, 22 sector antennas) reach the Douglas fir. Measurements on 27 September 2015.



Needles only in the lower quarter on the left.

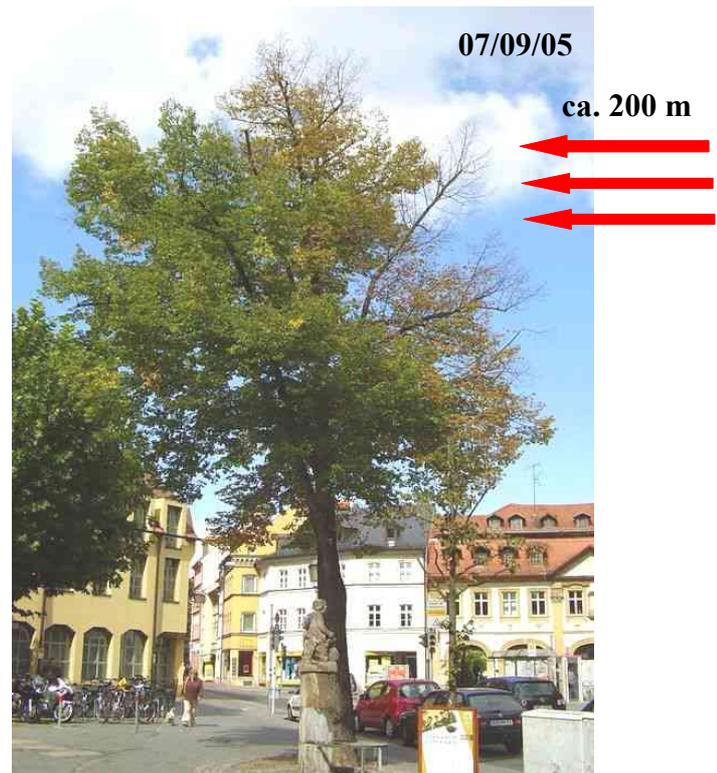
Lime tree, Am Kranen (2006-2011)



13

September 2006

View from the south
In Sept. 2006 a difference between left and right side was noticed. The right side was brown and partly leafless; the left side green with dense foliage



07/09/05

ca. 200 m

On 5 September 2007 the difference between left and right had increased.



09/09/26

On 26 Sept. 2009 branches on the right were dead.



11/09/17

On 17 Sept. 2011 dead parts had been cut off.

RF-EMF from phone mast Grüner Markt 23 (height 28- 35 m, 23 sector antennas) reach the tree.

Lime tree, Michelsberg Monastery (2007-2012)

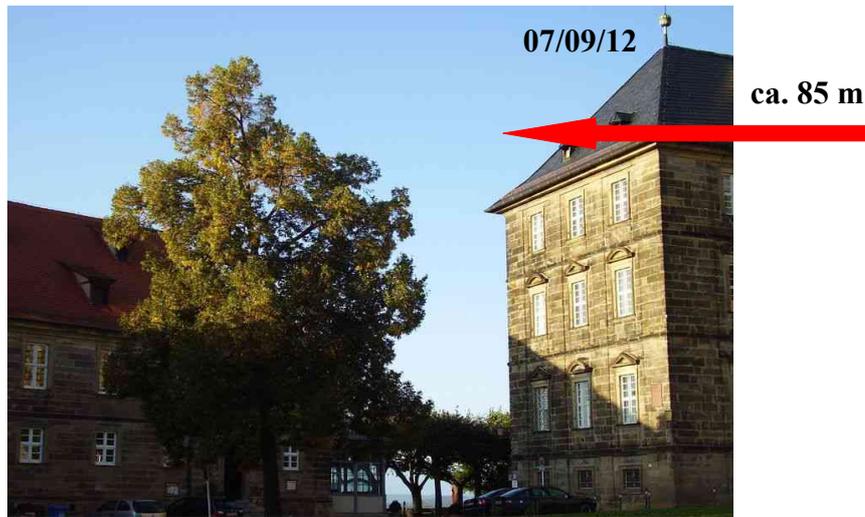


View from the west

On 12 Sept. 2007 beginning crown transparency was seen. Some leaves turned yellow too early. A phone mast is situated in the roof of the former monastery. The RF-EMF hit the lime tree. The chestnut in the background, which is located in a radio shadow, is still green



On 19 August 2012 holes were noticed in the upper crown. The chestnut was healthy.



View from the south

On 12 September 2007 the view from the south showed a difference between the left and the right side in the upper part. The leaves on the right side on top were already brown.

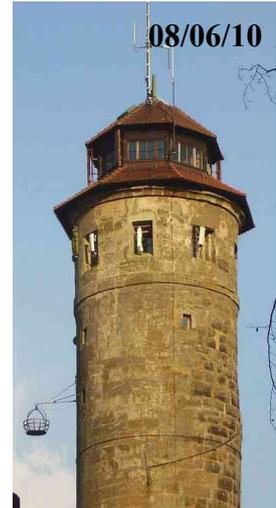


On 2 October 2009 the differences between left and right and top and down were more pronounced.



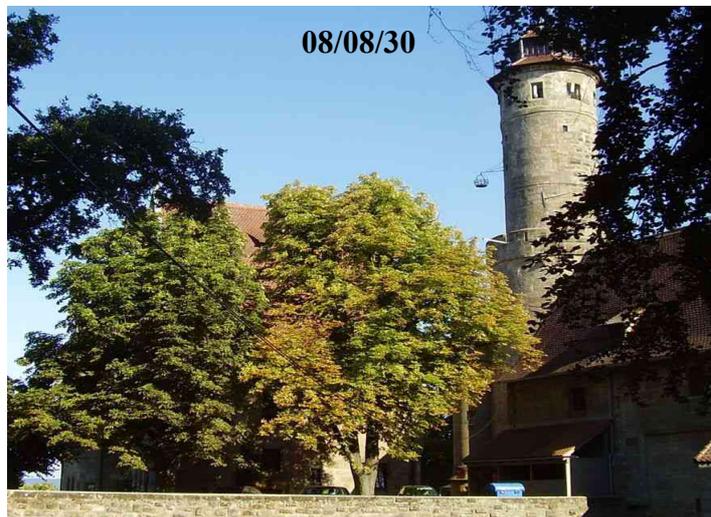
On 19 October 2011 it was visible that branches had been cut. There were no construction works which could have injured the roots. In the year 2005 three sector antennas were added to the existing Nondirectional antenna. The Lime tree stands in the radiation field of the 230°- sector antenna.

Chestnuts, Altenburg (2007-2009)



Altenburg tower with 17 sector antennas and directional antennas

On 12 Sept. 2007 the difference between the two chestnuts was noticed.

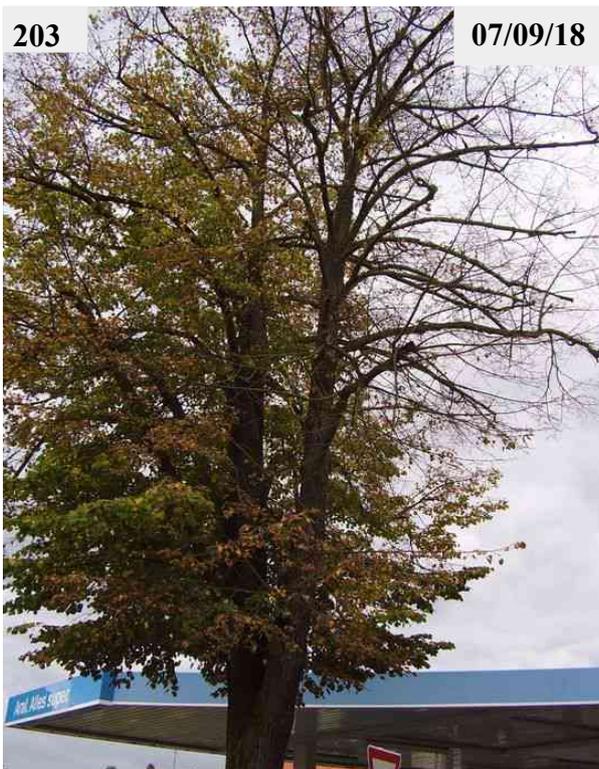


On 30 August 2008 chestnut left was green, chestnut right yellowish brown (leaf margins brown).

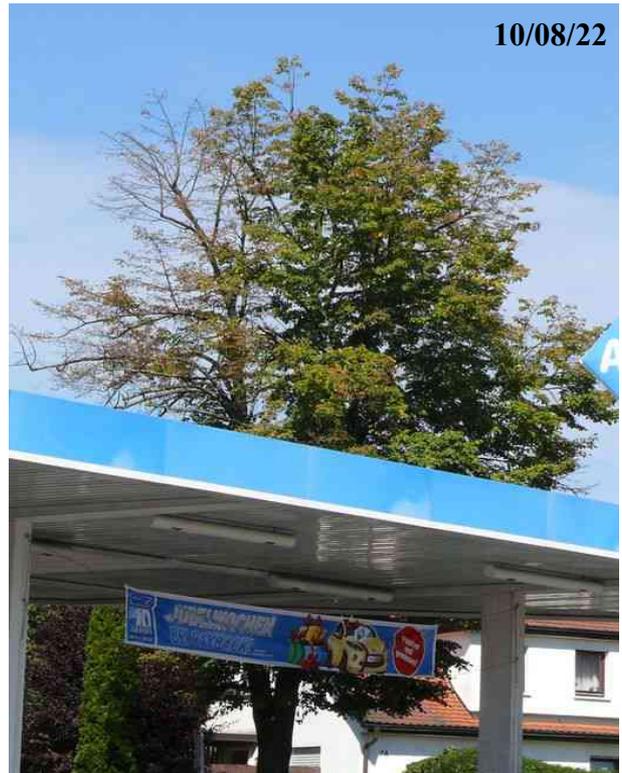


On 20 Oct. 2009 chestnut left still had leaves. Chestnut right was leafless. The chestnut on the right is probably hit by side beams. She attenuated radiation and protected the chestnut left from RF-EMF.

Lime tree, Am Hahnenweg/Würzburger Straße (2007-2013)



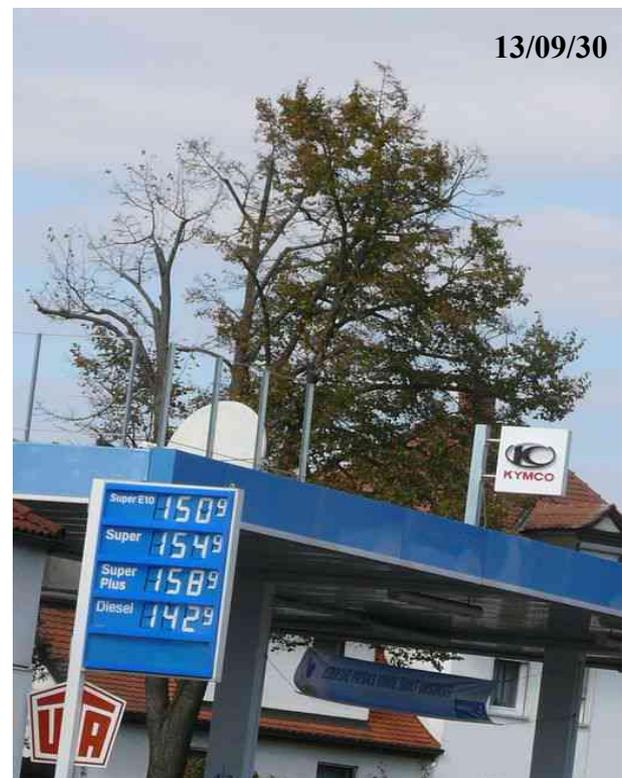
View from the north
The early loss of leaves on the west side was noticed. From the west (Altenburg) RF-EMF reach the tree. Additionally directional radio link crosses here.



View from the south
In the year 2010 the brown colouring and the loss of leaves on the west side were observed already on August 22.
On the west side branches had been cut



On 14 August 2011 it was noticed, that dead twigs and branches had again been cut off.



On 30 Sept.2013 left side leafless, right side leafy.
Nearby a further phonemast was installed in 2014.

14/11/05



Birch and Conifer, Am Hahnenweg (2007-2016)

204

07/09/18



View from the south
On 18 September 2007 the birch had already lost many leaves.

10/06/22



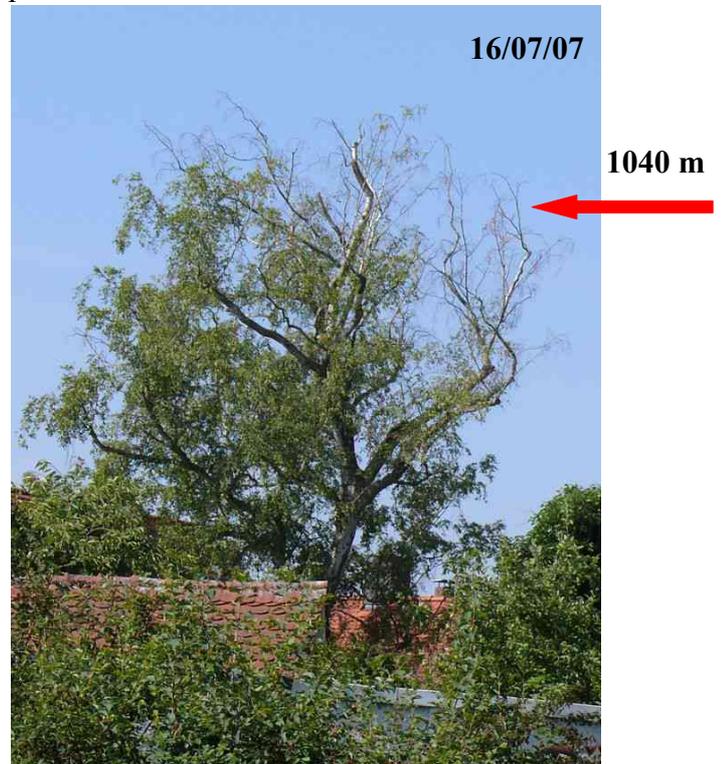
View from the south
In the following years damage in the upper part of the birch was observed.

11/02/11



View from the southeast
In February 2011 dead parts on the top had been removed. The tree on the northwest side had been cut down. The tower of the Altenburg is visible. The conifer had lost needles on the exposed side.

16/07/07



View from the northeast
This perspective shows that the damage has begun on the side which is oriented towards the Altenburg (distance 1040 m) with 17 sector antennas.

Chestnut, Schützenstraße/Busstop Sodenstraße (May- October 2008)

51

08/05/15

07/08/31

ca. 50 m



08/07/08



In May 2008 the chestnut had grown no leaves on its left side.

Visual contact was given to phone mast Hainstr. 39, which started operating in 2007.

In July some leaves were already brown. One dead branch had been cut off.

08/08/19



In August 2008 the whole chestnut was brown.

08/10/22



In October 2008 the chestnut had been felled.

Mountain ashes, Breitäckerstraße (2008-2014)

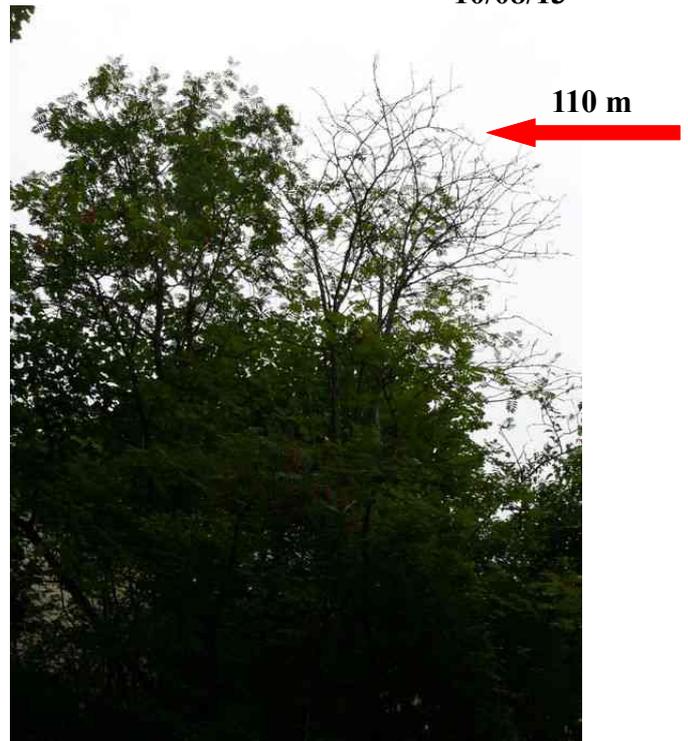
14

08/06/07



View from the northwest
On 7 June 2008 the difference between the two mountain ashes in a garden was noticed.

10/08/13



On 13 August 2010 the difference had increased. Many branches of the ash on the right were dead. The ash was felled.

13/08/31



As a result the ash on the left was not shielded anymore. On 31 August 2013 the left ash had died back also.

14/08/06



In the summer 2014 the second mountain ash had been felled too..

This difference between the two mountain ashes in 2008 can be explained by the attenuation of radiation through leaves. In the year 2008 a great amount of the RF-EMF was absorbed from the ash on the right and reflected, scattered or diffracted. Therefore the exposure of the ash on the left was initially much lower than the exposure of the ash on the right. However, after the ash on the right had been felled, the radiation increased considerably.

In the garden numerous other deciduous trees and conifers showing damage were found. In the southern property line which is close to phonemast Breitäckerstr. 9, a gap in the tree population had occurred already in 2007. Measurement in the garden on 22 November 2004: 1400 $\mu\text{W}/\text{m}^2$.

The phonemast is situated in a distance of 110 m from house and garden of a family with four children. The whole family suffered since 2000 from unexplainable symptoms.



29.09.04

Phone mast Breitäckerstraße 9 (07.07.10): height 25,7 m – 26,8 m, 12 sector antennas (2 x 30°, 60°, 95°, 2 x 150°, 180°, 215°, 2 x 270°, 300°, 335°) und directional radio.



Aerial picture, H. Dietz, NürnbergLuftbild

View from southwest to the cemetery of Gaustadt and the phone mast Breitäckerstr. 9 (yellow). The effects on trees could already be recognized through the early yellowing in the year 2004. The mountain ashes, which have been cut down meanwhile, are marked red.

Spruce trees and birch, Zollnerstraße (2008-2016)



View from the southwest

In June 2008, the spruce, which was closer to the phone mast (distance of 55 m), lost many needles in the upper part. The birch did not grow upwards.



In July 2011 the loss of needles had increased. The birch did not prosper.



In August 2013 most needles had gone. The phone mast was enlarged. Measurement: 3280 $\mu\text{W}/\text{m}^2$.



In April 2014 the situation was similar.

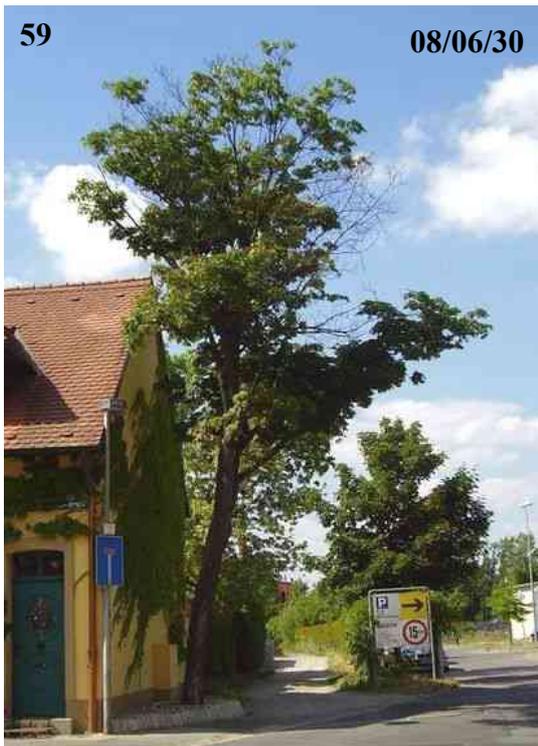


In April 2015 the spruce on the right had been felled.



In May 2016 the birch had died off. The spruce on the left began to loose needles.

Maple, Robert-Bosch-Straße (2008-2013)



View from the south
In June 2009 the damage on the right (east) side and on the top was noticed.



In 2009 the damage had increased.
The distance to the phone mast was 320 m.



320 m

Phone mast
Robert-Bosch-
Str. 40
Height 30 m,
9 antennas



In 2011 further decline. In July 2012
the dead branch broke during a storm.
Measurement on 21.07.12: $1680\mu\text{W}/\text{m}^2$.



Later in 2012 the maple was felled.
Large parts of the Virginia Creeper on the east
side of the house died off.

Maple, Hauptsmoorstraße (2008-2011)

60

08/07/08

10/08/07

280 m



View from the northeast

In July 2008 the unilateral damage of the maple tree was seen. Visual contact was given to the mobile phone site Hauptsmoorstr. 26a.



The dead branches had been cut off. On 7 August 2010 the leaves on the left side were brown.

11/02/05

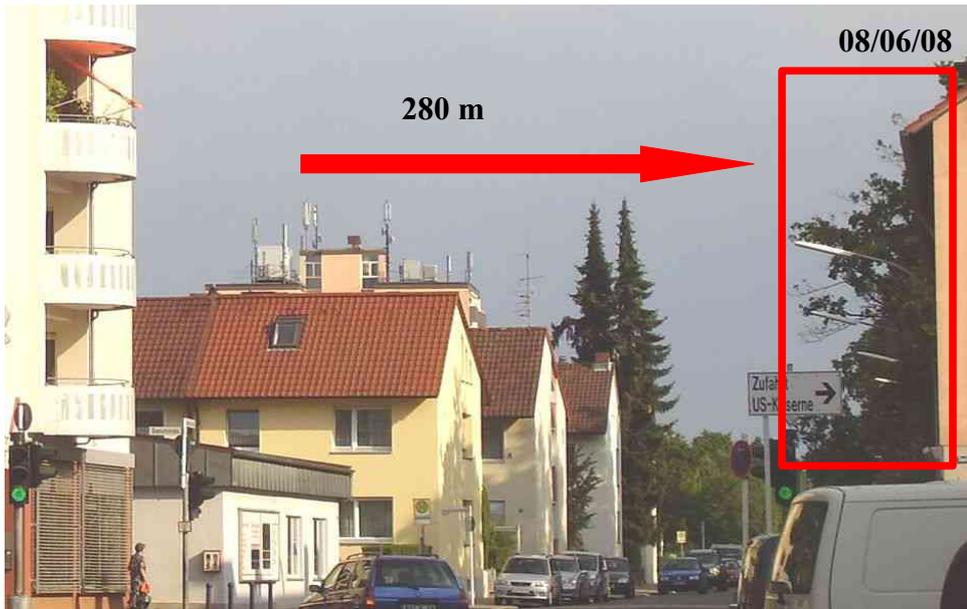


The maple tree showed even without leaves that damage had taken place.

11/06/03

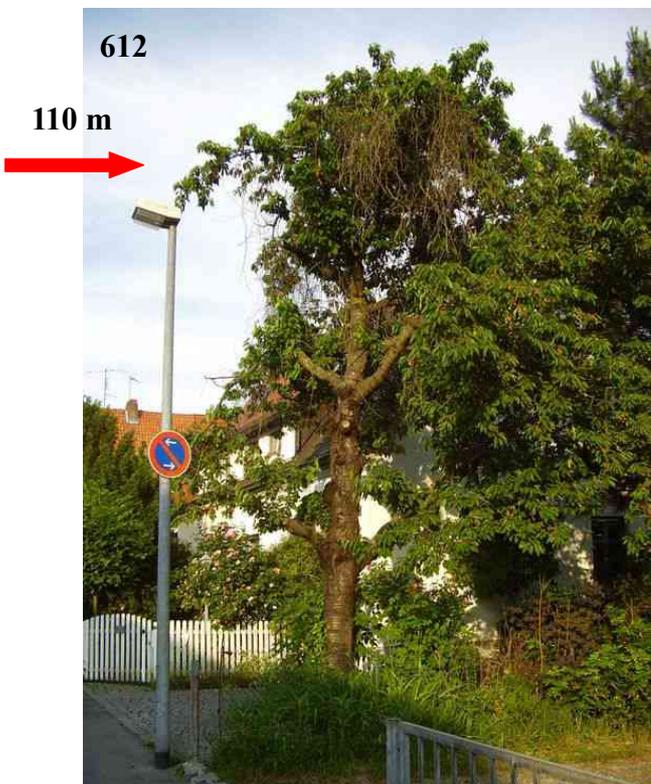


Road safety was not ensured anymore because of the asymmetrical shape. In spring 2011 the maple tree was felled.

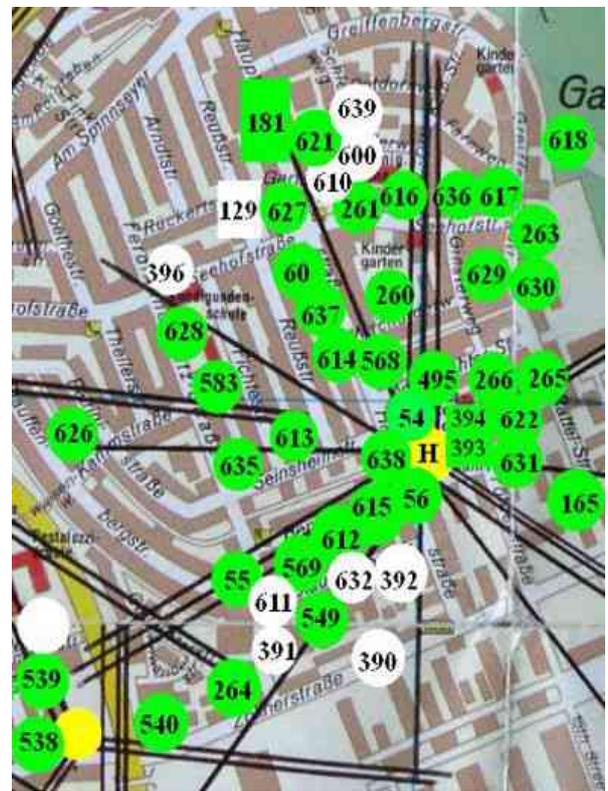


View from the crossing Hauptsmoorstraße/ Seehofstraße on the damaged maple tree to the right, mobile phone site Hauptsmoorstr. 26 a and two conifers with growth disturbance on the top. Mounting height: 26,6 m – 31,1 m, eighteen sector antennas (3 x 0°, 2 x 60°, 95°, 3 x 120°, 140°, 180°, 215°, 3 x 240°, 270°, 300°, 335°).

Around this mobile phone site numerous tree damages in gardens often beginning on the side, which was facing the antennas, were documented since 2008. All existing trees were affected: pear, cherry, walnut, birch, lime tree, beech, oak, hornbeam, field maple, tree of life, yew, sugarloaf spruce and various conifers. Only in the radio shadow of buildings one could see healthy trees. More trees around this site: pages 80, 81, 195, 222, 252, 371-380, 498, 499, 569, 608, 623, 636.



View from the west
Unilateral damaged cherry tree in Benkertstraße with visual contact to the phone mast.



Phone mast Hauptsmoorstr.(H), sites of exposed trees (green), of trees in radio shadow (white).

Conifer, Dr.-Rattel-Straße/US-Army (2008-2016)



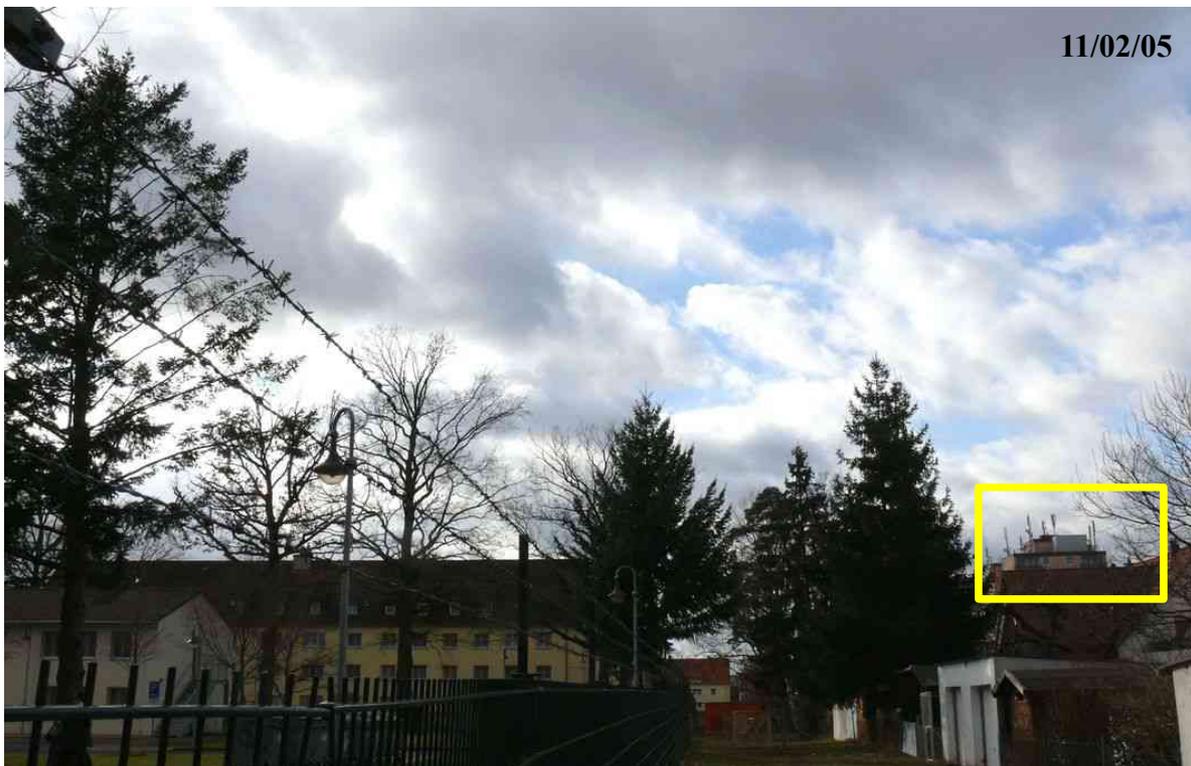
192 m

View from the northeast

On 8 July 2008 this unilateral damage pattern of a conifer was perplexing.



Over eight years only a slight increase of the damage appeared.



View from the east

From the conifer on the left visual contact to the phone mast Hauptsmoorstr. 26a is given.

Lime tree, Residenzstraße/Ottoplatz (2008-2013)



View from the southeast
On 18 August 2008 loss of leaves and brown colouring was noticed. Only on the left green leaves were seen.



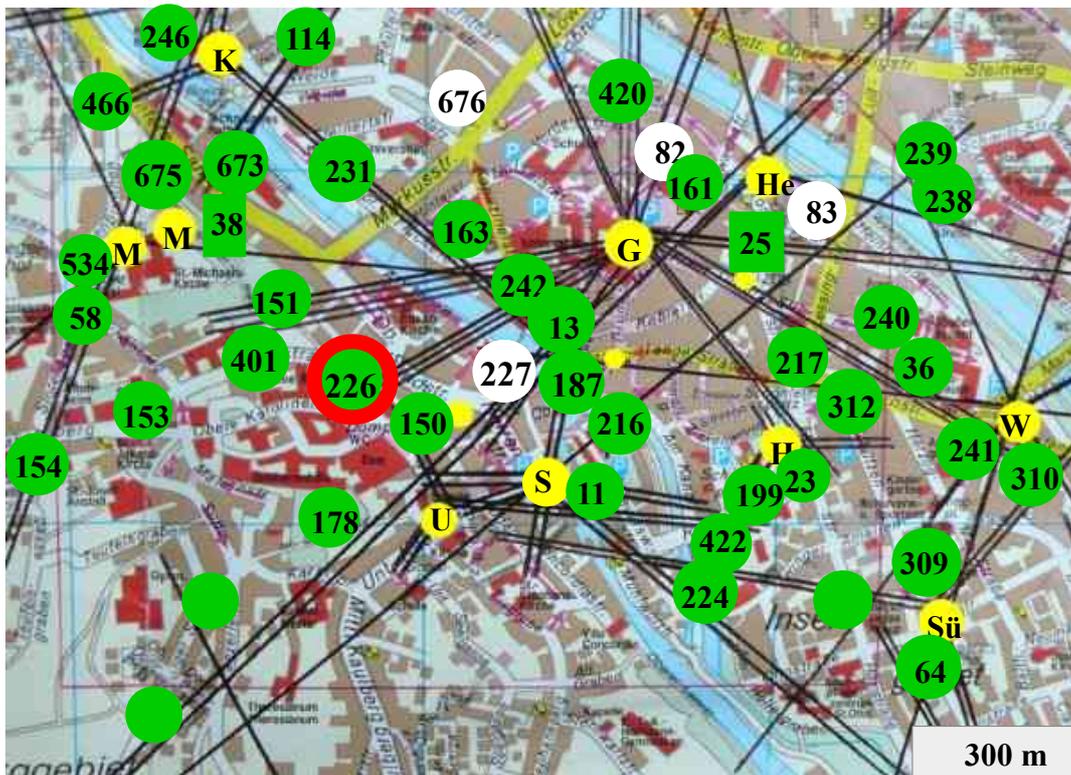
In the following time the asymmetrical damage pattern in the crown increased.



In 2011 dead branches on the eastside had been cut off. On 7 July the tree had already lost many leaves. From the east RF-EMF of several phone masts reach the tree (see map).



In 2013 the situation was similar.



Detail from City map Bamberg with Cathedral square, Michelsberg, Concert Hall, Center, Schranne, Wilhelmsplatz and a part of the Haingebiet. The sites of the phone masts (yellow), the main beam directions of the sector antennas (black), sites of exposed trees (green) and sites of trees in the radio shadow of buildings were added (base of the map: City map Bamberg, 23. edition, Städte-Verlag E. v. Wagner & J. Mitterhuber).

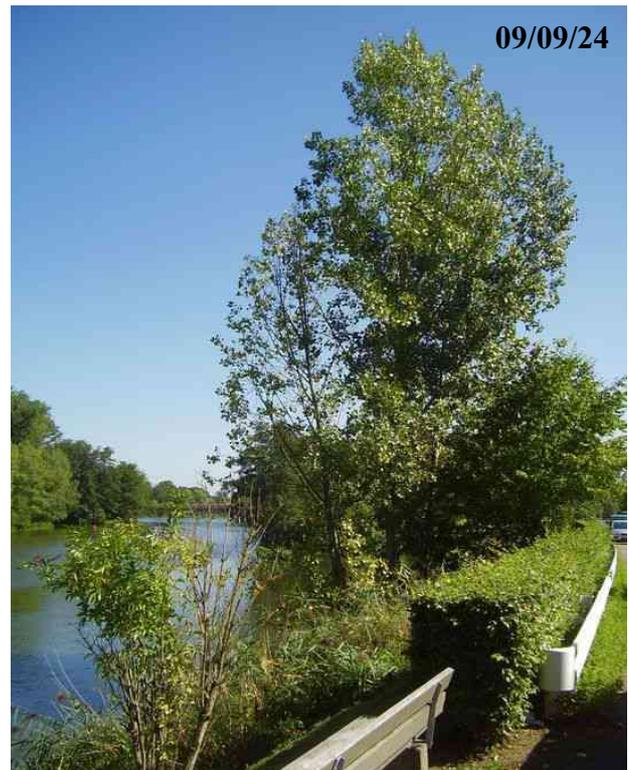


View from the southwest
View from the Rosengarten over the lime tree to phone mast Grüner Markt 23.
On its westside the lime tree was still green.
Measurement on 12 July 2010: $3830 \mu\text{W}/\text{m}^2$



On 21 Sept. 2008 the lime tree in the court of the former Dominican Monastery (now Schlenkerla) had still dense foliage. The tree is shielded by the surrounding buildings.

Poplar, Am Regnitzufer (2008-2016)



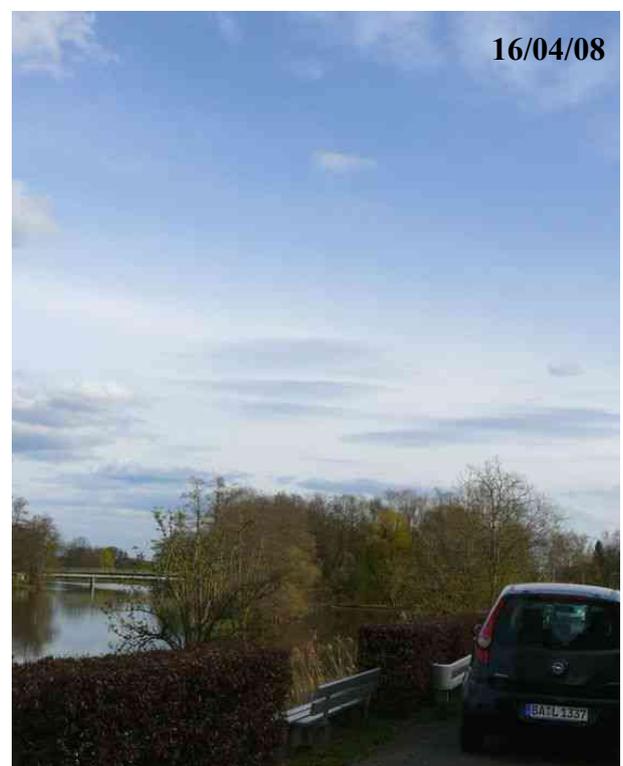
View from the north to poplar and elder.

On 18 August 08 the poplar was yellow on the left side. poplar had lost many leaves on the left side. Visual contact is given to phonemast Gutenbergstr. 20 in a distance of around 2 km,

View from the northwest. On 24 Sept. 09 the

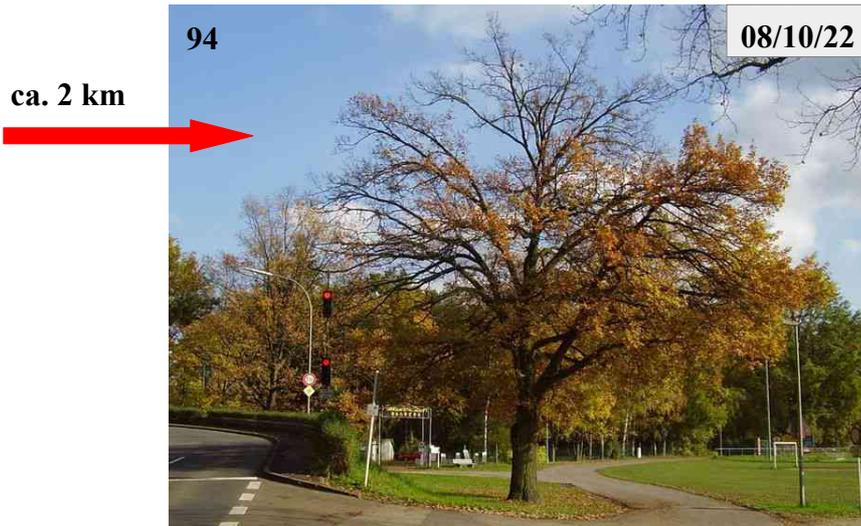


On the left side branches had been cut. In the following years the crown grew asymmetrically. On 22.09.13 the elder had already lost most leaves.



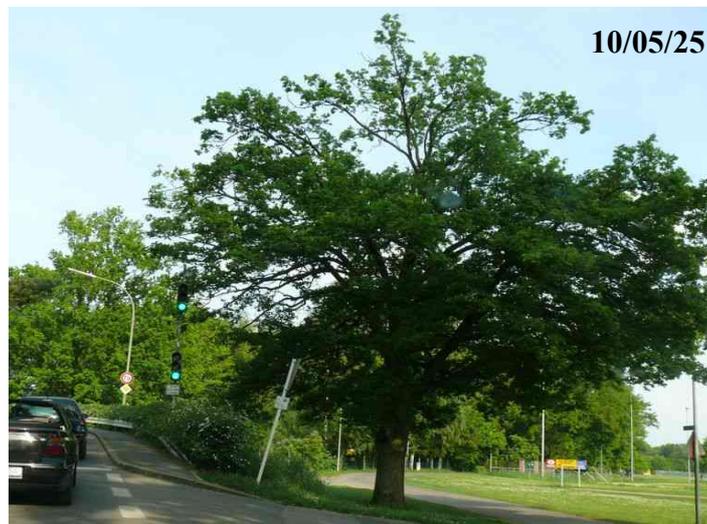
Because of the asymmetrical shape road safety was not ensured anymore. In winter 2015 the poplar was felled.

Oak, Brigde in Bamberg-Bug (2008-2014)



View from the northwest

In Oct. 2008 differences concerning defoliation between left and right side and between upper and lower part of the oak were noticed. From left (northeast) radiation of phone mast Gutenbergstr. 20.

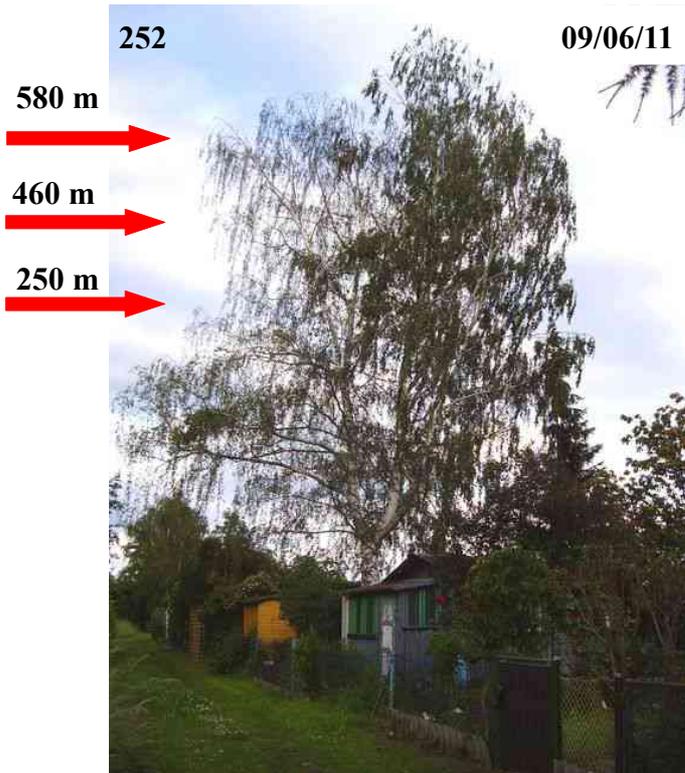


In May 2010 crown transparency on the left side and on the top

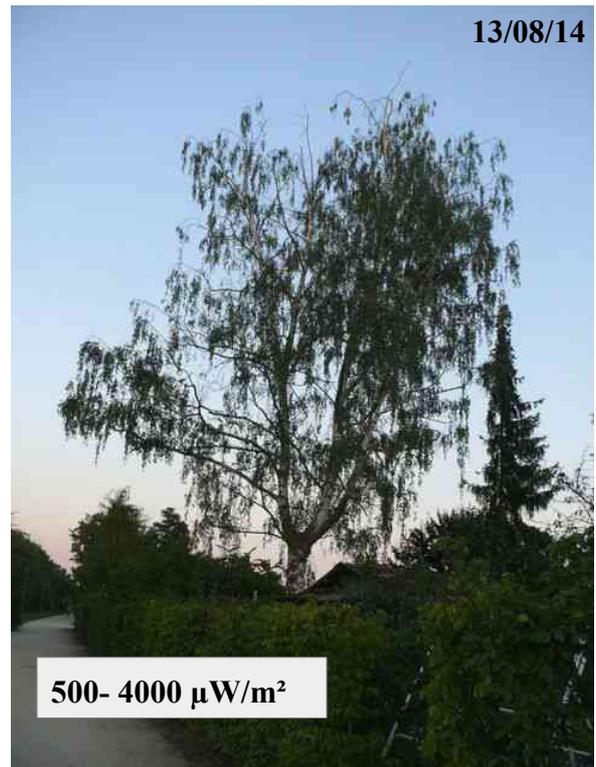


In July 2014 some branches on the left side and on the top had died off.

Birch, Allotment garden Black bridge/grounds of horticultural show 2012 (2009-2015)



View from the northwest
Allotment garden Black bridge.
In June 2009 the unilaterally damaged birch
was seen. More birches had already been felled.



Horticultural show 2012, Port adventure path.
RF-EMF from three phone masts in the port.
reach the birch. Measurements along the path.



On 06 August 2014 the leaves had turned brown -
probably as a result of putting into operation
4 G (LTE Long-Term Evolution).



In winter 2014/2015 the birch had been felled.

Birches, Am Hahnenweg (2009-2016)



203

09/06/14

View from the east

On 14 June 2009 a slight difference between the south and the north side of the birches was visible. The growth of the conifer was disturbed.



10/06/22

On 22 June 2010 the difference between the two sides was clearer. Visual contact was given to the phone mast Altenburg (810 m).



12/05/29

150 $\mu\text{W}/\text{m}^2$

View from the southeast

On 29 May 2012 the unilateral damage and the damage of the treetop had increased.



16/05/25

From year to year it became worse. In 2016 the birches had been felled.

Walnut, Schoolyard of the Gangolfschul (2009-2014)



View from the southeast
In June 2009 crown damage and a difference between the left and the right side was seen.



In July 2011 branches on the right had died off. RF-EMF from northeast (Ludwigstr. 25).

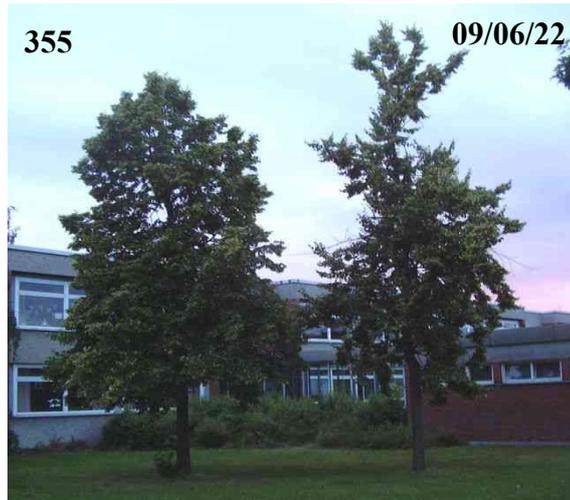


In August 2013 dead parts on the right and on top had been cut off. But the right side was leafless.



In July 2014 the walnut was felled. Phone mast Ludwigstr. 25: height 37 m, 3 (now 12) antennas.

Lime trees, Heidelsteigschool (2009-2013)



View from the southeast

In June 2009 the difference between the two lime trees on a meadow was perplexing because they stood under largely identical site conditions.



However, there is one difference: from the right RF-EMF from the phone masts Kantstr. 33 (height 43 m, 9 sector antennas) and An der Breitenau 2 (height 28 m, 21 sector antennas) reach the trees. A great amount of the electromagnetic waves is absorbed from the lime tree on the right and reflected, scattered or diffracted. Therefore the exposure of the lime tree on the left is much lower.



On 17 Sept. 13 the lime tree on the right had already lost many leaves. Measurements on 1 Nov. 15.

Birch trees on the bank of the river Regnitz (2009-2013)



231

09/09/16

217 m



Concert and Congress Hall of the „Bamberg Symphony Orchestra“ with phone mast

View from the southwest to the eastbank of Regnitz. Crown transparency at both birches. The upper half of the left birch had severe damage. From the left side (northwest) RF-EMF (main beams of two 130°- sector antennas) hit the left birch. Phone mast Concert and Congress Hall: height 25 m, 6 sector antennas.



16/07/06



13/08/02

In August 2013 the left birch was felled. Crown transparency at the right birch. In 2014 the phone mast on the Concert hall had been enlarged to 21 sector antennas. In April 2016 it was shocking to see that more trees along the river had been cut down.



08/07/08

95 m


Hornbeam, Hainstraße/Sodenstraße (2009-2014)

535

09/10/06



View from the northwest

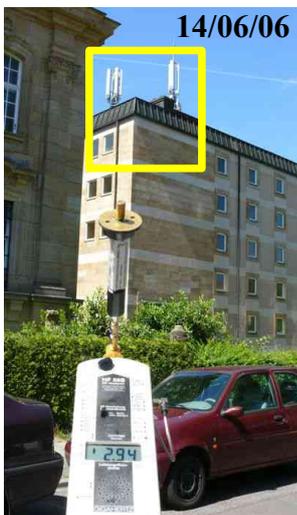
In 2007 the phone mast Hainstr. 39 started transmission.

In October 2009 a side difference at the hornbeam was seen: left side almost leafless, right side with dense foliage.



13/05/21

In May 2013 the tree had grown only few leaves on the left.



14/06/06





14/06/06

In 2014 the mobile phone site had been enlarged from 6 to 21 sector antennas.

In June 2014 branches had been cut off.

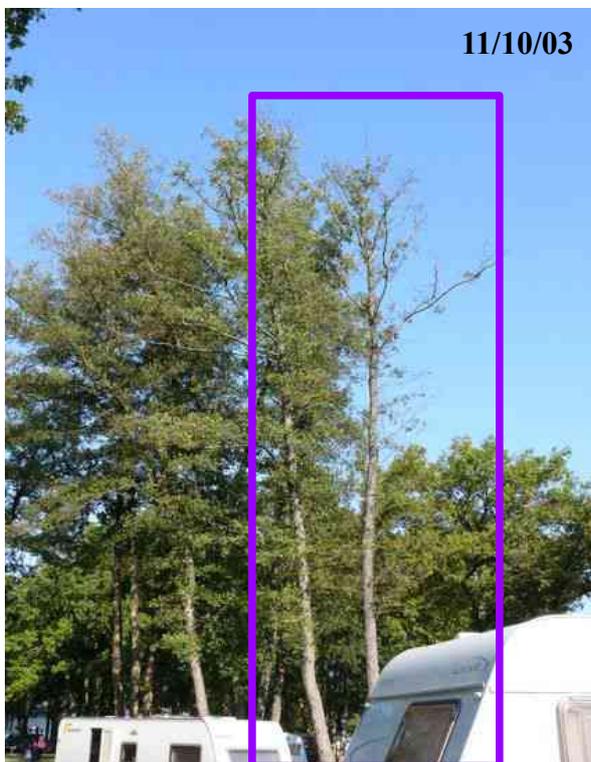
Measured value: 2940 $\mu\text{W}/\text{m}^2$

Alders, Campsite in Bamberg-Bug (2009-2013)



View from the south

In October 2009 two alders on the eastern side of a larger group of alders had died. The dead alders (marked black) were felled in winter 2009/2010. From east RF-EMF are coming from the phone masts Gutenbergstr. (2,3 km) and A 73 at Strullendorf (4 km), from the television station (also DVB-T) Kälberberg (10 km) and from the radio station (DAB) Geisberg (11 km).



In the following period the next alders died (purple). In winter 2012/13 these were felled also. Since 2004 severe tree damages occurred on the campsite. The damages increased rapidly. All tree species were affected. Numerous trees were felled (p. 170, 367, 570, 585, 605, 629).

Maple trees, Playground at the Hospital (2010-2014)



145

10/07/01

08/06/10

ca. 2 km
←



Phone mast
Altenburg with
17 sector antennas
and directional
radio (10/10/21)

View from the northeast

Maple trees at the playground of the hospital. On 1 July 2010 the difference between the maple trees on the right and on the left was noticed.

Visual contact is given to the phone mast Altenburg Castle in a distance of 2 km.



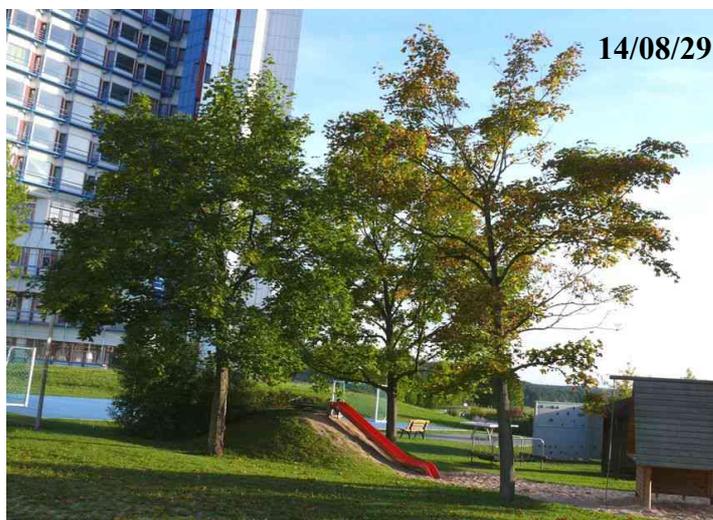
12/08/23

View from the
Hospital over
the playground
to the Altenburg.
Value at a window:
88 $\mu\text{W}/\text{m}^2$



13/08/02

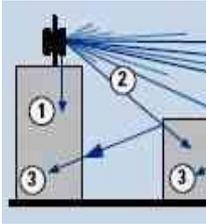
On 2 August 2013 the maple tree on the right side was brown und had already lost leaves.



14/08/29

On 29 Aug.2014 the situation was similar. Additionally, new planted trees nearby did not grow well.

Silver maple trees, Hospital (2010-2014)



Main beam and side beams, reflection on a building. Detail from „Mobilfunk“ STMUGV (2007)



View from the northeast



Tree on the right in another perspective

Silver maples on the left of the playground above. On 1 July 10 crown transparency at the two trees on the right, whereas the tree in the middle had dense foliage. The silver maple on the left had in turn sparse leaves. The reflections of the RF-EMF on the facade could be the cause (see figure).



On 23 August 2012 the impression was similar. Only the tree in the middle was in full leaf.



On 29 August 2014 furthermore, the trees don't develop well except the tree in the middle.



Locust trees, Don-Bosco-Straße (2010-2013)

164

10/10/06



280 m

10/06/26



6 sector antennas

In Oct. 2010 considerable difference between the two trees.
Locust tree on the right leafless; visual contact to phone mast.

Phone mast Margaretendamm 28
(height 26 m, 6 sector antennas)

12/05/12



View from the southeast
In 2011 the locust tree on the right died off and was felled.

10/10/06



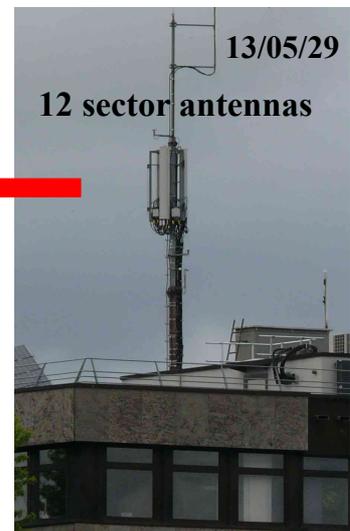
Measurement: 2920 $\mu\text{W}/\text{m}^2$

13/09/10



The second locust tree was felled in winter 2012/2013.
Numerous trees in the radiation field of this phone mast are damaged or already felled

13/05/29



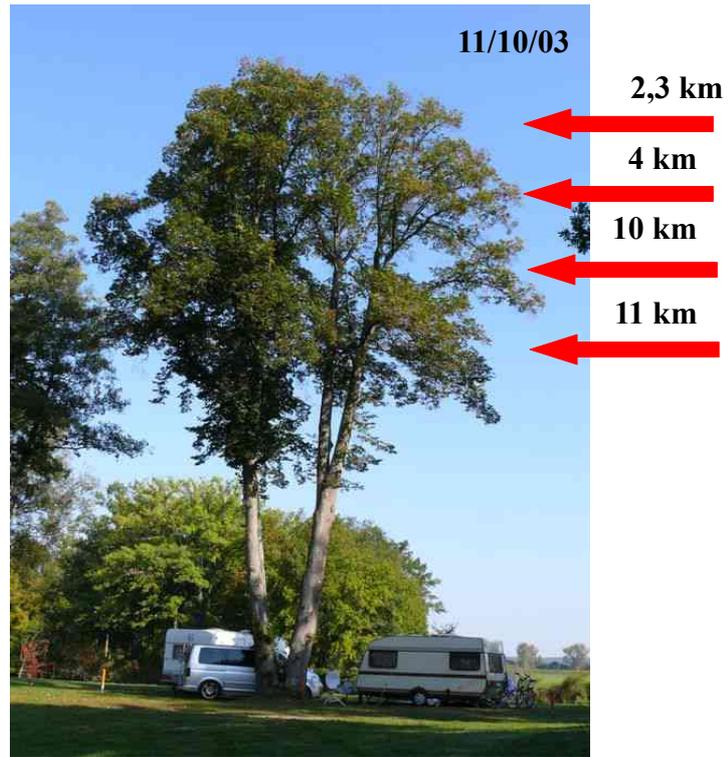
12 sector antennas

The phone mast was enlarged.

Lime trees, Campsite in Bamberg-Bug (2010-2014)



View from the southwest
 On 12 Oct. 2010 the great contrast between the right and the left lime tree was noticed. From the east RF-EMF are coming from the phone masts Gutenbergstr. (2,3 km) and A 73 at Strullendorf (4 km), from the television station (also DVB-T) Kälberberg (10 km) and from the radio station (DAB) Geisberg (11 km).



On 3 Oct. 2011 the lime on the right was not brown, as in the year before, but transparent.



In 2013 branches had died and broke off.



It is dangerous under the trees

Pine, Babenbergerring/Schlüsselbergerstraße (2011-2012)

170

11/02/11

632 m



View from the southwest
In February 2011 loss of needles on the left side. On the right side many needles were brown.

11/07/05



View from the southeast
In July 2011 the pine had lost further needles. Visual contact to phone mast Altenburg (632m).

12/05/29



View from the southwest
In May 2012 the loss of needles had increased.

12/08/23



View from the southeast
In August 2012 only a few brown needles were left. Measurement: 250 $\mu\text{W}/\text{m}^2$
In 2013 the pine was felled.

Chestnuts, Beer Garden, Mahr's-Bräu (2011-2014)



View from the west

On 3 June 2011 the two chestnuts on the westside of the Beer Garden were brown. RF-EMF from the three phone masts Wilhelmsplatz, Theresienstraße and Erlichstraße interfere at this place.



On 20 Sept. 2012 the two chestnuts were leafless; the other chestnuts and a lime tree still had leaves.



On 25 August 2014 the stem of one chestnut was cut; the second chestnut was leafless. The third chestnut began to turn brown. RF-EMF come not only from the west but also from the southeast through gaps between the buildings (distances 432 m, 622 m, 633 m).

Beech, Southern part of horticultural show 2012 (2012-2016)



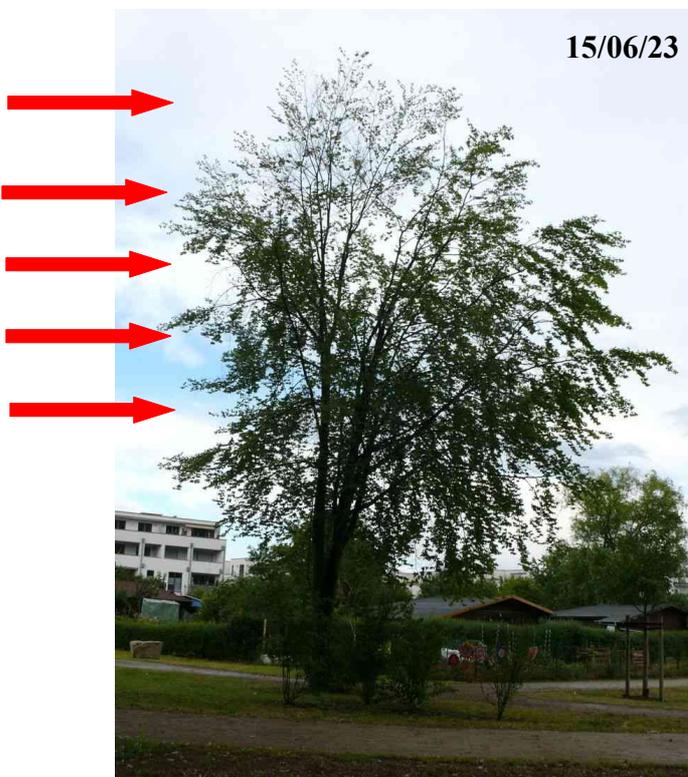
View from the southwest

On 27 August 2012, during the horticultural show, RF-EMF from the northwest and the north (three phone masts in the port) reach the tree.



View from the west

From this perspective the difference between the crown transparency on the left side was observed. north and the south side is better recognizable.



View from the west

In June 2015 crown transparency had increased.

In 2014/15 LTE (4 G) was added to many phone masts.



View from the west

In July 2016 the beech was almost leafless.

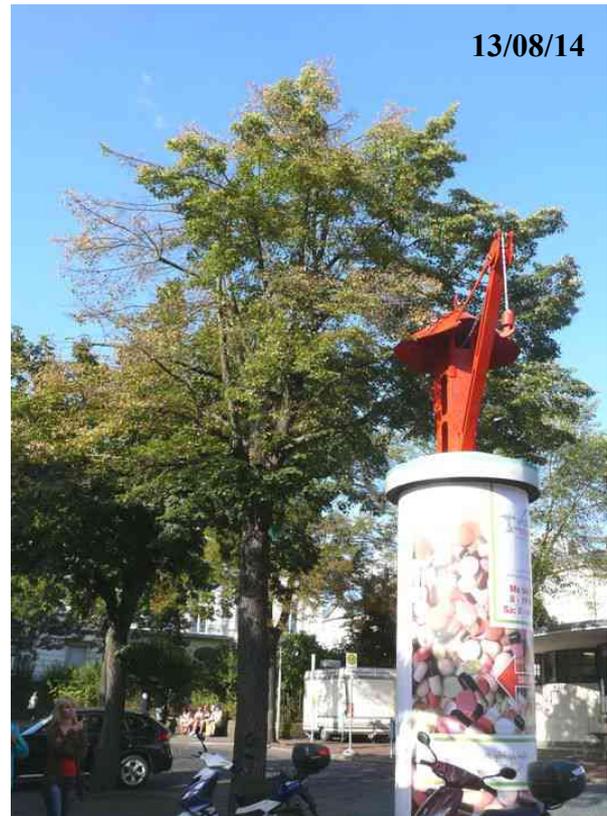
A further phone mast started transmission.

Lime tree, Lange Straße/Südliche Promenade (July 2013 - April 2014)



View from the southwest

On 15 July 2013 leaves turned yellow top left.



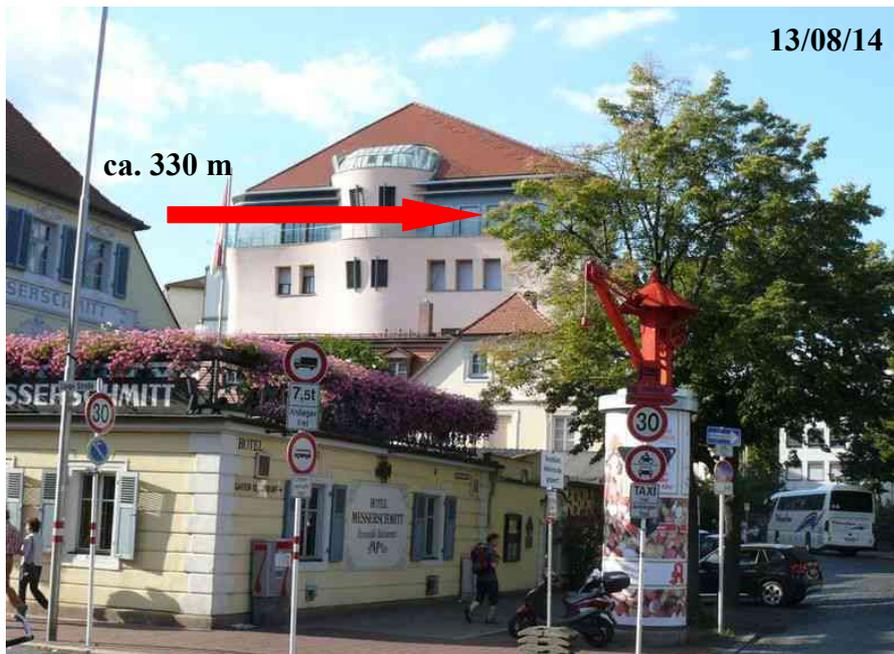
On 14 August 2013 the section top left was leafless.



On 7 Sept. 2013 the whole left side had turned brown.



On 30 Sept. 13 the lime had lost many leaves.



View from the south

View from the road intersection at the Schönleinsplatz to the lime tree behind the advertising pillar. In the background on the left a gap between buildings is visible.



View from the southeast



View from the southwest

Looking from the southern end of the green area at the Schönleinsplatz to the lime tree, a part of the phone mast Grüner Markt 23 is visible.

In winter 2013/2014 branches had been cut.

Maple, Babenbergerring (2014-2016)

427

14/07/16



14/09/11



View from the southeast

In July 2014 the upper right section showed damage. In September 2014 many leaves had fallen.

15/08/04



16/07/07



In August 2015 the damage was similar

Visual contact is given to the phone mast Altenburg in a distance of 630 m.

In July 2016 the damage had increased.