



Highfrequency



- for shielding high-frequency electromagnetic waves
- very good tear resistance with soft quality, antistatic, elastic
- 100 % textile properties
- elastic knitted fabric for a wide range of applications
- **organic cotton, kbA (controlled organic cultivation)**
- The New Antiwave quality is a right-left jacquard knit, in a combination of combed organic certified cotton and silver coated polyamide.

The coating is not made of controversial nano-silver, but of pure silver that surrounds the entire polyamide fibre. The precious metal silver is absolutely harmless to human health and to nature.

Pure silver has a natural antibacterial effect and can also have a positive effect on skin problems as well as excessive sweating and body odour.

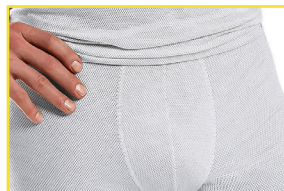
Thanks to the innovative fabric construction and the use of high-quality materials, this knitted fabric protects against electromagnetic radiation in the range from 20 kHz to 10 GHz with an efficiency of > 97 %. This is confirmed by an expert opinion by the EMF test lab Bavaria.

Also available by the metre and particularly suitable for making shielding clothes.

New Antiwave is a high-quality, easy-care fabric with a high-quality finish that ensures that the shielding properties remain intact even after several washes. Due to the antibacterial effect of the silver, it is sufficient to wash the laundry at 30 - 40 °C.

**Order-No.: 101080, 100977, 100978,  
100979, 100980**

Short-Desc.: AW Men-Short  
M, L, XL, XXL, XXXL



### Shielding knitted fabric

#### New Antiwave - Men-Shorts

Type	MHz	dB	in %
DVB-T2	470 - 690	20	99,0
LTE / 5G wide	700 - 750	19	98,8
GSM, LTE	920 - 960	19	98,8
GSM, LTE	1800 - 1880	16	97,5
DECT	1880 - 1900	16	97,5
LTE, 5G wide	2110 - 2170	15	96,9
W-LAN 2400	2400 - 2500	15	96,9
5G fast	3400 - 3700	15	96,9
W-LAN 5200	5150 - 5350	14	96,0

### Technical data

available sizes:	M, L, XL, XXL, XXXL ≈ 5, 6, 7, 8, 9
thickness:	ca. 0,5 mm ± 10 %
colour:	light grey / silver
basis weight:	ca. 145 g/m <sup>2</sup>
mesh size:	< 0,1 mm x 0,1 mm opaque
composition:	89 % Cotton (Organic) 9 % Polyamide 2 % Silver
properties:	very good tear resistance with soft quality, antistatic, elastic
wash cycles:	~ 40 x
basis of examination:	ASTM D-4935-2010 IEEE-Standard 299-97
shielding effectiveness:	max. ~ 20 dB (~ 99 %) direction-independent

### Care instructions

	particularly gentle washing (delicate or wool wash cycle at 30 or 40 °C)
	gentle ironing on level 1 (iron at low temperature)
	bleaching not allowed No detergents with bleach
	do not tumble dry
	no dry cleaning

### Scope of application

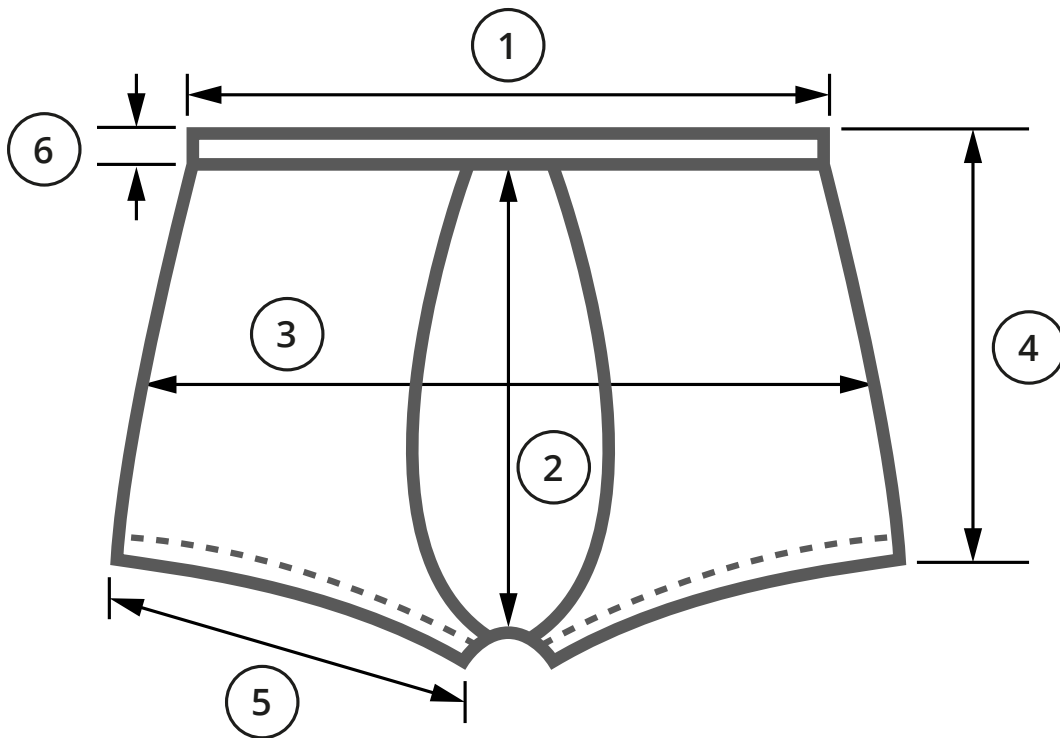
- public areas, home
- can be used as outerwear or underwear



New Antiwave - Size/Dimensions

Men-Shorts

No.	Dimensions (in cm)	48/50 Size: 5	52/54 Size: 6	56/58 Size: 7	60/62 Size: 8	64/66 Size: 9	Tol ±
1.	Waist size	32	33	36	37	38	3 %
2.	Length front and back	29	30	31	33	34	3 %
3.	Rise	44	46	48	50	52	3 %
4.	Length side	27	28	29	31	32	3 %
5.	Leg width	24	25	25	25	26	3 %
6.	Waistband	2,5	2,5	2,5	2,5	2,5	3 %

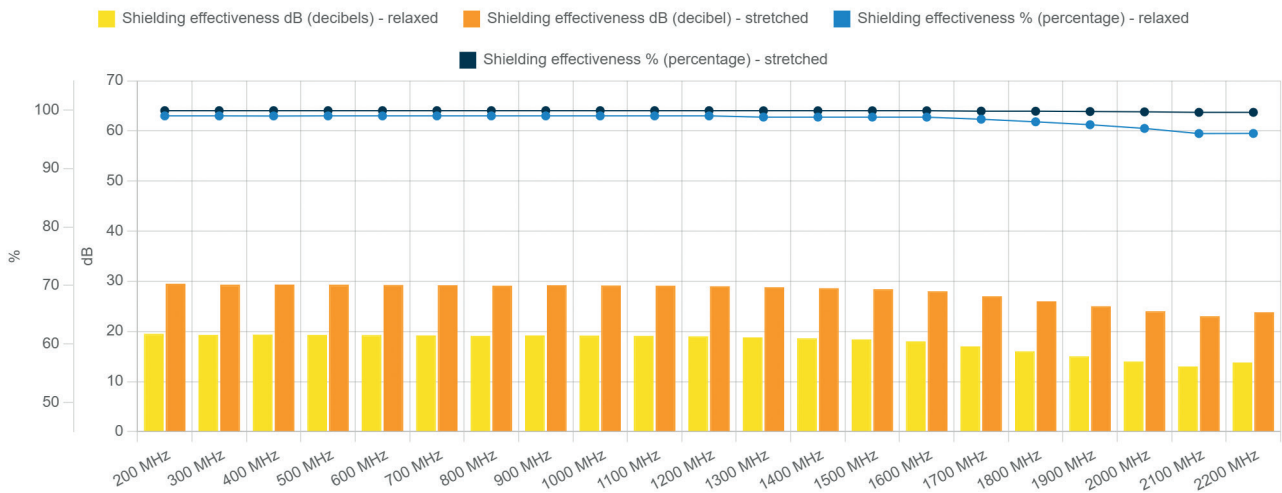




Type	MHz	Description
DVB-T2	470 - 690	digital video broadcasting – terrestrial, 2nd generation, TV via antenna
LTE / 5G wide	700 - 750	from 4G, now 5G NR without beamforming / MIMO
GSM, LTE	920 - 960	from 2G - D1, now 5G NR without beamforming / MIMO
GSM, LTE	1800 - 1880	from 2G - D2, E network, now 5G NR without beamforming / MIMO
DECT	1880 - 1900	wireless phone
LTE, 5G wide	2110 - 2170	from 3G, formerly UTMS, now 5G NR without beamforming / MIMO
W-LAN / WiFi 2400	2400 - 2500	wireless LAN
5G fast	3400 - 3700	5G NR - New frequency band with beamforming / MIMO
W-LAN / WiFi 5200	5150 - 5350	wireless LAN

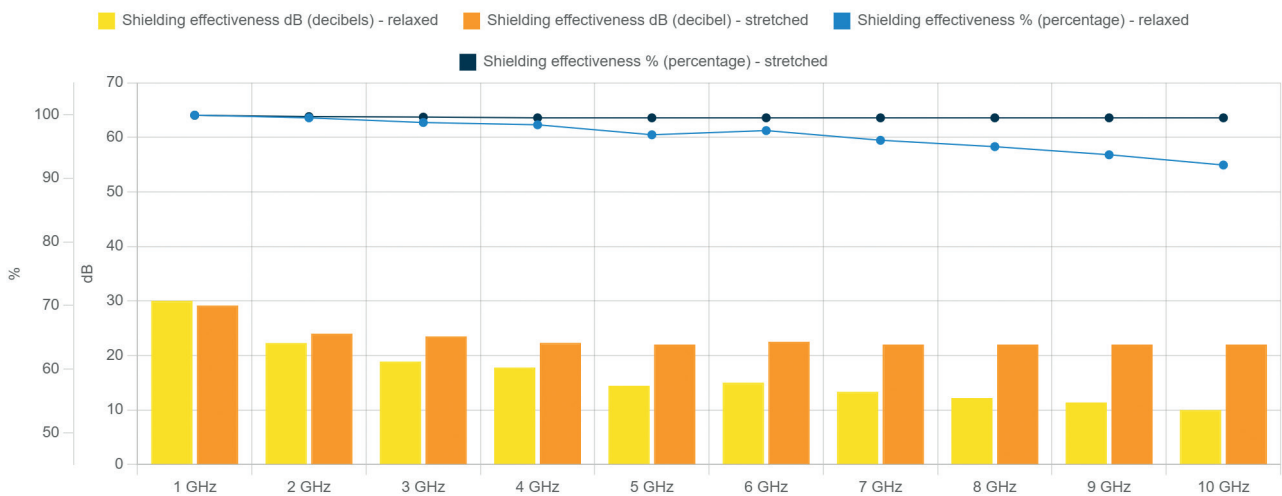
Shielding values: According to test report: Prof. Pauli., Universität der Bundeswehr München, HF-, Mikrowellen- und Radartechnik

Shielding effectiveness - New Antiwave Organic Cotton - 200 MHz to 2200 MHz (2,2 GHz)



1000 MHz = 1 GHz -- (according to test report Prof. Dipl. Ing. Pauli)

Shielding effectiveness - New Antiwave Organic Cotton - 1.0 GHz to 10 GHz



1000 MHz = 1 GHz -- (according to test report Prof. Dipl. Ing. Pauli)



**Home textiles**

**Washing instructions incl. symbols (DIN EN ISO 3758:2012)**

**Content - Washing options**

Detergent.....	1	Washing test - Biologa Danell shielding textiles.....	4
Machine washing.....	2	Further information.....	12
Hand wash.....	3	Frequently asked questions.....	12

**Applies to the following products**

HOME TEXTILES	Topas CS, Topas SN, Swiss Shield Naturell, Swiss Shield Evolution, Swiss Shield Daylite, Swiss Shield Wear, Swiss Shield Ultima, Sunshine 64, Dali, Picasso, New Antiwave
CANOPIES	Topas-BE, Topas-BD, Topas-BU, TOPAS-SN Swiss Shield Naturell-BE, Swiss Shield Naturell-BD, Swiss Shield Naturell-BU Swiss Shield Evolution-BE, Swiss Shield Evolution-BD, Swiss Shield Evolution-BU Swiss Shield Daylite-BE, Swiss Shield Daylite-BD, Swiss Shield Daylite-BU
CLOTHING	Antiwave Women-Shirts, Shorts, Leggings, Antiwave Men-Shirts, Shorts, scarfs, Beanies

**Best care**

**Detergent**

**Tested and recommended detergents**

**Ecover / Wool and delicates detergent**

Ingredients:

- 5-15 %: Anionic surfactants
- < 5 % Non-ionic surfactants
- Soap
- Fragrances - Limonene
- Preservatives
- 2-Brom-2-Nitropropan-1,3-Diol
- Water
- Table salt
- Citric acid

**Sodasan / Wool & Fines**

Ingredients:

- < 30 % water
- 5-15 % sugar surfactant (non-ionic surfactant)
- Coconut fatty alcohol sulphate (anionic surfactant)
- < 5 % evaporated salt
- Alcohol (ethanol)
- Vegetable lecithin
- Citrate
- Natural perfume oil
- Limonene
- Geraniol
- Preservative
- 2-Brom-2-Nitropropan-1,3-Diol

**Detergent and laundry quantity**

**Detergent quantity:**

- Always use as less detergent as possible. As a rule, umbrella textiles are only slightly dusty.
- **Ecover: approx. 20 ml**
- **Sodasan: approx. 20 ml**  
(Further detergent recommendations:
- Sonett sensitive detergent
- Sonett olive detergent for wool and silk
- Sonett Olive Detergent for Wool and Silk sensitive

**Quantity shielding textiles**

- Fill the laundry drum only with shieling materials.
- You will find the max. laundry load in the delicates programme in the instructions for your washing machine. (usually 1.2 - 1.5 kg)

**Wash test**

Biologa shielding textiles can usually be washed 40 times and more. The screening attenuation, as with all screening textiles, decreases during this process, but the remaining function still fulfils a strong high-frequency reduction (min. 90 %).

You can see the complete washing test in the appendix (page 10).

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Washing machine

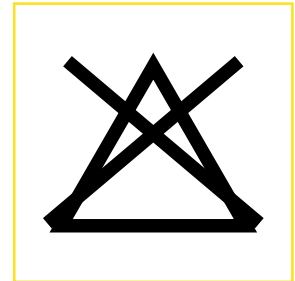
Machine washing

Individual steps

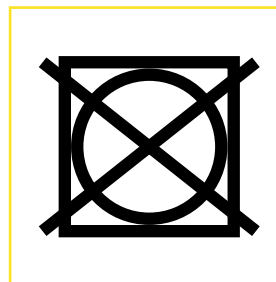
- M1: 30 °C delicates/wool wash / DO NOT SPIN!**  
This wash cycle has a particularly gentle mechanical treatment. Reduce the amount of laundry considerably (fill the drum only up to one third). Set the appropriate washing programme.  
(Antiwave products 40 °C delicates)
- M2: Do not bleach**  
Bleaching is not possible. Use only bleach-free detergents. If in doubt, try on a concealed area or sample.
- M3: Do not tumble dry**  
The textiles do not tolerate tumble drying.
- M4: Do not iron hot**  
Maximum temperature of the iron soleplate of 110 °C. Also corresponds to the iron temperature level „polyacrylic/polyamide (nylon) /acetate“. Do not iron with steam. Iron with a dry intermediate cloth if necessary. Do not warp.
- M5: Professional cleaning**  
Dry cleaning is not possible. Do not treat with solvents. Do not use stain removers containing solvents.  
No wet cleaning possible.
- M6: Natural drying (optional)**  
Drying on the clothesline in the shade
- M7: Natural drying (optional)**  
Drying on the clothesline from a dripping wet state in the shade



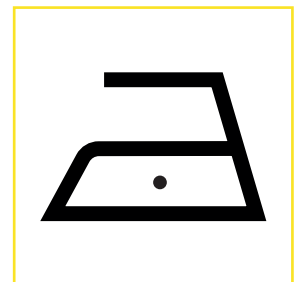
M1: WASH / SPIN



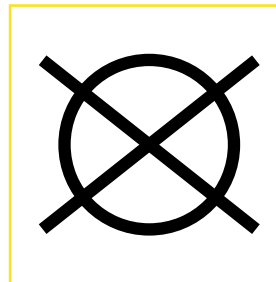
M2: BLEACHING



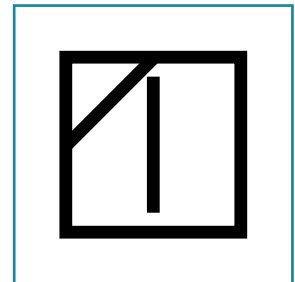
M3: TUMBLER - DRYING



M4: IRONING



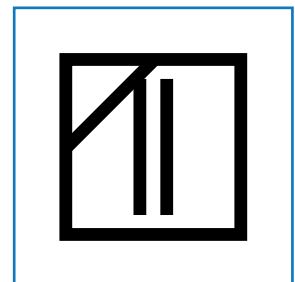
M5: Professional cleaning



M7: NATURAL DRYING 1

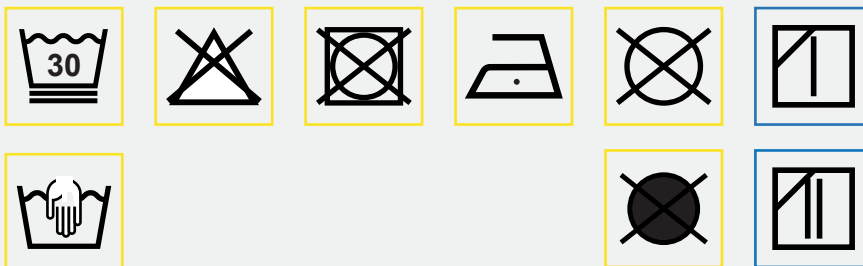
Pre-drying

See Fig. 1 (next page)



M8: NATURAL DRYING 2

General overview of applicable washing symbols



CARE CODE: **AXXAXBX**

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Washbasins, tubs

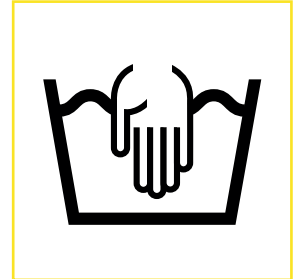
Hand wash

Individual steps

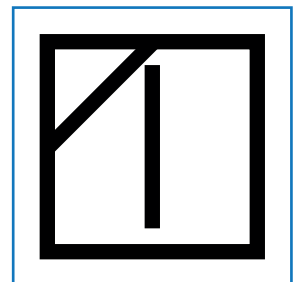
H1: Hand wash,

Water temperature lukewarm to max. 30°C.

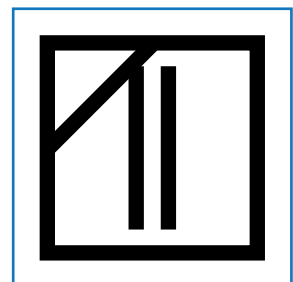
1. Fill your washbasin or, depending on the size, your bathtub with lukewarm water.
2. Add a teaspoon of detergent (e.g. ecover / Sodasan). Wool detergent, mild detergent without chlorine, without bleach, without optical brighteners. Do not use fabric softener.
3. Place the textile in the water. Soaking time is usually not necessary as the textile is usually only slightly dusty and not excessively soiled. If so, then less than one minute.
4. Place the textile floating in the water, avoid kneading, wringing, rubbing, strong rubbing and twisting.
5. Rinse the textile in clean water. Do not spray or rinse under running water. Repeat the process approx. 2 x
6. For pre-drying and subsequent damp hanging, it is recommended to lay the textile on a towel and gently roll it up including the textile. You can also treat the textile as described under H2.
7. Dripping wet hanging without the towel technique is also possible as indicated in H3.



H1: Hand wash



H2: Natural drying Clothesline - Shade



H3: Natural drying Clothesline dripping wet - shade

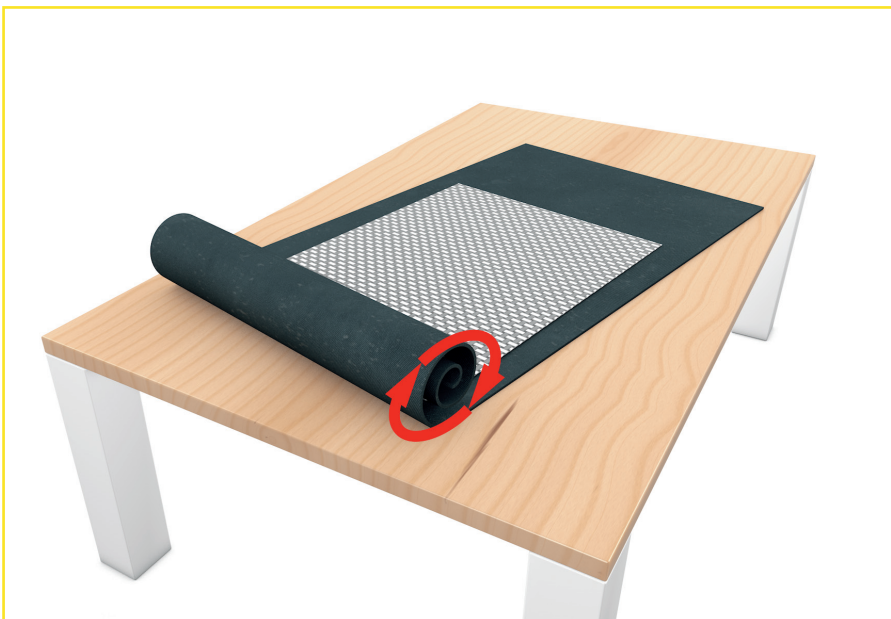


Fig. 1: Pre-dry in towel - hand wash and machine wash

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## Wash test

### Washing test - Biologa Danell shielding textiles

#### Test machine specifications

Type: Bauknecht WA Sensitive 44 Di

#### Settings used:

- Programme: Delicate laundry 30 °C (curtains and delicate clothes)
- Max. load: 1.5 kg
- Water consumption: 60 litres
- Consumption: 0.4 kWh
- Duration: 0:46 hrs.
- Spin: OFF
- No prewash
- No fabric softener
- No cold wash

#### Laundry quantity

- 7 samples each approx. 1 sqm/per piece (ins. 1.5 kg)
- Topas CS
- Sunshine 64 (ecru/white)
- Swiss Shield Naturell
- Swiss Shield Evolution
- Swiss Shield Daylite
- Picasso
- Dali

#### Additional information

- Water quality varies from place to place. You can ask your waterworks for the current data. For copyright reasons, the water quality data from the company headquarters cannot be published here.
- The settings of the washing modes of your washing machine may differ from those used here. You will find them in the instruction manual of your washing machine.
- The environment in which the textile is used has an influence on its durability (salt water, chemical substances, etc.).

#### Detergents used

##### Ecover / Wool and delicates detergent

#### Ingredients:

- 5-15 %: Anionic surfactants
- <5 % Non-ionic surfactants
- Soap
- Fragrances - Limonene
- Preservatives
- 2-Brom-2-Nitropropan-1,3-Diol
- Water
- Table salt
- Citric acid

##### Sodasan / Wool & Fines

#### Ingredients:

- <30 % water
- 5-15 % sugar surfactant (non-ionic surfactant)
- Coconut fatty alcohol sulphate (anionic surfactant)
- <5 % evaporated salt
- Alcohol (ethanol)
- Vegetable lecithin
- Citrate
- Natural perfume oil
- Limonene
- Geraniol
- Preservative
- 2-Brom-2-Nitropropan-1,3-Diol

#### Detergent quantity

- Ecover: 20 ml
- Sodasan: 20 ml

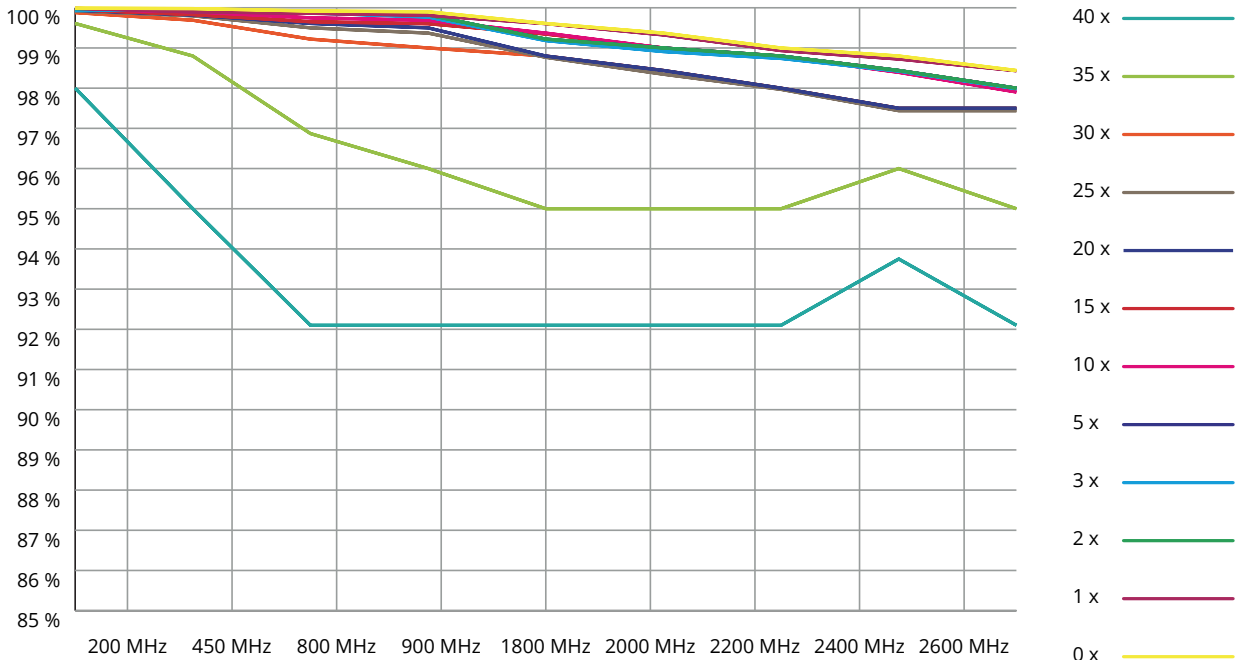
#### Comparative measurements

- The comparative measurements were carried out with an ADVANTEST R3131 incl. generator (9 kHz-3 GHz).
- The comparative measurements were always carried out with the same environmental variables as far as possible.
- The 2021 batch of all umbrella textiles was used as a reference.



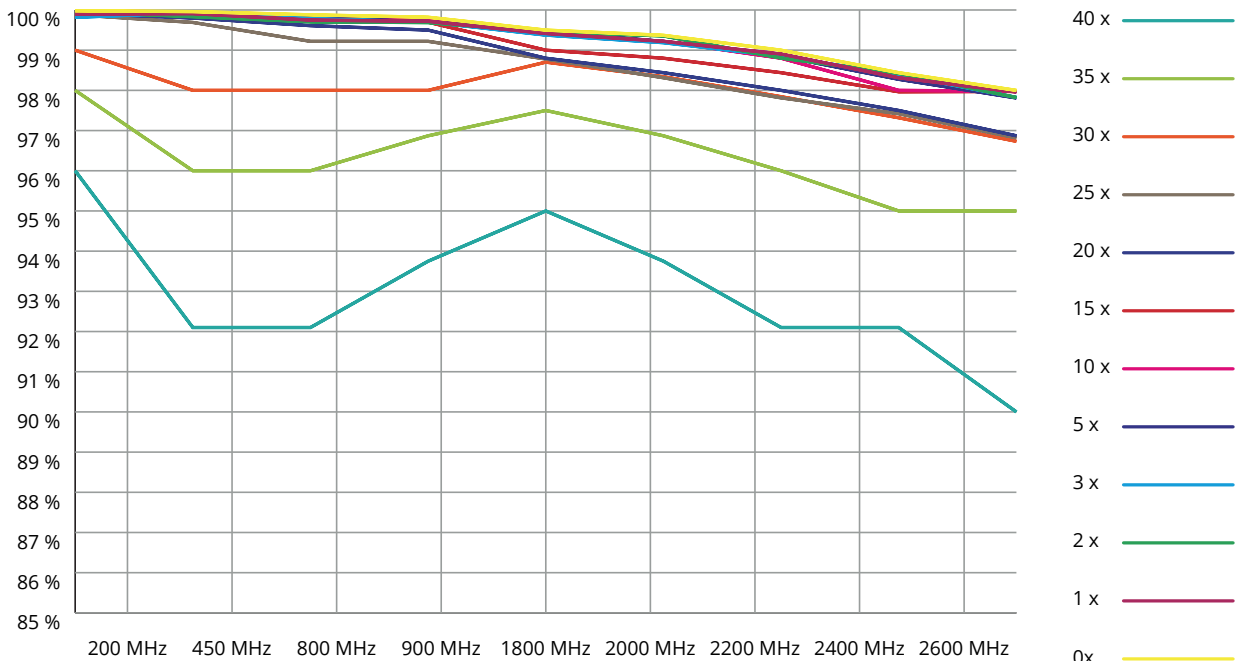
Wash test

Wash test - Topas CS - Ecover



Wash test

Wash test - Topas CS - Sodasan



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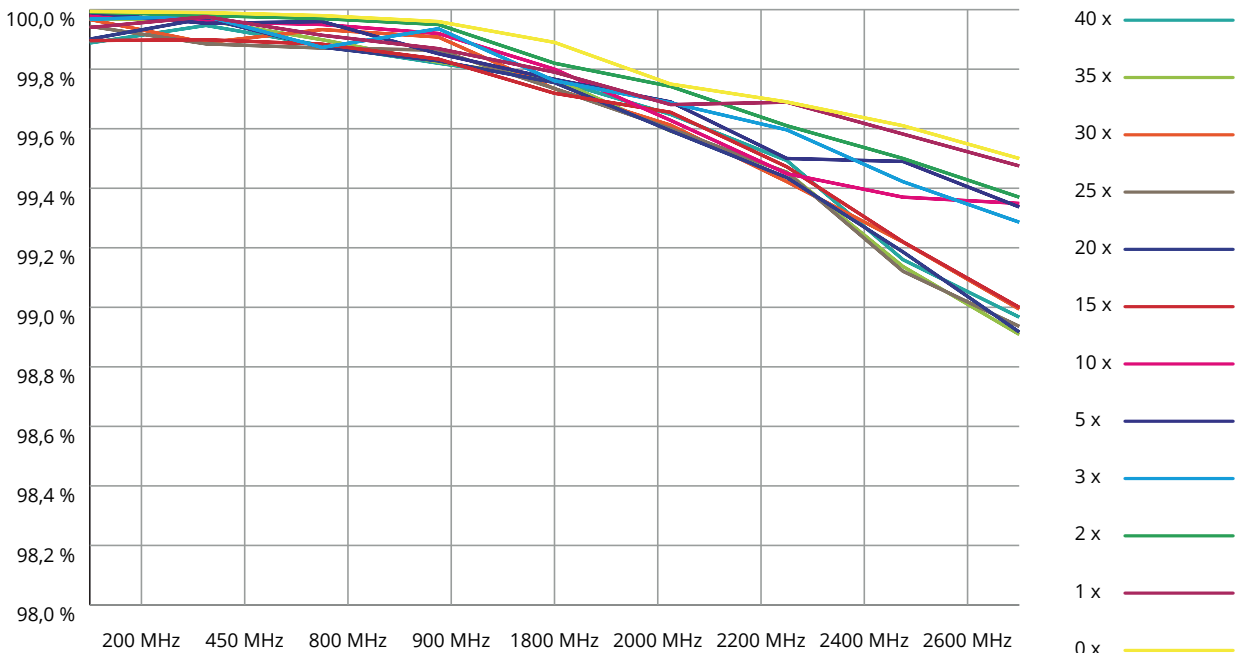
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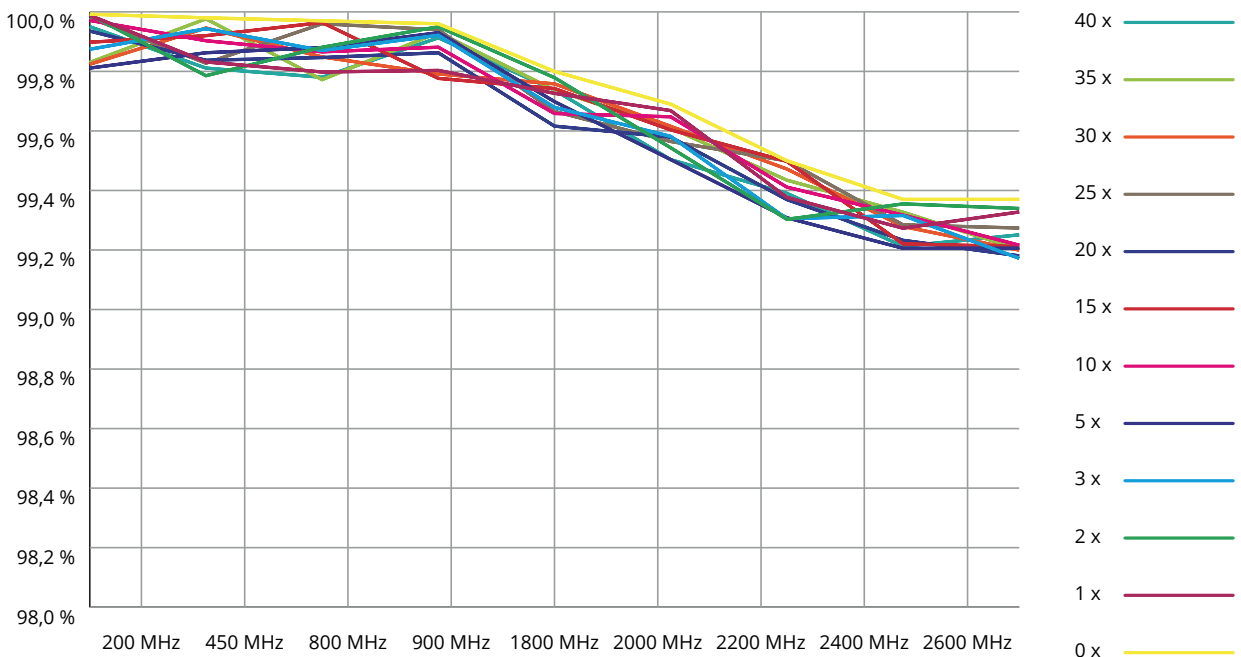
Wash test

Wash test - Sunshine 64 - Ecover



Wash test

Wash test - Sunshine 64 - Sodasan

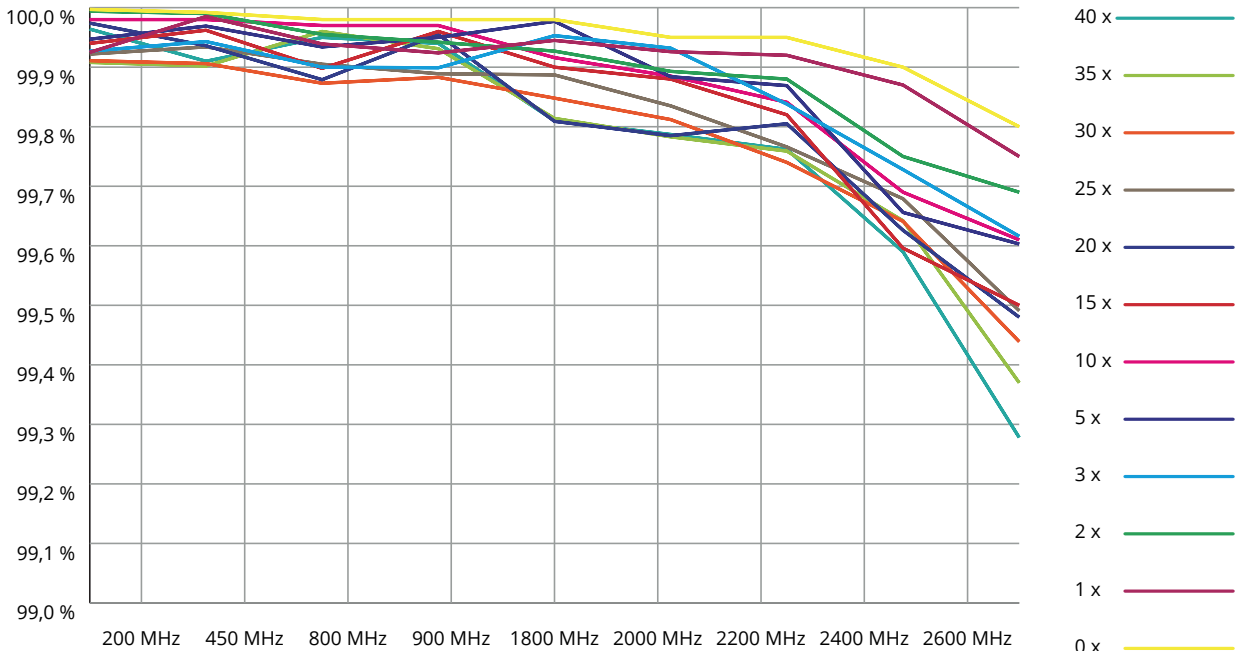


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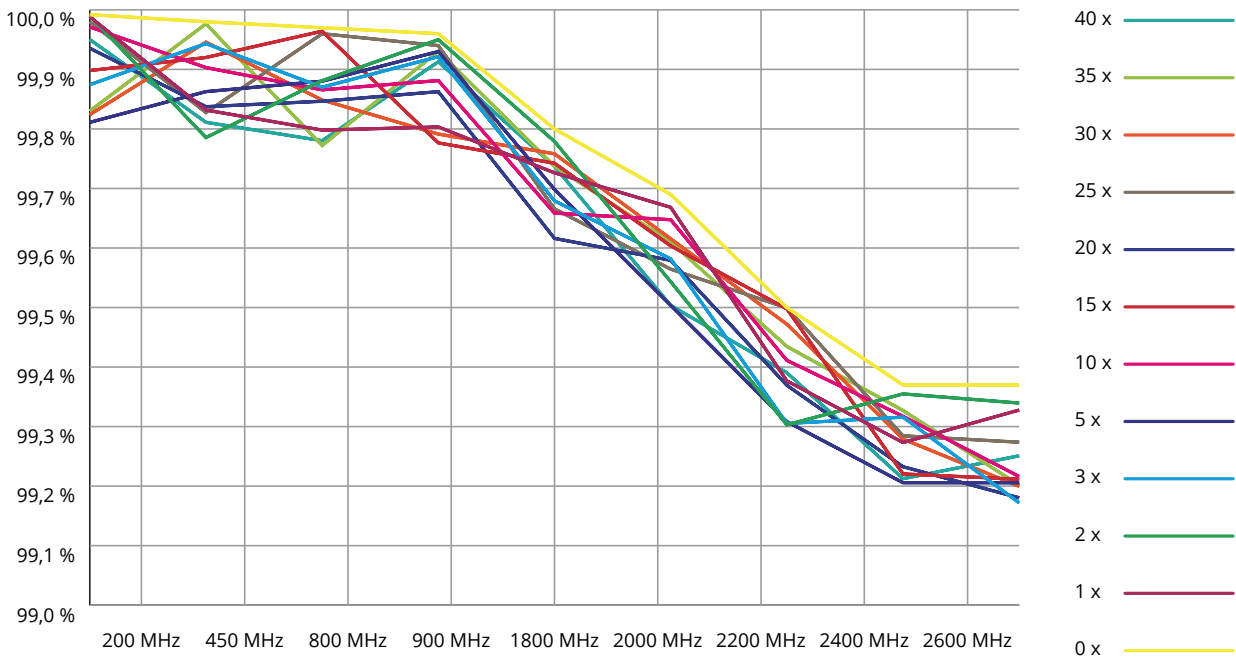
Wash test

Wash test - Swiss Shield Naturell - Ecover



Wash test

Wash test - Swiss Shield Naturell - Sodasan



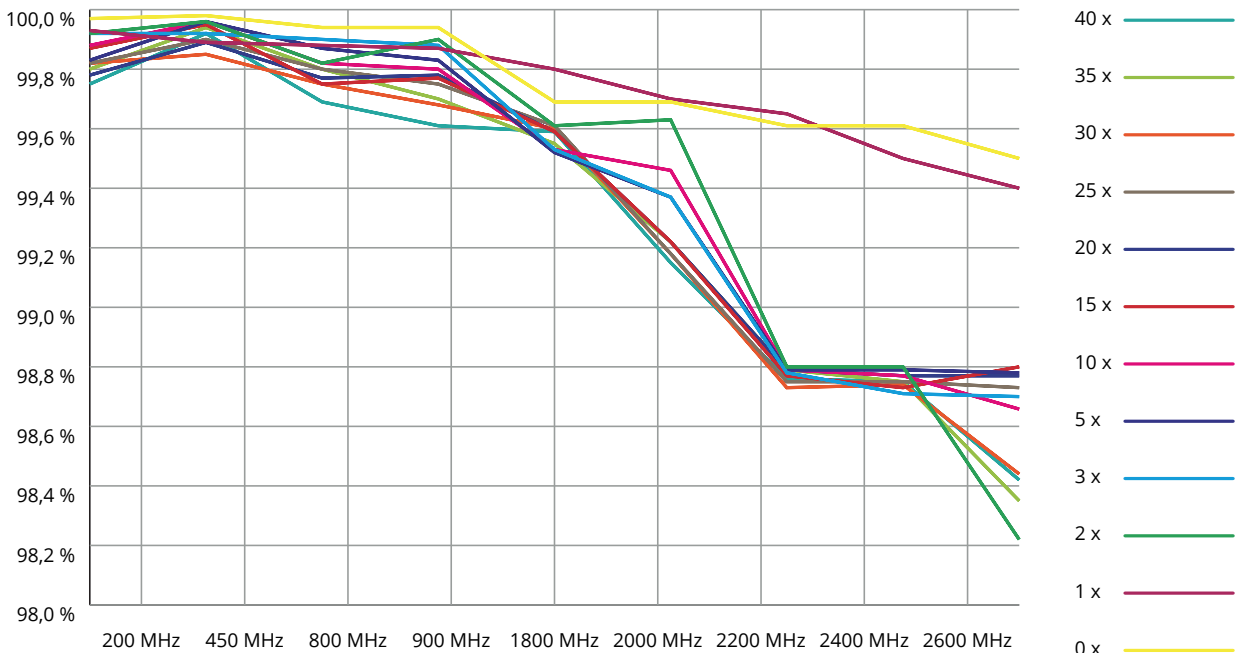
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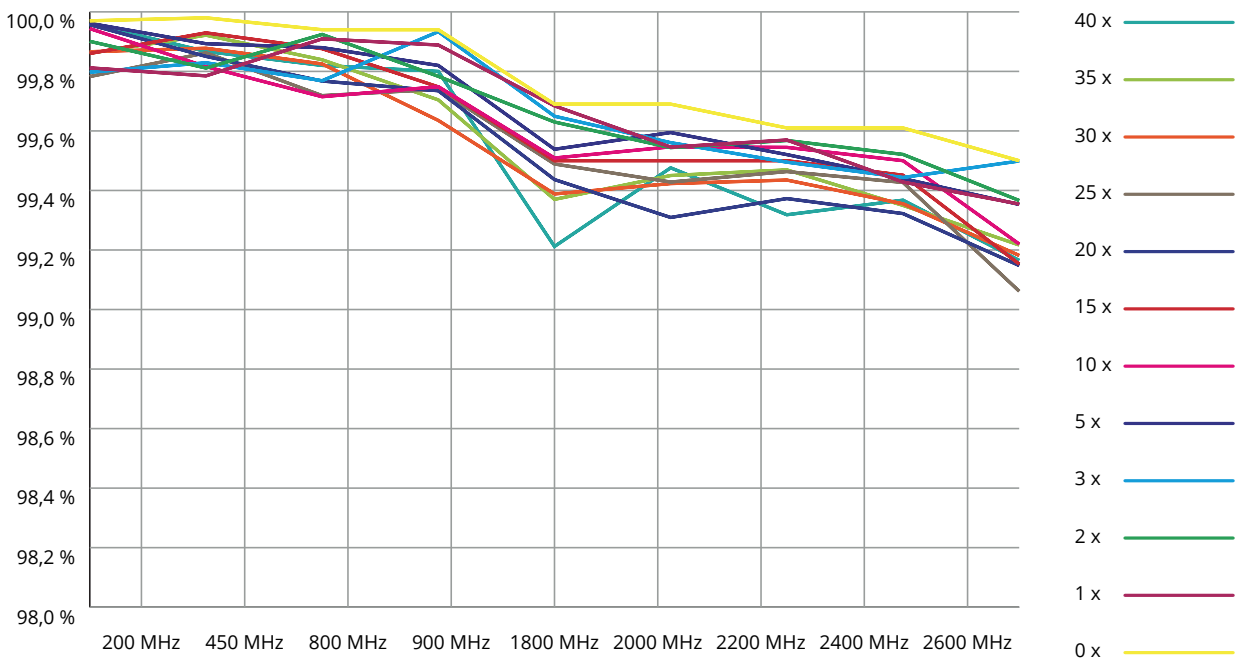
Wash test

Wash test - Swiss Shield Evolution - Ecover



Wash test

Wash test - Swiss Shield Evolution - Sodasan



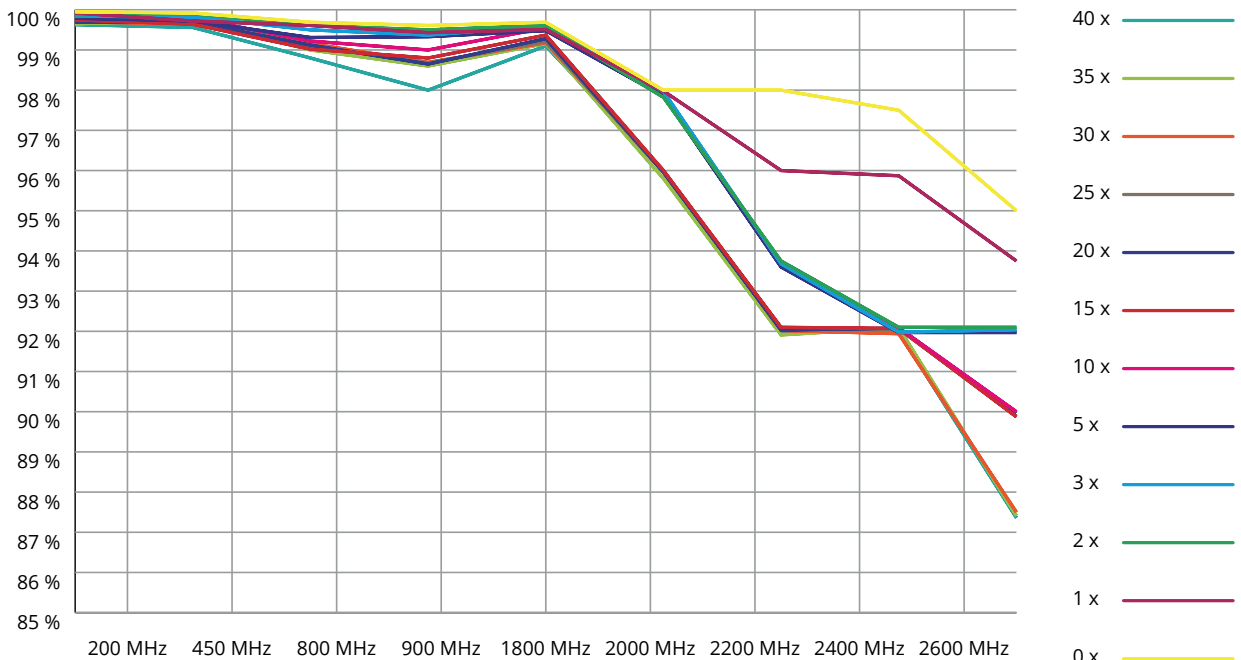
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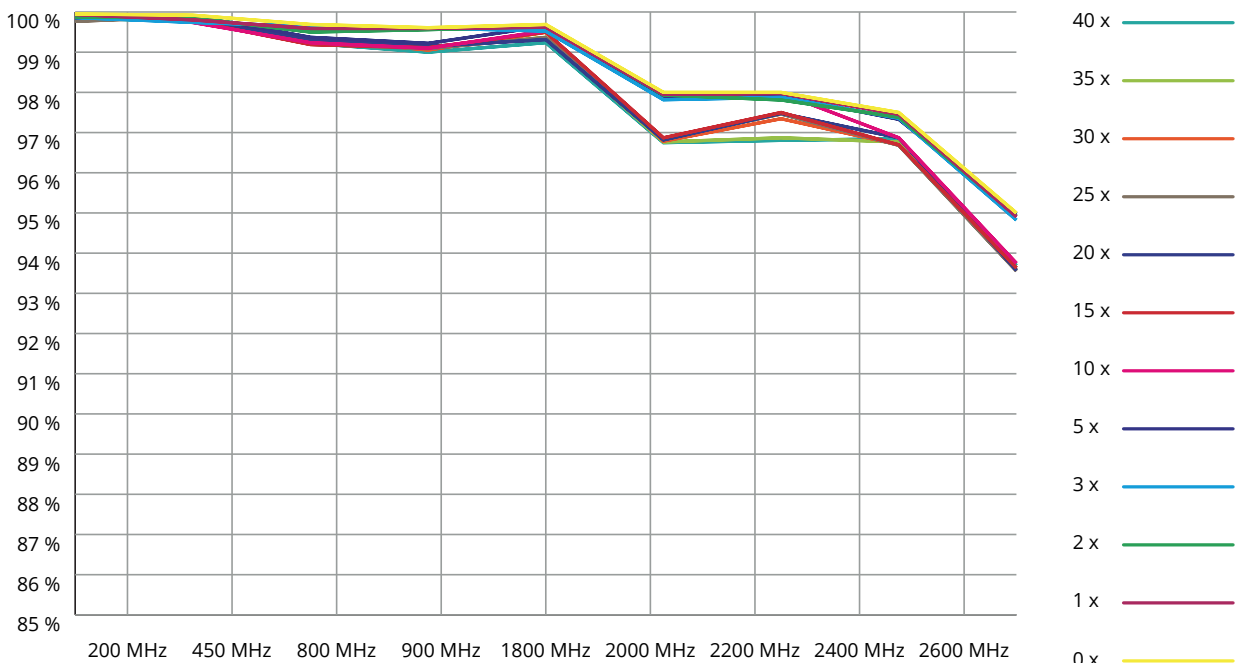
Wash test

Wash test - Swiss Shield Daylite - Ecover



Wash test

Wash test - Swiss Shield Daylite - Sodasan



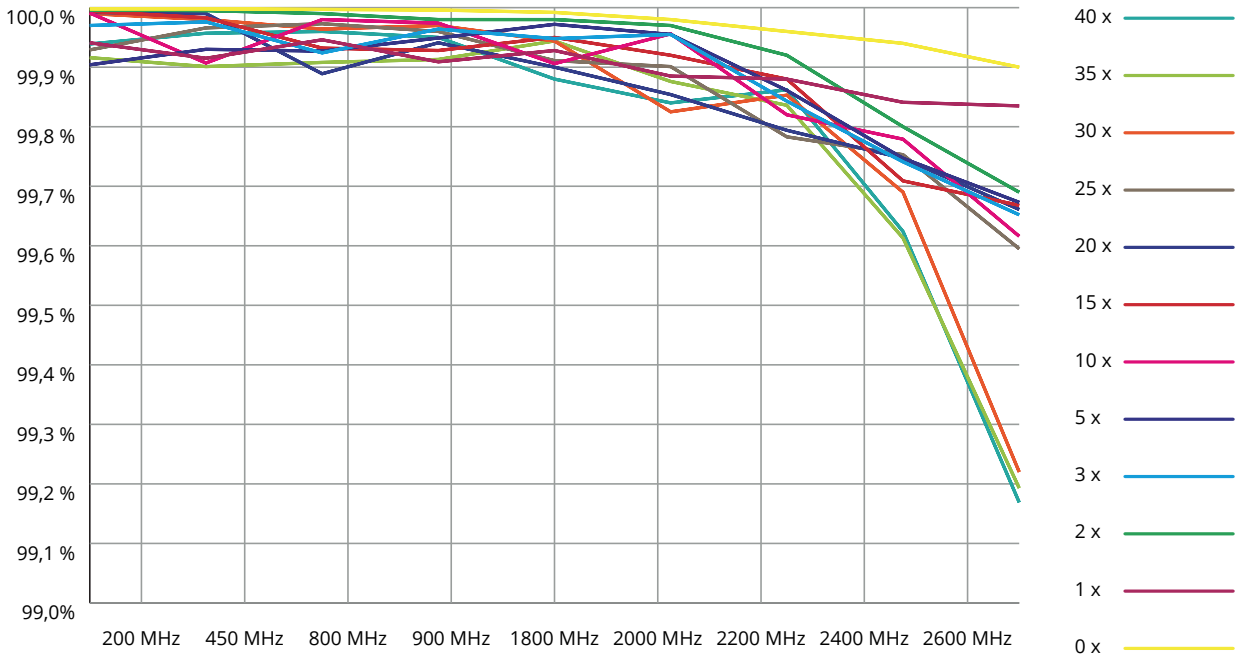
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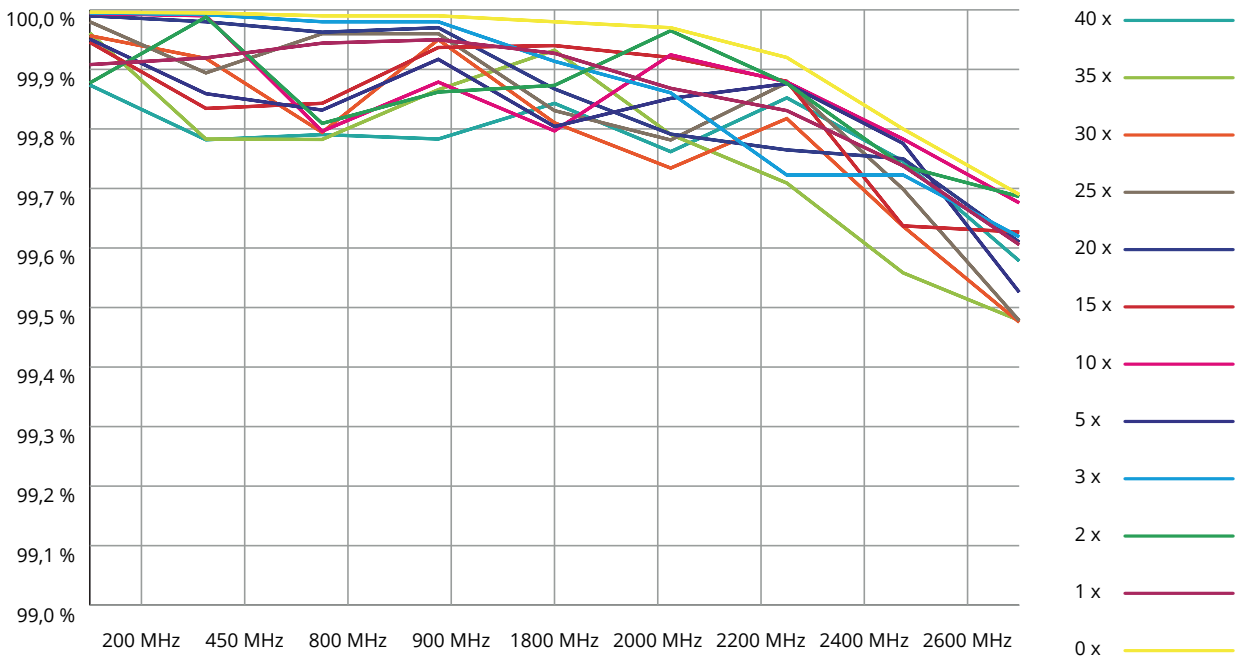
Wash test

Wash test - Picasso - Ecover



Wash test

Wash test - Picasso - Sodasan



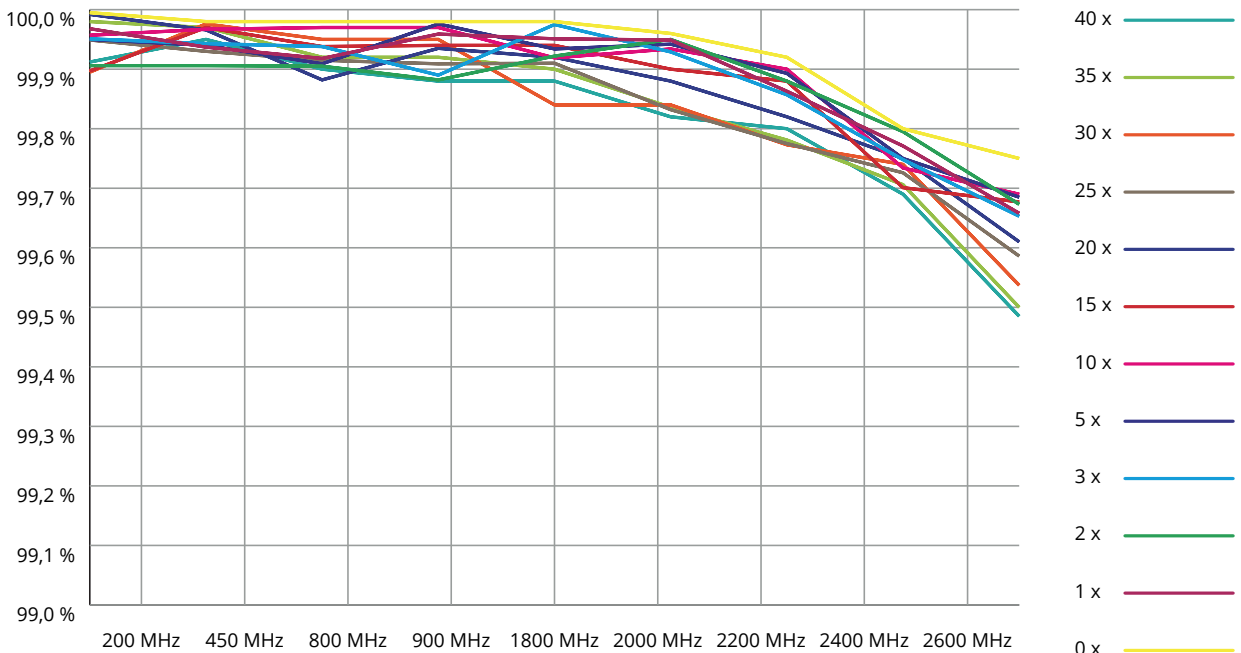
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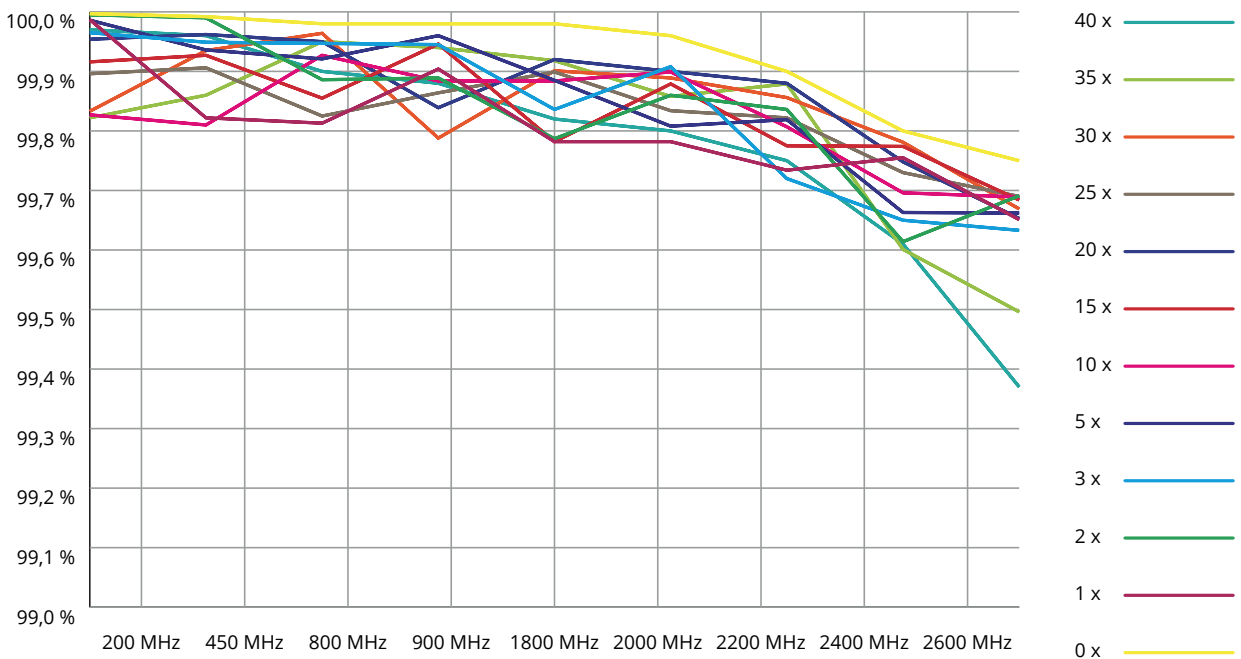
Wash test

Wash test - Dali - Ecover



Wash test

Wash test - Dali - Sodasan



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**Washing instructions home textiles**

**Further information**

**Further information**

**Colour fastness (Dali+Picasso+Swiss Shield Naturell)**

Shades, colour differences and batik-like discolourations are not manufacturing defects and do not represent quality defects. Silver-plated products or products made of natural cotton are subject to colour change. This usually has no influence on the screening attenuation of the material.

**Washing temperatures**

Higher washing temperatures are not necessary due to the antibacterial properties of silver.

**Storage**

If you do not use the purchased product immediately after purchase, we recommend that you leave it in its original packaging until use and store it in a dry place at normal room temperature (20 °C +/- 2 °C and 50 % +/- 10 % humidity). The storage location should not be exposed to direct sunlight and should be free from acidic and alkaline media.

**Washing instructions home textiles**

**Frequently asked questions**

**FAQ**

Durability of shielding textiles?	Shielding textiles are subject to chemical and mechanical wear just like conventional textiles. Do not wash shielding textiles too often and only ever wash them according to these instructions in order to achieve maximum durability. Measure from time to time. If your shielding textile has no or no longer sufficient attenuation, you should replace it. Biologa Danell has no influence on your environmental variables.
Can I also use shielding textiles outdoors?	Never use shielding textiles outdoors! Exclusively indoors in front of windows, doors, walls and on ceilings.
Which silver is used in shielding textiles?	Biologa Danell uses microsilver in shielding textiles. We does not sell products with incorporated nanoparticles.
Can the incorporated silver drop off the textile?	The silver is so firmly bonded to the yarn that it will not come off under normal mechanical stress. This is additionally reinforced by insulation.

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