QUESTIONNAIRE ON SPECTRUM REQUIREMENTS FOR TERRESTRIAL TELEVISION BROADCASTING IN CONNECTION WITH WRC-15 AGENDA ITEM 1.2

Name of the Administration: Germany

Contact person: N.N.

Email address:

Telephone number:

1 a) What standards have you adopted for digital terrestrial television broadcasting?

b) Have you started introduction of digital terrestrial television services?

c) If yes, please provide further detail on the number of multiplexes in use, their technical specifications, the percentage of geographic area or population they are intended to cover and the total spectrum use to inform WP 6A.

Reply:

Country	No of Multi-plexes	System & Modulation	FEC	GI	Reception Mode[1]	Capacity per multi-plex (Mb/s)	Current Percentage Population Coverage	Intended Percentage Population Coverage	Content per Multiplex	Total Capacity (Mb/s)	**Total Spectrum Bandwidth Used or intended for imple-mentation (MHz)**	Any additional comments (eg. duration of licences)
D	3 (Layer 1-3)	DVB-T, 16-QAM	2/3	1/4	Fixed, portable	13.3	90% - 100%	95% - 100%	4 SD	39.9	320	Public service multiplexes licensed until 2025
	3 (Layer 4-6)	DVB-T, 16-QAM	2/3	1/4	Fixed, portable	13.3	55% - 66%	75% - 80%	4 SD	39.9		Commercial multiplexes licensed until 2025
	2 (Layer 7+8)	DVB-T, 16-QAM	2/3	1/4	Fixed, portable	13.3	14%	15% - 20%	4 SD	26.6		Commercial multiplexes licensed until 2025
	1 (Layer 9)	DVB-T, 16-QAM	2/3	1/4	Fixed, portable	13.3	6%	10% - 15%	4 SD	13.3		Commercial multiplex licensed until 2025

The multiplexes in row 1 are universal.

The multiplexes in rows 2 to 4 are regional/local.

The figures for coverage are for fixed reception.

See also attached maps in the Annex providing an indication of regional coverage per multiplex. The maps give an overview of the channel usage in the indicated allotments. They do not imply that all locations within an allotment are necessarily covered nor do they indicate the overspill coverage beyond allotment borders.

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[1] Eg Fixed, Portable outdoor/Mobile, Portable indoor

2 a) Have you commenced analogue television switch-off?

b) If you have any such plans, when do you expect to have completed the analogue switch-off process?

Reply:

Analogue switch-off for public services and commercial services was in 2008.

Currently, still 13 analogue low-power transmitters for local TV are in operation.

3 a) What is the percentage of viewer uptake of terrestrial television in your country, including those whose service provider uses terrestrial broadcast re-transmission (e.g. in cable networks)?

b) If possible, please also provide details of the number or proportion of users who receive television primarily by terrestrial means.

Reply:

About 12 % of viewers use the terrestrial platform, averaged over the entire country.
In metropolitan areas, where about 50% of the population live, up to 25% of viewers us the terrestrial platform. The acceptance is increasing.

Terrestrial Television as the primary means of reception is used by about 5 % of the viewers, averaged over the entire country. In metropolitan areas this percentage is 8.3%.

Small cable networks, e.g. in hotels or hospitals, often use terrestrial signals in the headends serving about 1.5 to 2 million receivers.

4 a) Indicate how many analogue television transmitters use channels in the frequency sub-band 694-790 MHz (as indicated in Resolution **232 (WRC-12)**).

b) How many are in the remaining part of the UHF band.

Reply:

a) Of the 13 low-power transmitters for local TV, 10 transmitters use channels in the frequency range 694-790 MHz.
b) The remaining 3 transmitters use channels below.

5 a) What frequencies/channels are currently used or intended to be used by digital terrestrial television broadcasting in your country? Please distinguish between those in use and those intended to be used.

b) If allotments/SFNs are in use, a sketch map of frequency allocations could be included, with an accompanying table of allocations, ~~as shown in Annex 2~~. Otherwise, it might be possible to show main transmitters and channels, grouped in layers, in a table.

c) Please indicate how many digital television assignments/allotments use channels in the frequency sub-band 694-790 MHz (as indicated in Resolution **232** (**WRC-12**), and

d) How many are in the remaining part of the UHF band.

Reply:

a) Channels in use range from 21 to 60.
b) The 3 universal layers and the 6 regional/local layers which are currently in use are described in the maps given in the Appendix. (The question marks in layers 6 and 7 indicate that the decision on the channel is yet to be taken)
c) About 140 assignments use channels in the range 694-790 MHz.
d) About 445 assignments use channels in the range 470-694 MHz.

6 a) Are those frequency bands also shared with other primary services?

b) If yes, please give details of those systems and their spectrum use.

Reply:

a) No other primary services in the band 470 - 790 MHz.
790 - 862 MHz is co-primary with the Mobile Service.
b) 790 - 862 MHz is exclusively used by the Mobile Service (LTE).

7 a) Are those frequency bands also shared with secondary services such as PMSE, radio astronomy or wind-profile radar?

b) If yes, please give details of those systems and their spectrum use.

Reply:

a+b) The interleaved spectrum is used for the deployment of PMSE. PMSE is heavily used in this band.
Radio astronomy uses channel 38, which prevents the usage of channel 38 by broadcasting in large parts of the country as well as the usage of channels 37 and 39 relatively close to RAS stations.
4 wind-profile radar stations are in operation in channel 22.

8 a) Do you foresee the adoption or expansion of television services broadcast using second-generation systems such as DVB-T2?

b) If yes, please give indicative details of the planned transition, including any simulcast period.

Reply

a) The introduction of DVB-T2 is envisaged and is currently undergoing the planning process.
b) With the introduction of DVB-T2 a transition period including simulcast is required, which is yet to be defined. For this transition period additional spectrum in the UHF band is needed.

9 a) Do you foresee a requirement for new and enhanced services, including HD and 3D television, on the terrestrial television platform?

b) If yes, please give indicative details of the number and nature of services planned, and if known, the expected timeframe for their introduction.

Reply

a) HD services are planned to be introduced with the introduction of DVB-T2. All services will be designed for portable and mobile reception. It is intended to broadcast as many programmes as possible in HD quality.
b) The timeframe for the introduction of these services is currently under discussion.

10 a) Are there plans in your country to launch more multiplexes in the future?

b) If yes, how many more and when? Please also indicate the expected timeframe for their introduction.

Reply

a) The envisaged number of public service multiplexes has already been reached. For the transition period additional multiplexes are needed, see question 8.
A significant increase in the number of commercial multiplexes is not expected in the future. However, in some densely populated areas a few transmitters may be added. To increase capacity 64QAM is used in some areas and may be used in some other areas as well. The coverage area of the existing multiplexes may be increased. This could be done either by increasing the area of SFNs or by moving frequencies from rural areas to urban and metropolitan areas.

b) For the transition period at least 2 additional multiplexes are required.

11 a) What is the amount of spectrum you foresee that will be required for terrestrial television broadcasting, if plans in Questions 8, 9 and 10 are to be supported, and services identified in Questions 6 and 7 are to be taken into account? Please indicate the modes of transmission that will be used, and timeframes.
~~If appropriate, a suggested form to express these requirements is shown in Annex 3.~~

Reply:

a) 6 multiplexes interleaved in 320 MHz in the UHF band (470 - 790 MHz) are needed to fulfil the requirements of public and commercial broadcasters.
3 multiplexes out of these are envisaged to cover the demand of public service broadcasters for full area coverage (95% - 100% population coverage).
The remaining 3 multiplexes will be either used by commercial broadcasters for nationwide (full) area coverage as well, or alternatively, to provide metropolitan and local area coverage with more than 3 multiplexes.

Country	No. of Multi-plexes	System & Modulation	Reception Mode	Capacity per multi-plex (Mb/s)	Intended Percentage Population Coverage	Content per Multiplex	Total Capacity (Mb/s)	Total Spectrum Bandwidth needed (MHz)
D	3	DVB-T2, 64-QAM	Fixed, portable	18 - 25	95% - 100%	4 - 8 HD/SD	54 - 75	168[1,3]
	3[2]	DVB-T2, 64-QAM	Fixed, portable	18 - 25	95% - 100%[2]	4 - 8 HD/SD	54 - 75	168[1,3]

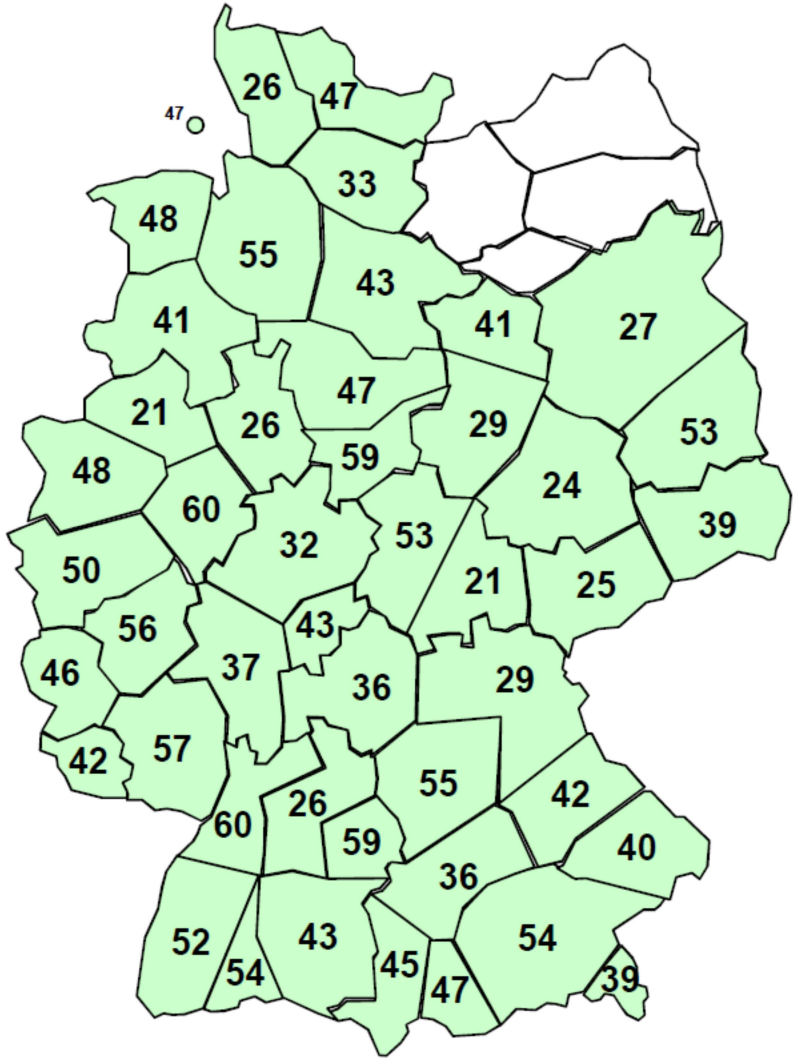
[1]: From experience with the GE06 planning process and the experience with coping with the impact of Digital Dividend I it is assumed that 7 channels are required to construct a layer with full area coverage.

[2]: 3 multiplexes with full area coverage (95% - 100% population coverage) are to be understood as a placeholder for the options described under a) for the remaining 3 multiplexes.

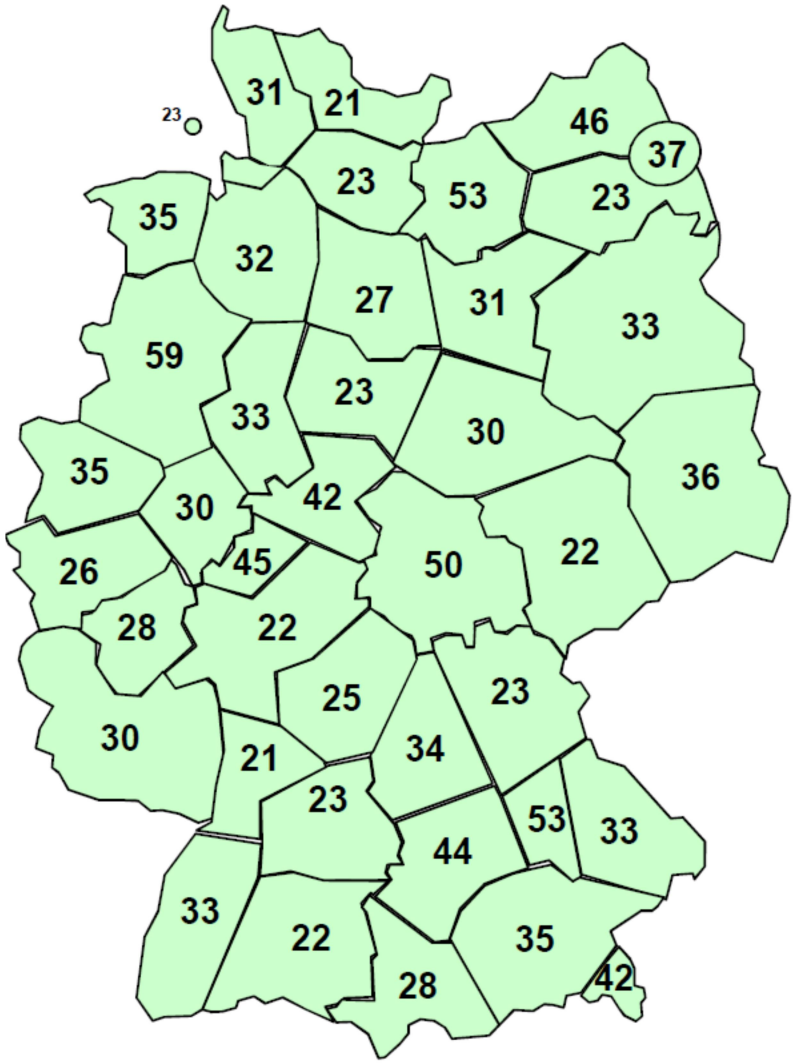
[3]: It is expected that the intended coverage target, with minor restrictions, can be achieved with the presently available spectrum of 2 x 160 = 320 MHz (470 – 790 MHz). This takes into account also secondary usage by other services which can not be “migrated” (radio astronomy and wind-profile radars).

APPENDIX

Layer 1



Layer 2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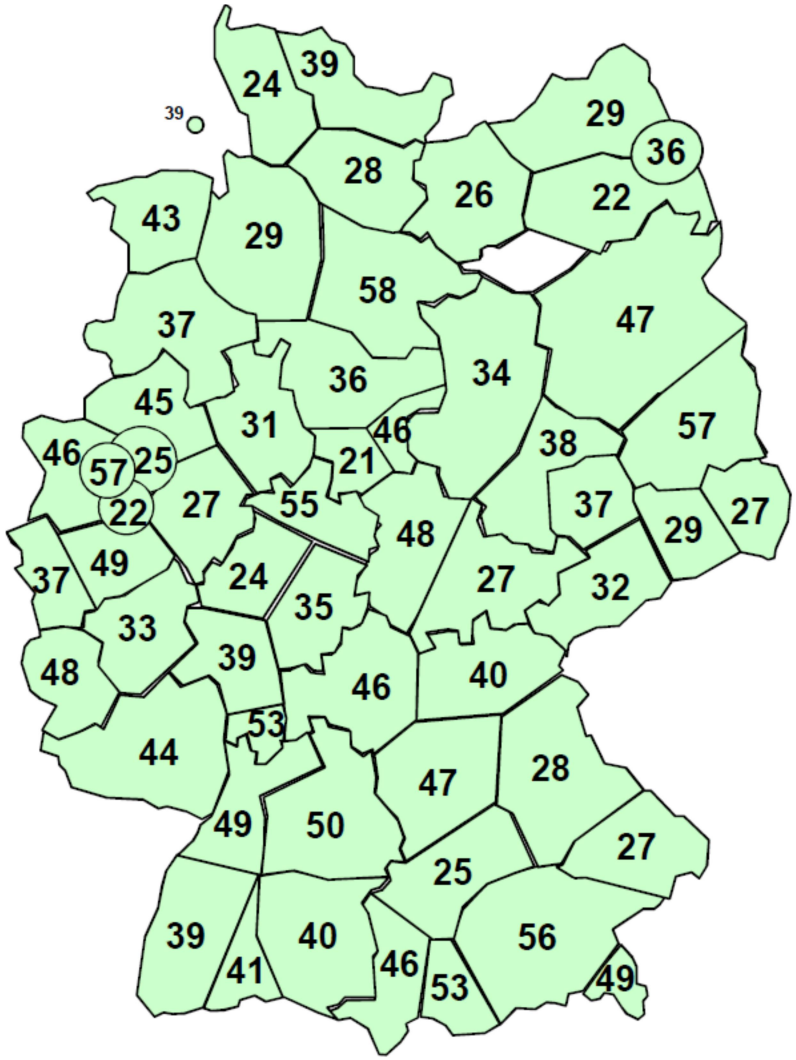
Layer 3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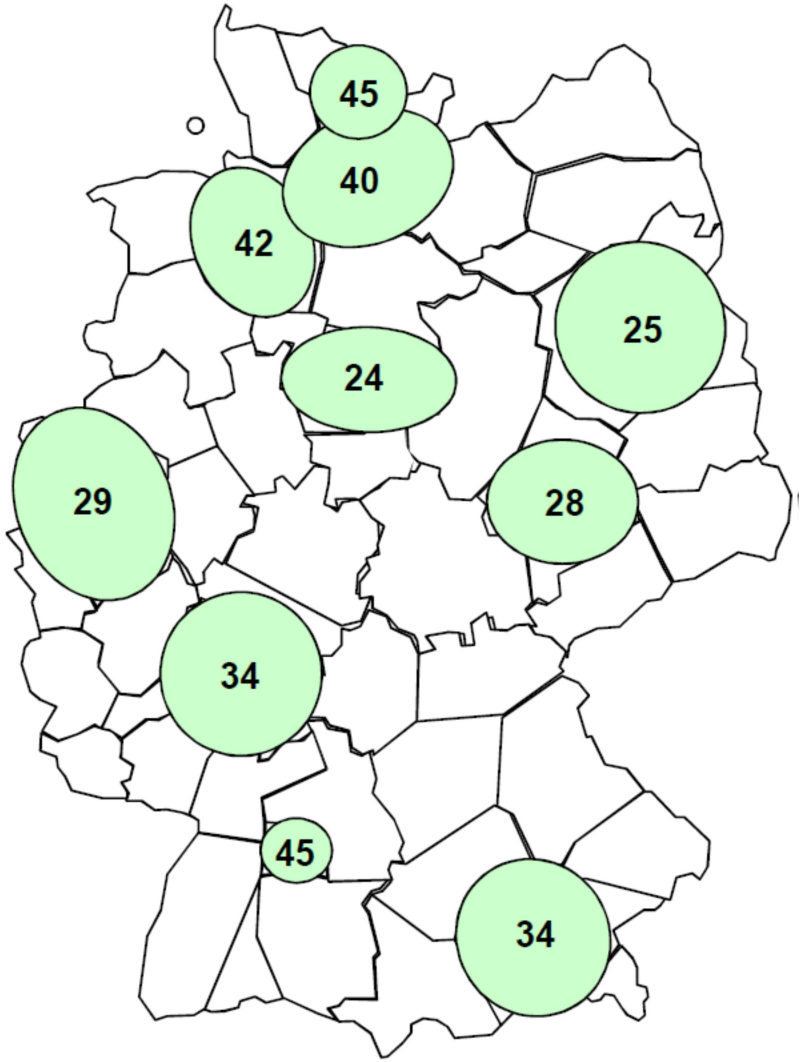
Layer 4



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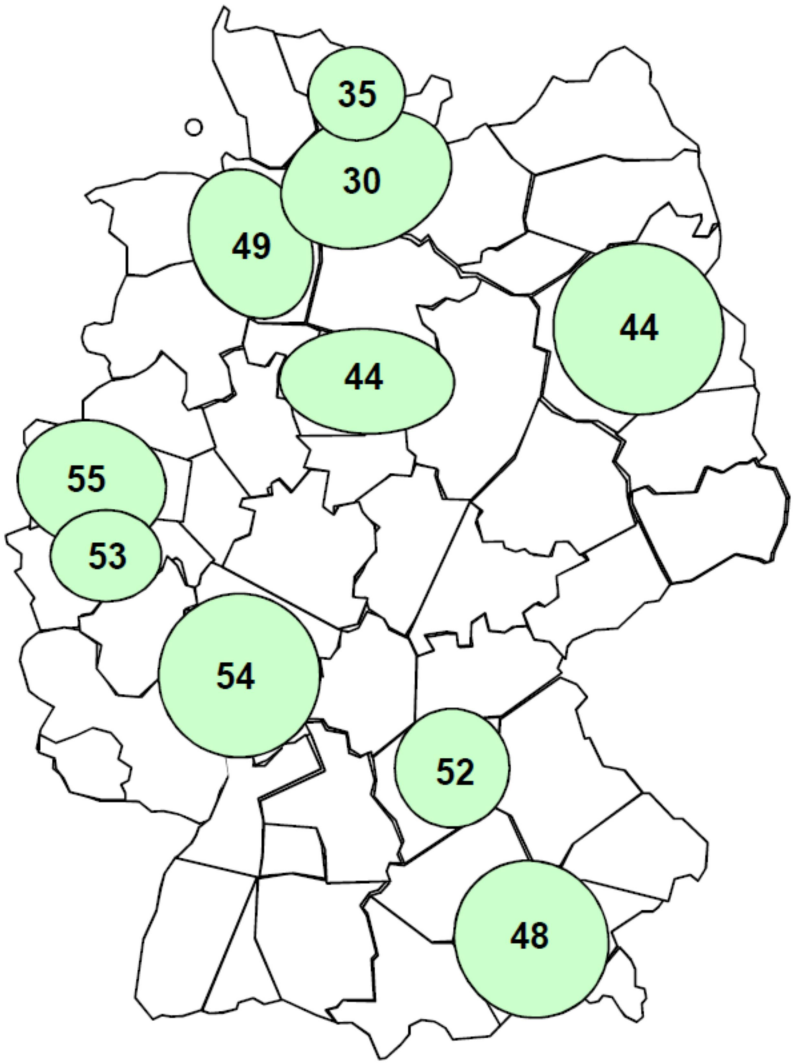

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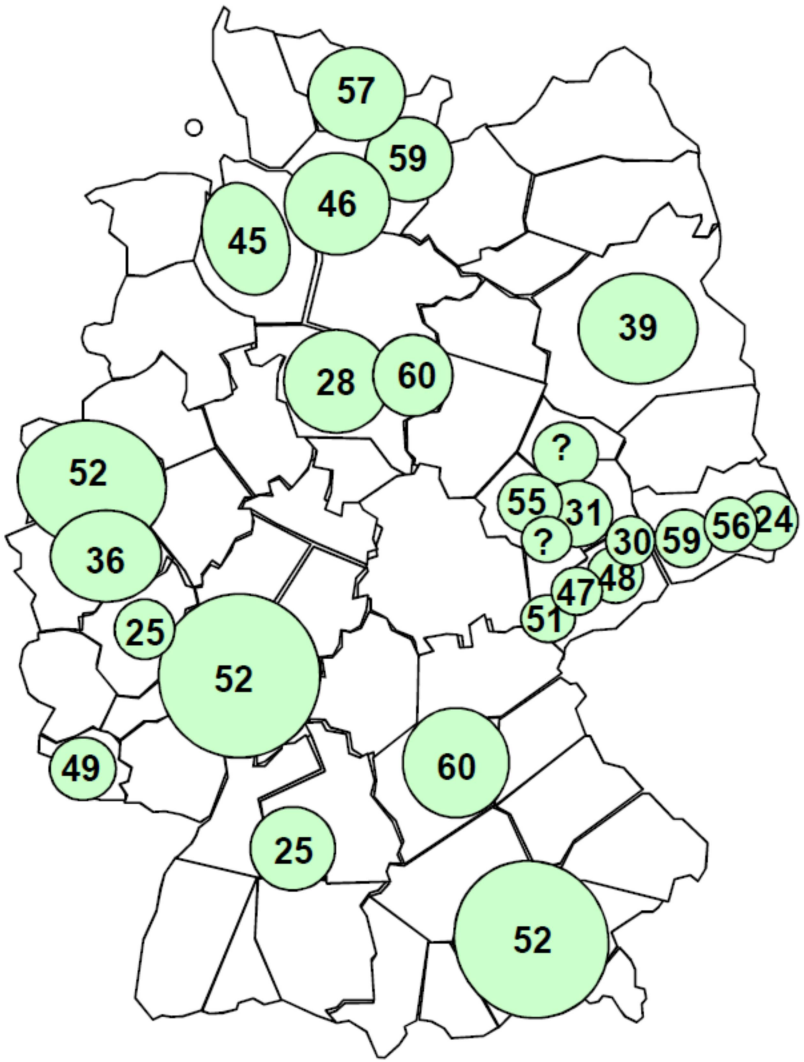

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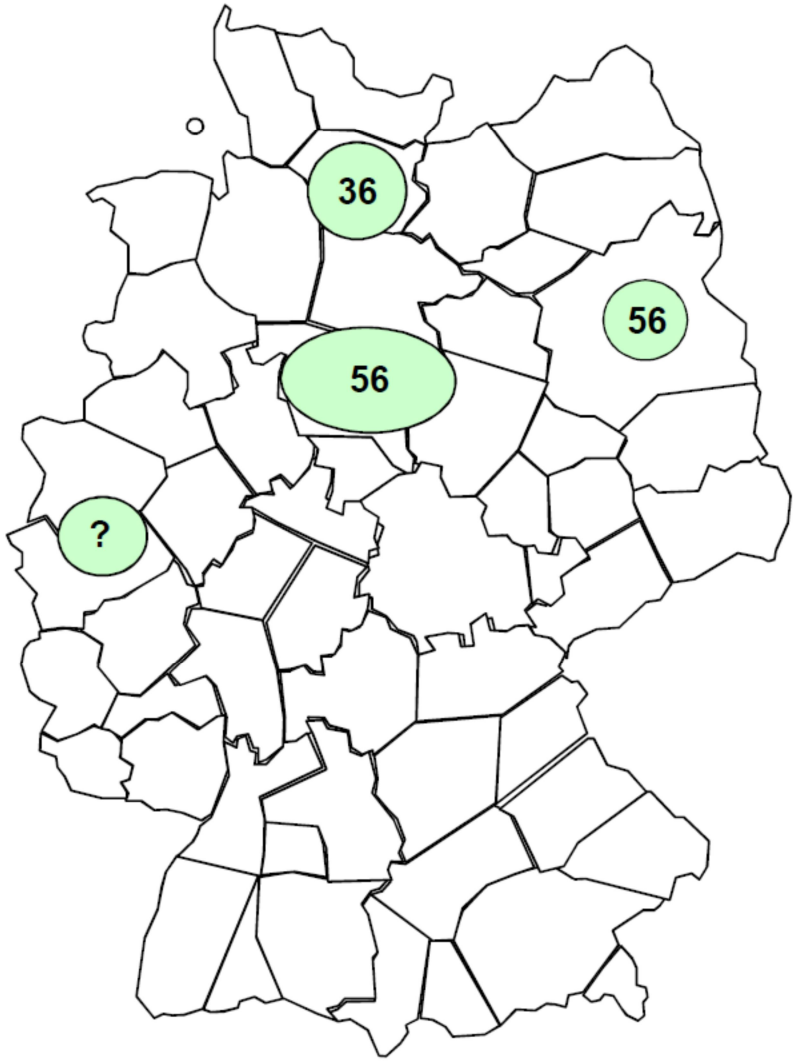
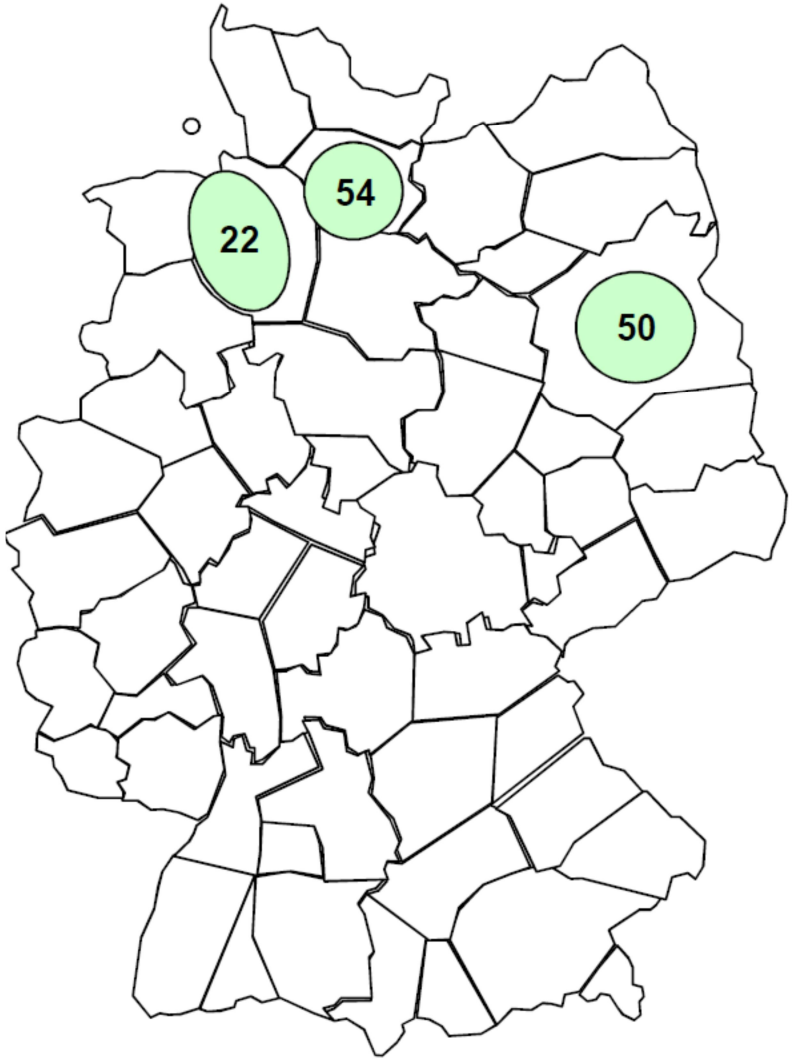


Layer 8



Layer 9