

# FRANKONIA

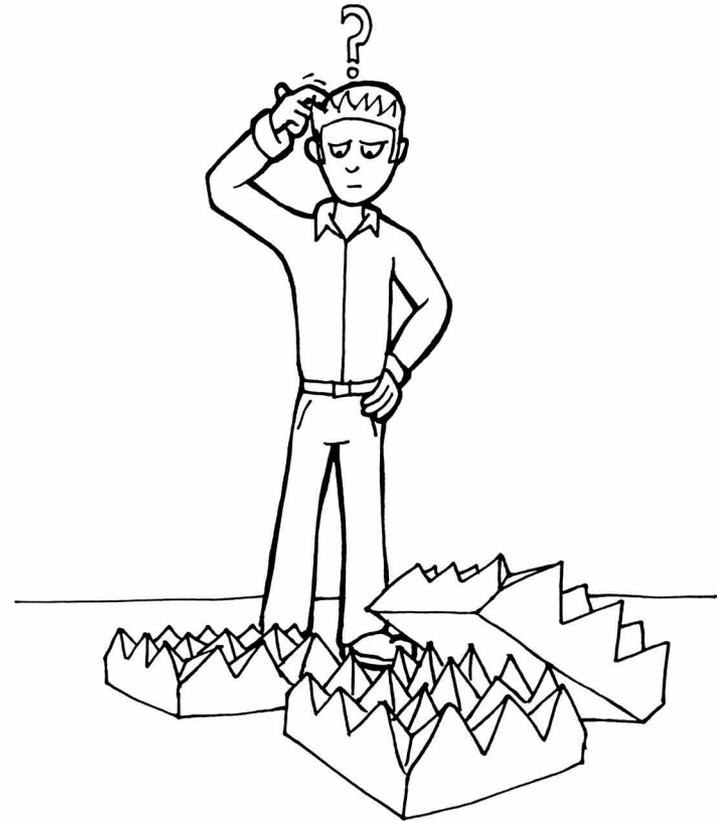
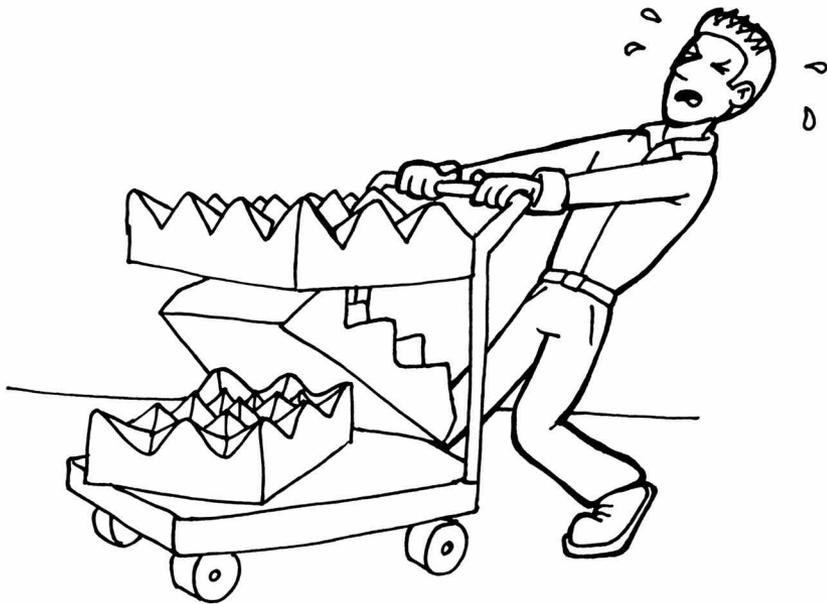
SAC-10 Plus TRITON

- World's First Multiple Test Axes Chamber-

A story from the past...

Moving floor absorbers several times a day?

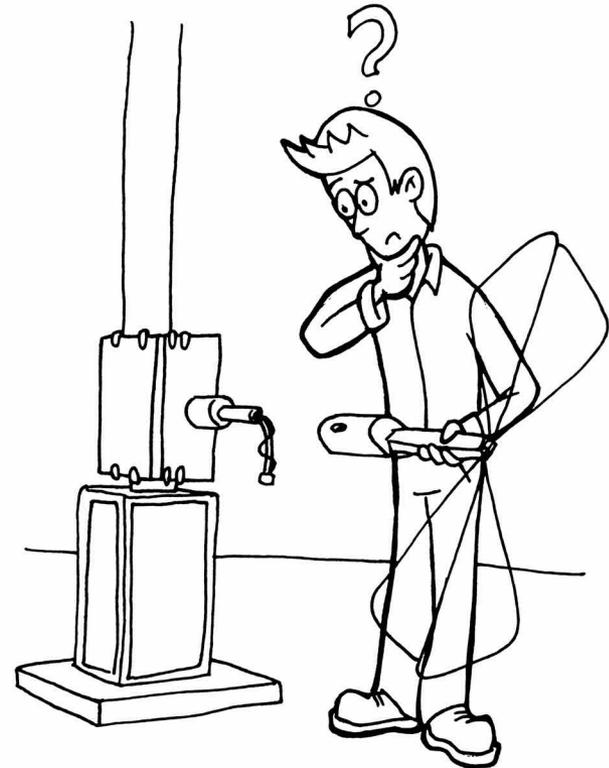
Reproducible floor absorber configuration?



A story from the past...

Setup EMI and EMS tests several times a day?

Malfunctions eliminated and stable quality guaranteed?



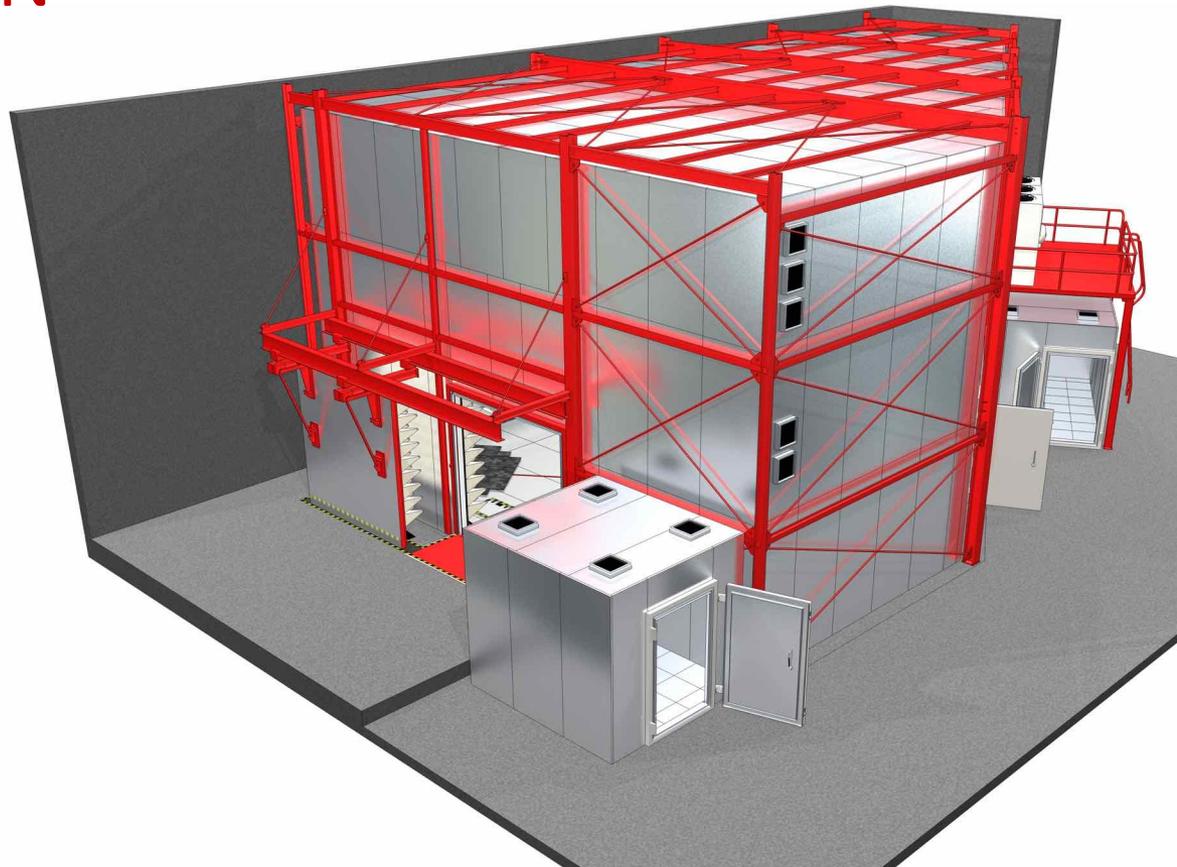
Time to change!

Built for Excellence

## Frankonia's SAC-10 Plus TRITON

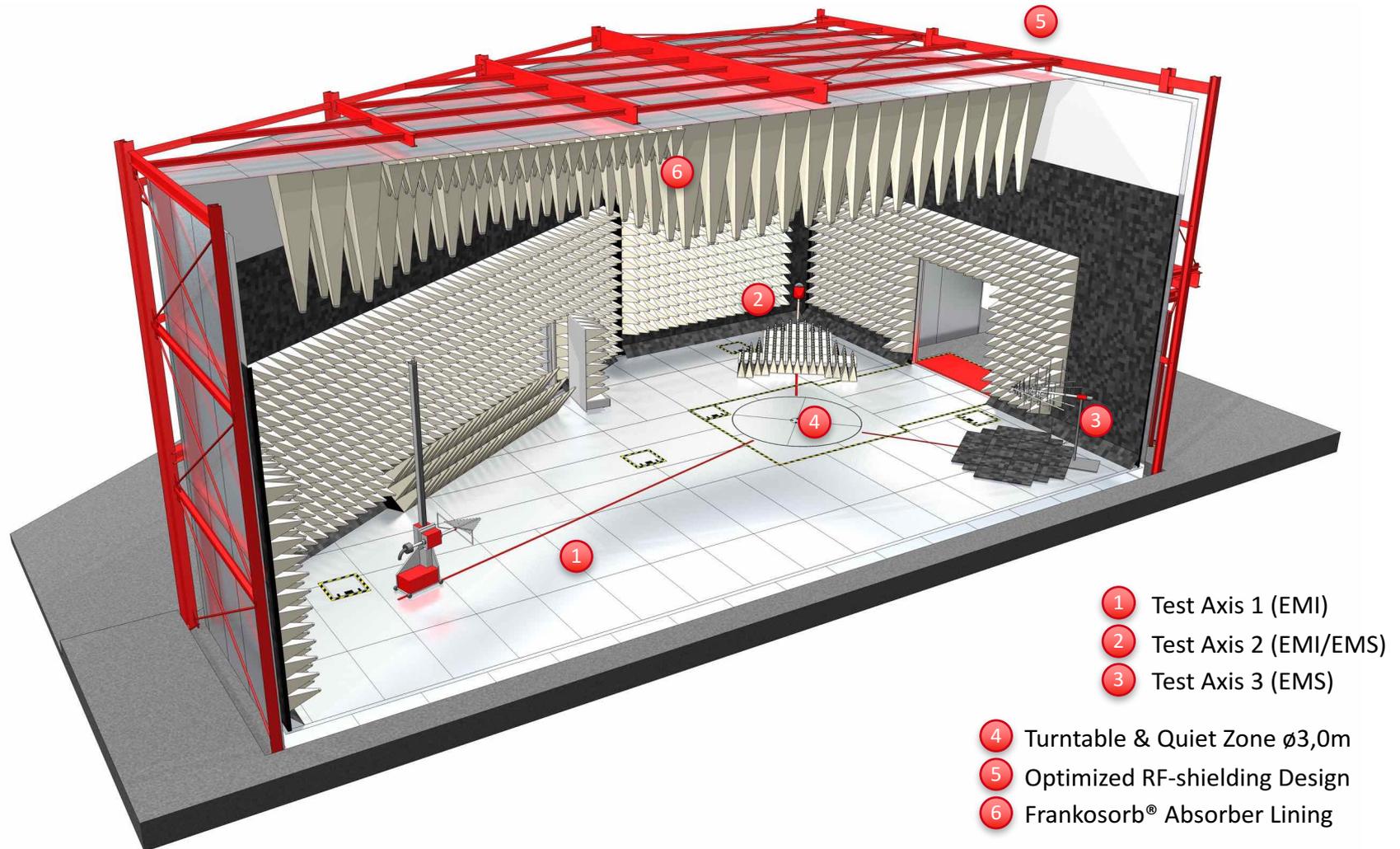
### Features at a glance:

- ✓ Semi-Anechoic Chamber
- ✓ Full compliant acc. to CISPR & ANSI
- ✓ Multiple Test Axes
- ✓ 10m, 5m & 3m measuring distances
- ✓ ø3,0m Turntable and Quiet Zone
- ✓ Movable floor-absorberboard's
- ✓ Floor absorbers remain in the chamber
- ✓ Antennas remain in the chamber
- ✓ Prepared for every EMI/EMS test procedure



## Concept & Features

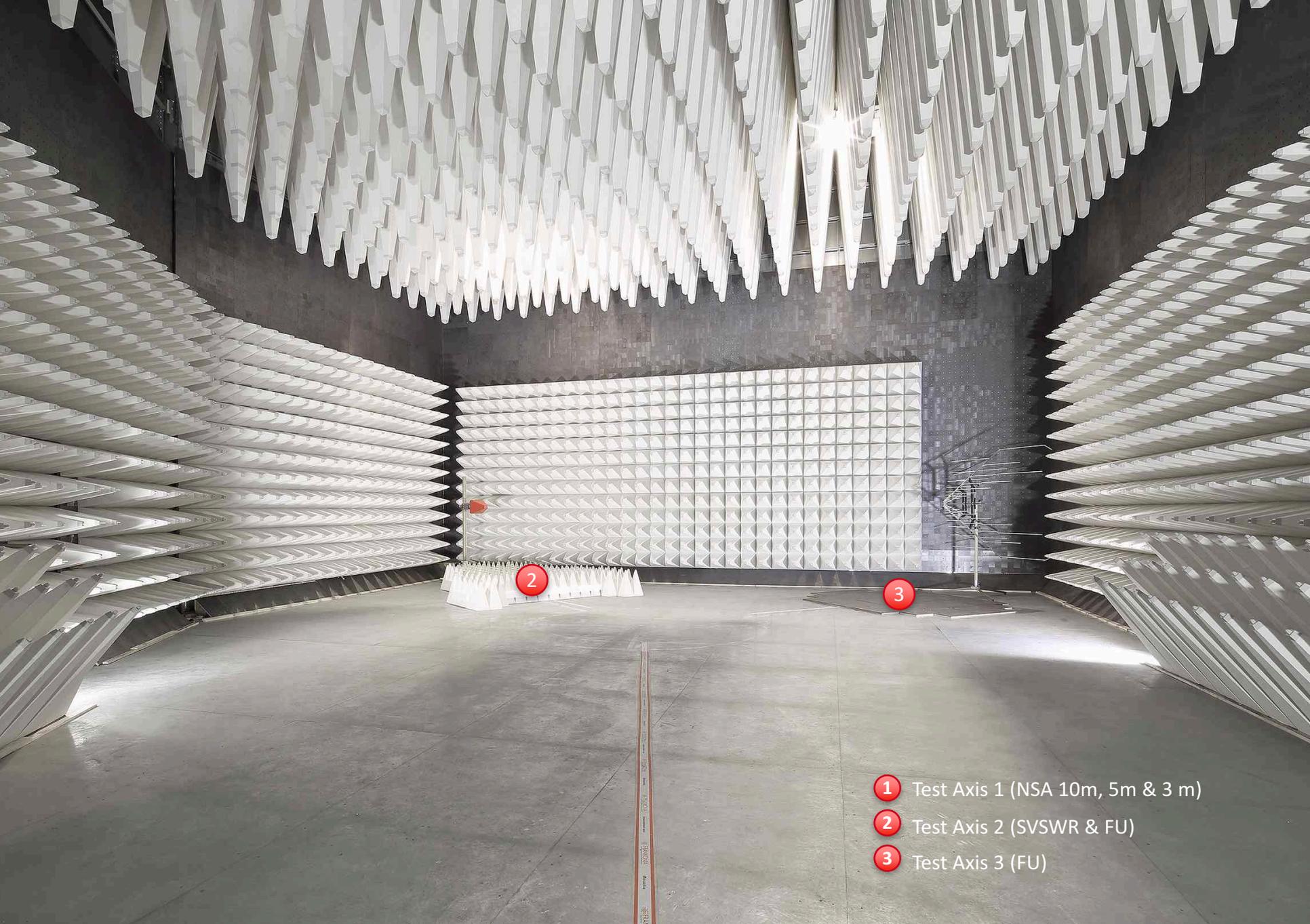
## SAC-10 Plus TRITON





1

- 1 Test Axis 1 (NSA 10m, 5m & 3 m)
- 2 Test Axis 2 (SVSWR & FU)
- 3 Test Axis 3 (FU)



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## Features



1,2,3

### Multiple Test Axes

- All required EMI/EMS tests in one chamber
- 10m, 5m & 3m measuring distances with a Quiet Zone of  $\varnothing 3,0$  m
- No need to modify the test environment or the test setup
- Test equipment and antennas remain connected in the chamber
- Floor absorbers remain in the chamber
- Quality of testing at a constant high level
- Test time decreases considerably
- Outstanding performance in a compact chamber size
- Frankosorb® non-combustible and long-lasting absorbers
- Cost-saving and future-proof investment



### Innovative

- Multiple test axis
- Individual use for all kind of EMI/EMS tests
- Radiated emissions (EMI): Full compliance according to CISPR 16-1-4, ANSI C63.4 (option)
- Radiated immunity (EMS): Full compliance according to IEC/EN 61000-4-3
- Space-saving chamber in polygonal shape
- Ingenious absorber lining with Frankosorb®

## Features



### **Time & Efficiency**

- No need to modify the test environment or the test setup
- Integrative automation set incl. antenna masts and turntable
- Antennas remain in the chamber
- Antennas are part of the package and included
- Floor absorbers remain in the chamber with guided movements (manual or semi- automatic)
- Malfunctions or damages are almost impossible
- Optimized workflow



### **Reproducibility & Quality**

- Easy and efficient to use
- Guided floor absorber movements
- Constant quality and performance
- Long-lasting Frankosorb® absorbers

## Frankosorb® Absorbers



Frankosorb®

Frankonia Absorber Technology

- 1 Ferrite Absorber
- 2 Hybrid Absorber
- 3 Pyramid Absorber

## SAC-10 Plus TRITON and Frankosorb®



### Frankosorb® Absorber Technology

- Nano thin-film technology guarantees highest homogeneity and impedance accuracy
- Non-combustible Absorbers according to DIN EN 13501-1 class A2 – s1 d0, equivalent to DIN 4102 class A2 (US NRL 8093 Tests 1,2,3,4 and 5; Chinese GB8624-2006; Russia GOST 30244-94), EN/ISO 5659-2 (smoke generation and opacity), very high power handling capacity up to 2 kW/m<sup>2</sup> or 850 V/m (continuous duty); 3,5 kW/m<sup>2</sup> or 1,150 V/m (intermediate power)
- Hardly inflammable Absorbers according to DIN EN 13501-1 class B, equivalent to DIN 4102 class B1 (US NRL 8093 Tests 1,2 and 3; Chinese GB8624-2006; Russia GOST 30244-94), very high power handling capacity up to 1 kW/m<sup>2</sup> or 600 V/m (continuous duty); 2,6 kW/m<sup>2</sup> or 1,000 V/m (intermediate power)
- High absorption capability paired with a fast cooling feature (hollow absorber)
- Not carbon-based absorbers
- Cost protective solution with Frankosorb® non-combustible absorbers as no sprinkler or fire extinguishing system is necessary
- High-performance characteristics ensure reproducible test results
- Proven long-term stability for more than 25 years
- Non-hygroscopic materials are used to meet any climatic conditions (humidity-proof and temperature-proof)
- Completely heat, cold and moisture resistant
- No toxic gases emitted in case of absorber heating
- ...

## SAC-10 Plus TRITON and Frankosorb®

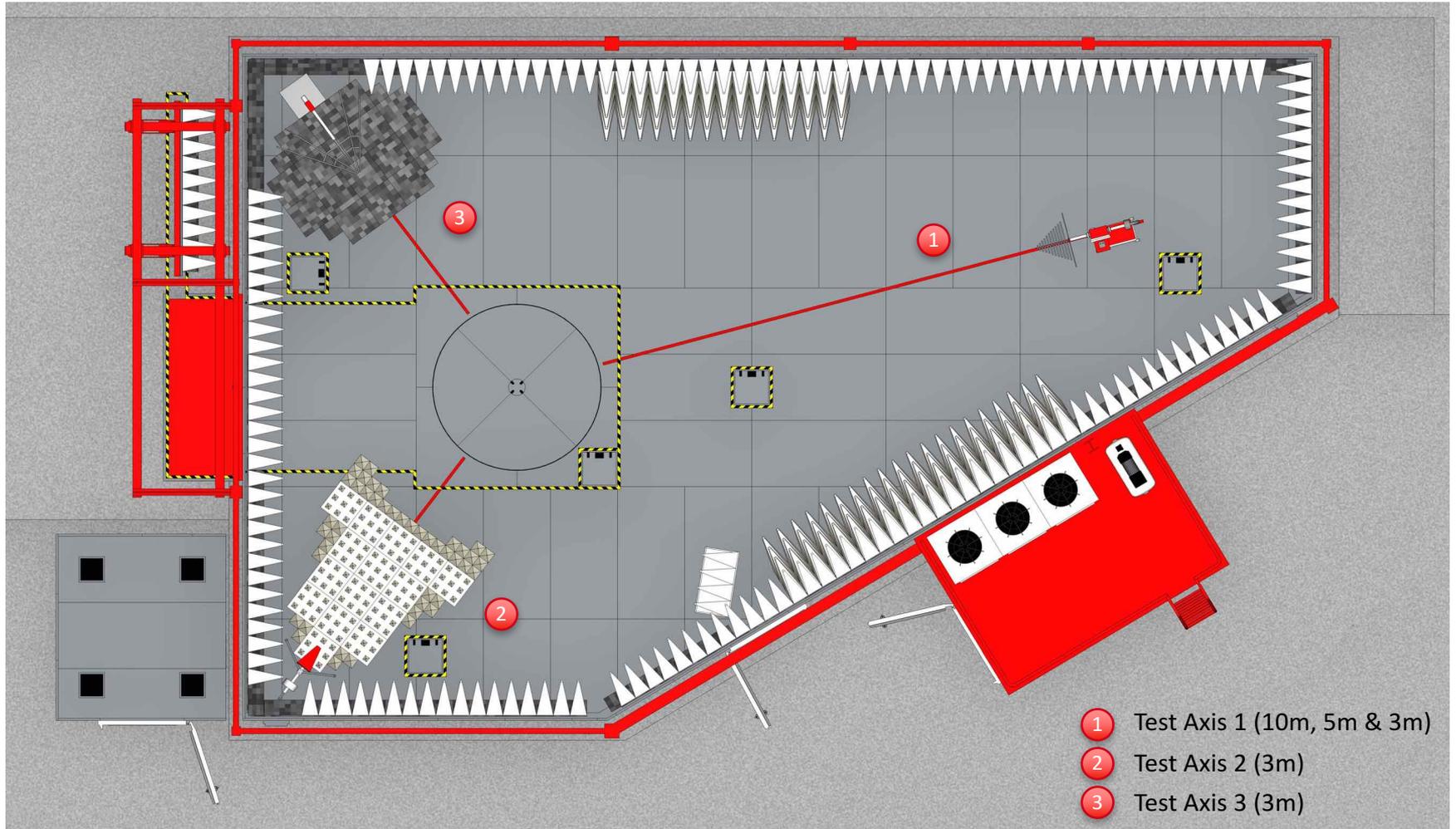


- ...
- No dirt, solvent-free, and free of glue or other harmful substances ensure a healthy environment for people and EUT
- Recyclable at 99%
- Clean room classification according to ISO 14644-1 Class 5
- Easy to clean and washable
- White coloring that improves the illumination level (no covers necessary)
- No aging or drooping, no losing performance
- Space-saving and stackable floor absorbers
- Digital manufacturing process of each absorber guarantees identical performances
- Easy and modern installation method, piece by piece that fits for any kind of shielding
- Lightweight absorbers require less statics
- Removable due to absorber fixation either by screw or hanging type

The Frankonia Frankosorb® absorber technology combines a variety of high-performance standards in a single solution. Due to the stable performance characteristics and its unique non-combustible attribute, a safe environment for people and EUT can be assured, which also leads to a constant, reproducible and long-lasting testing quality. Aligned with customers' requirements, the Frankosorb® absorbers are available in several configurations that achieve a cost-effective and high-performance solution. Thus, together with the Frankosorb® absorber technology, Frankonia's chambers offer the best choice

## Performance

## Overview test Axis



## Axis 1

### Performance Test Axis 1



Axis 1

#### Emission (EMI)

- Emission measurements up to 1 GHz
- 10,0 m, 5,0 m & 3,0 m test distances
- Validated for Normalized Site Attenuation (NSA) according to CISPR 16-1-4 (30 MHz to 1 GHz)
- Validated for Site Voltage Standing Wave Ratio (SVSWR) according to CISPR 16-1-4 (1 GHz to 18 GHz)
- Validated for ANSI C63.4 (option)

Axis 1

Test Axis 1

10m (NSA)

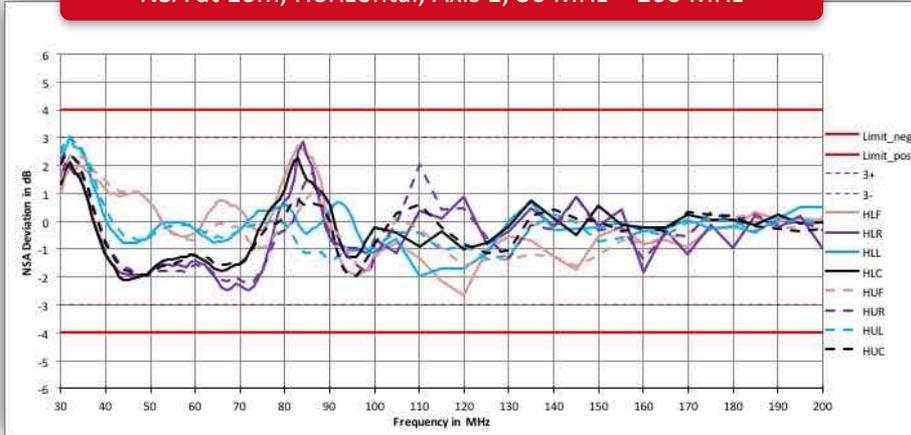
Axis 1

Test Axis 1

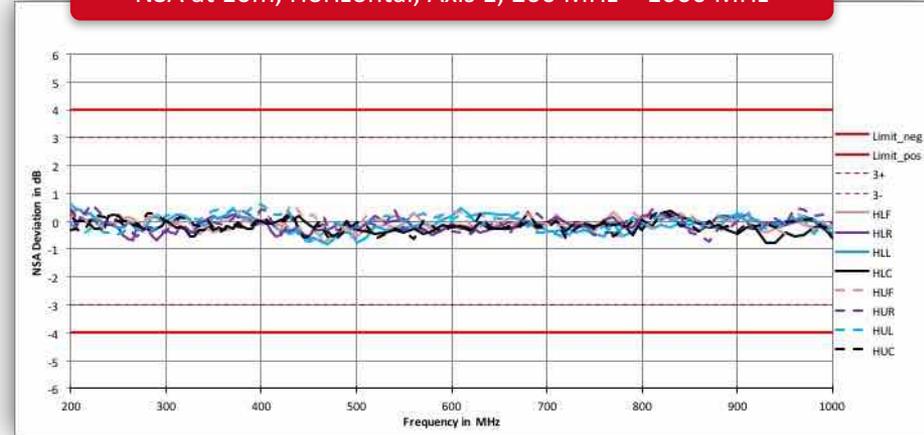
3m (NSA)

## Performance Test Axis 1 (NSA 10m)

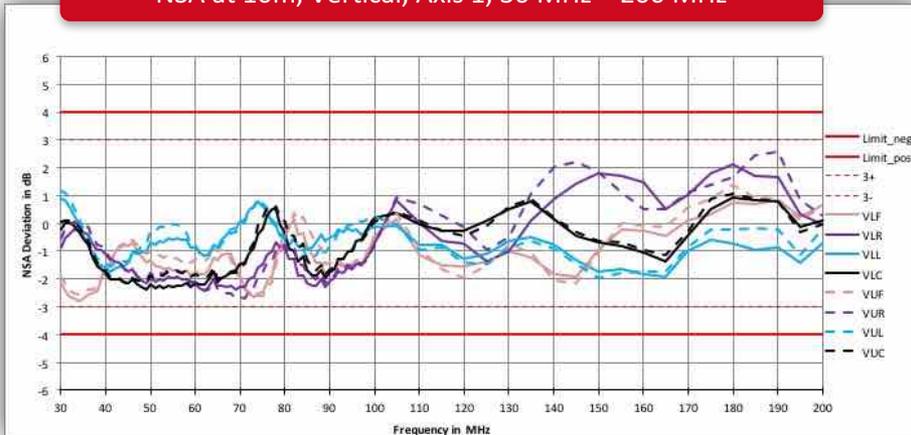
NSA at 10m, Horizontal, Axis 1, 30 MHz – 200 MHz



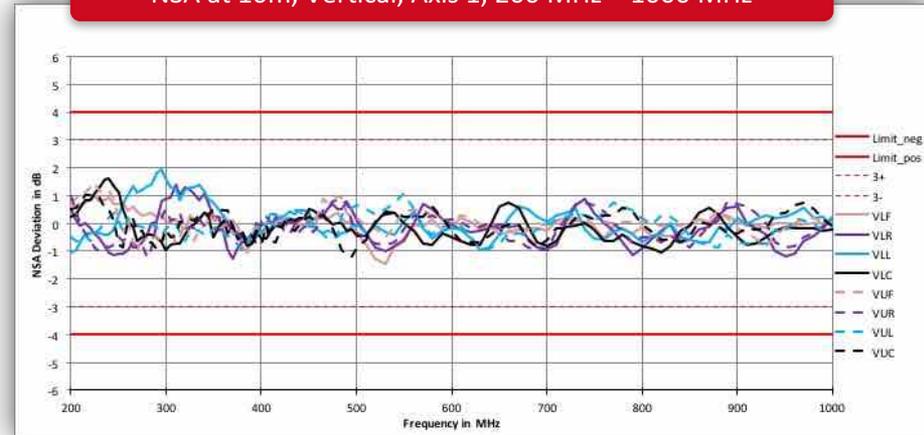
NSA at 10m, Horizontal, Axis 1, 200 MHz – 1000 MHz



NSA at 10m, Vertical, Axis 1, 30 MHz – 200 MHz

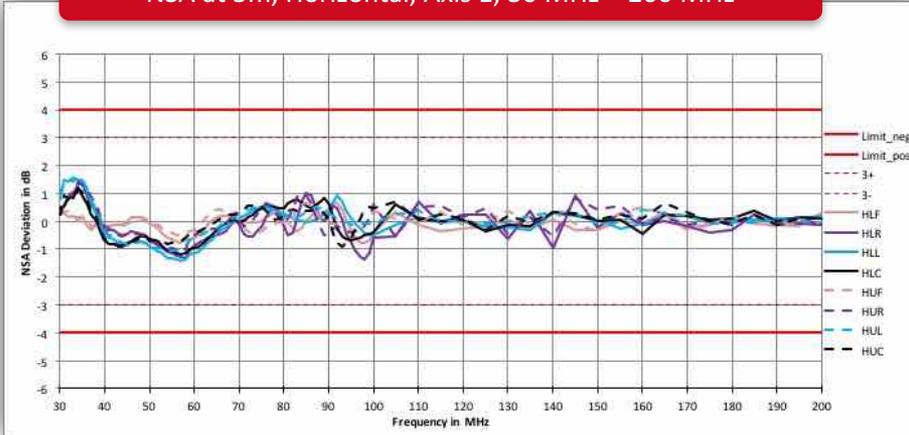


NSA at 10m, Vertical, Axis 1, 200 MHz – 1000 MHz

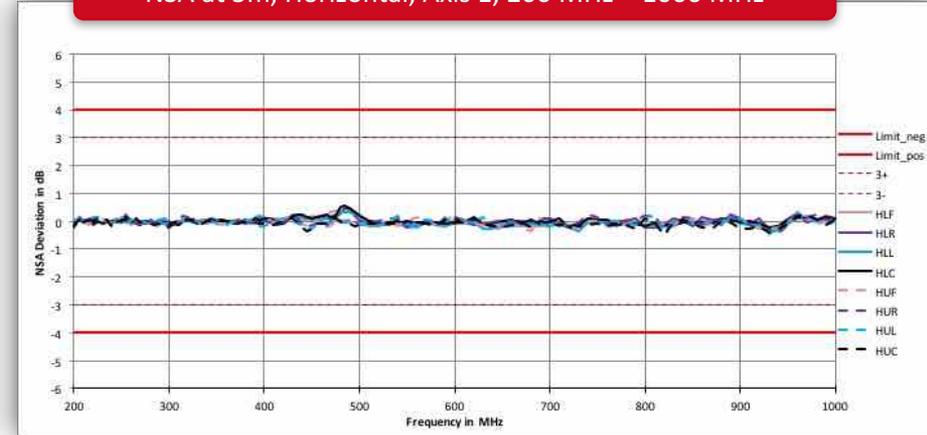


## Performance Test Axis 1 (NSA 5m)

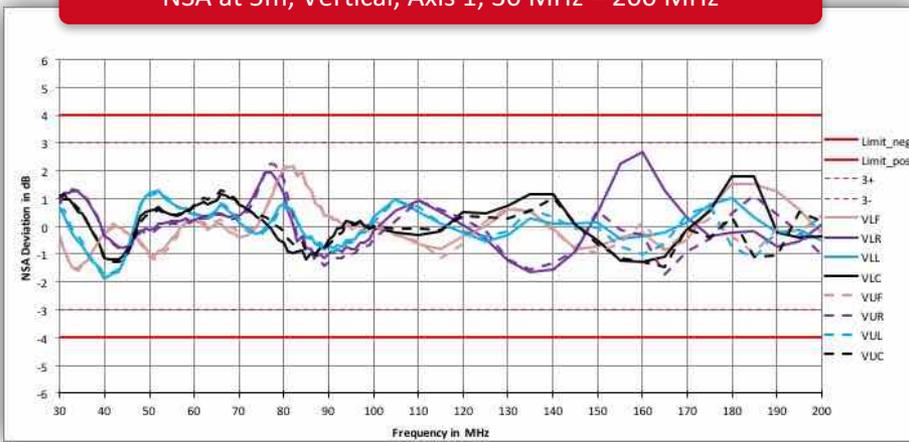
NSA at 5m, Horizontal, Axis 1, 30 MHz – 200 MHz



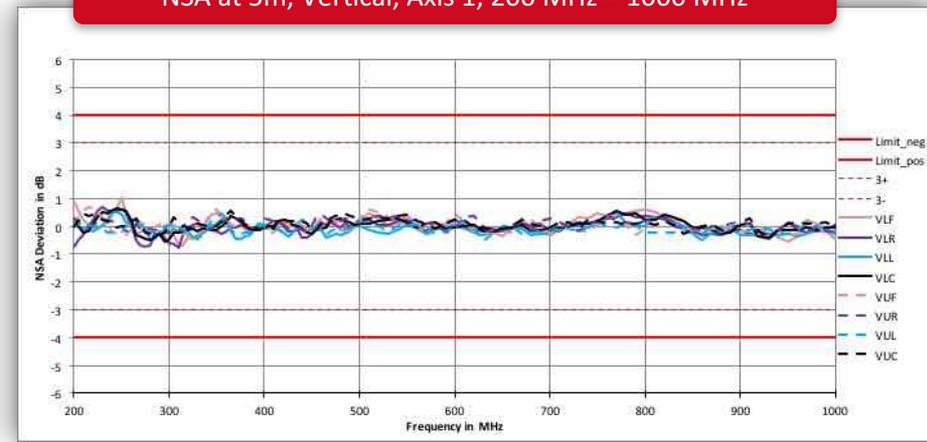
NSA at 5m, Horizontal, Axis 1, 200 MHz – 1000 MHz



NSA at 5m, Vertical, Axis 1, 30 MHz – 200 MHz

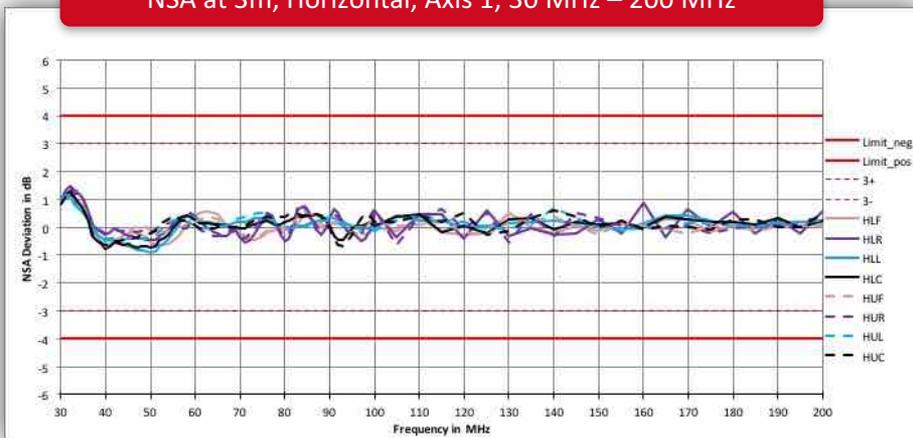


NSA at 5m, Vertical, Axis 1, 200 MHz – 1000 MHz

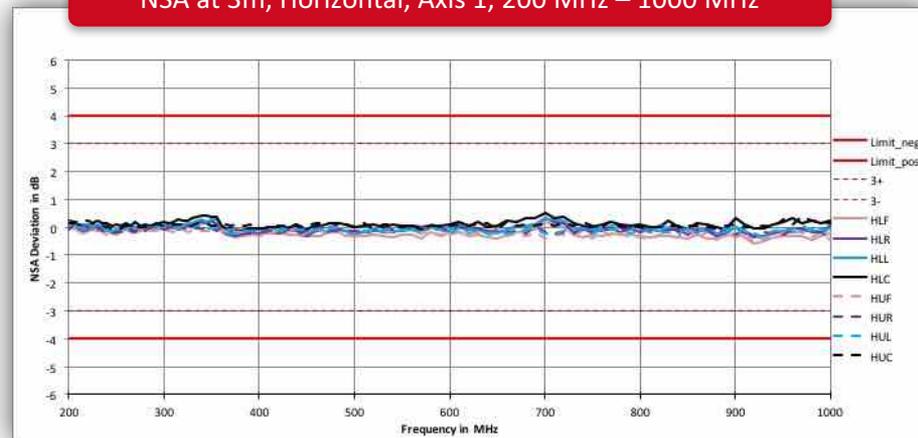


## Performance Test Axis 1 (NSA 3m)

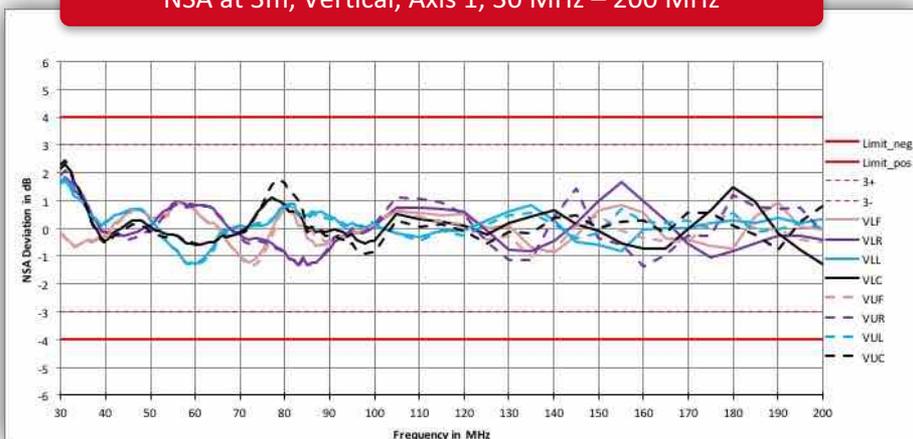
NSA at 3m, Horizontal, Axis 1, 30 MHz – 200 MHz



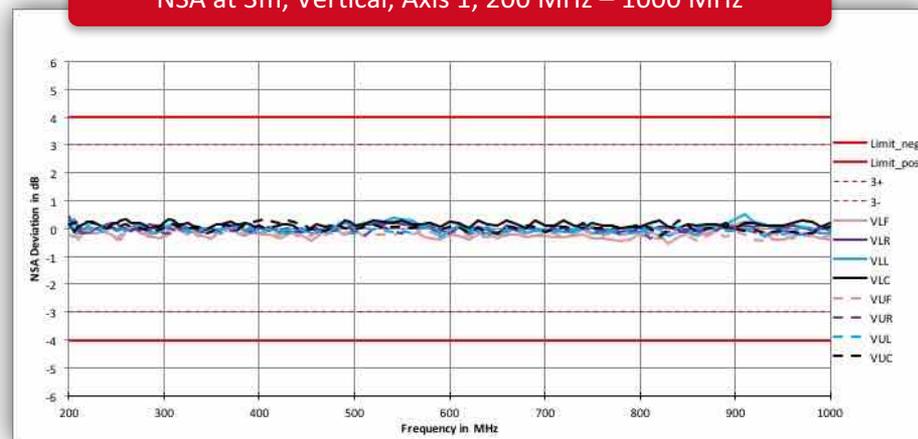
NSA at 3m, Horizontal, Axis 1, 200 MHz – 1000 MHz



NSA at 3m, Vertical, Axis 1, 30 MHz – 200 MHz

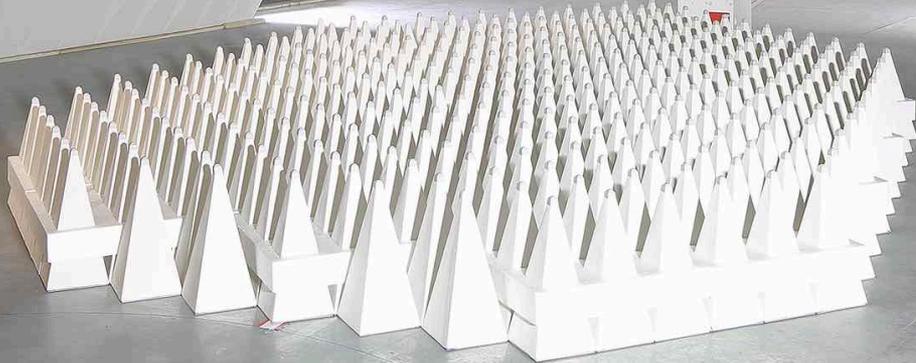


NSA at 3m, Vertical, Axis 1, 200 MHz – 1000 MHz



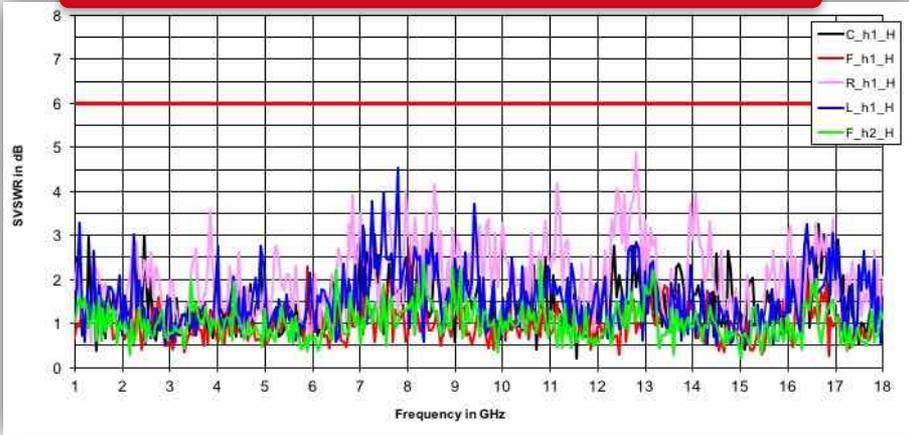
Axis 1

Test Axis 1  
5m (SVSWR)

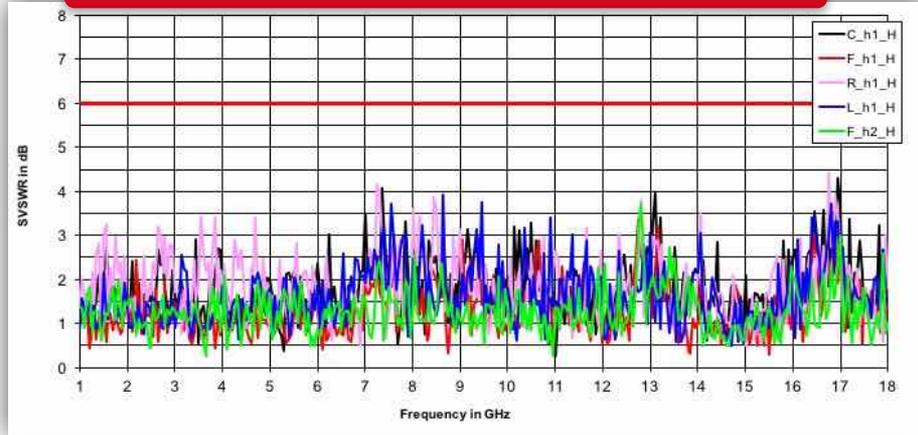


## Performance Test Axis 1 (SVSWR 3m & 5m)

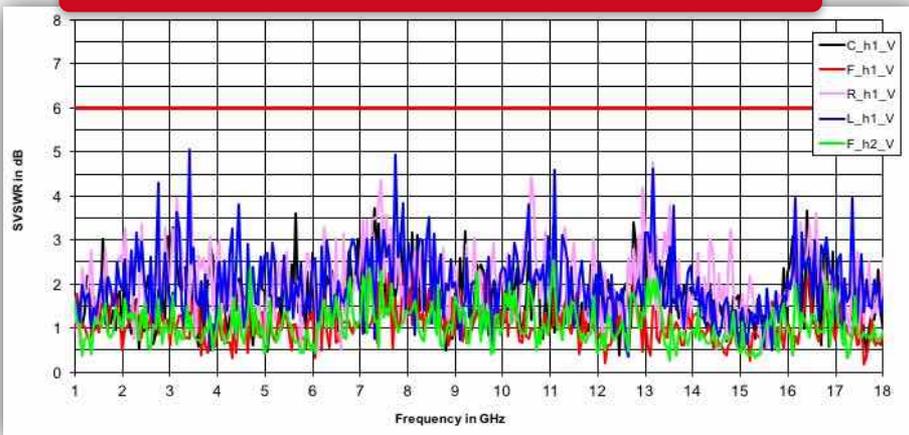
SVSWR at 3m, Horizontal, Axis 1, 1000 MHz – 18000 MHz



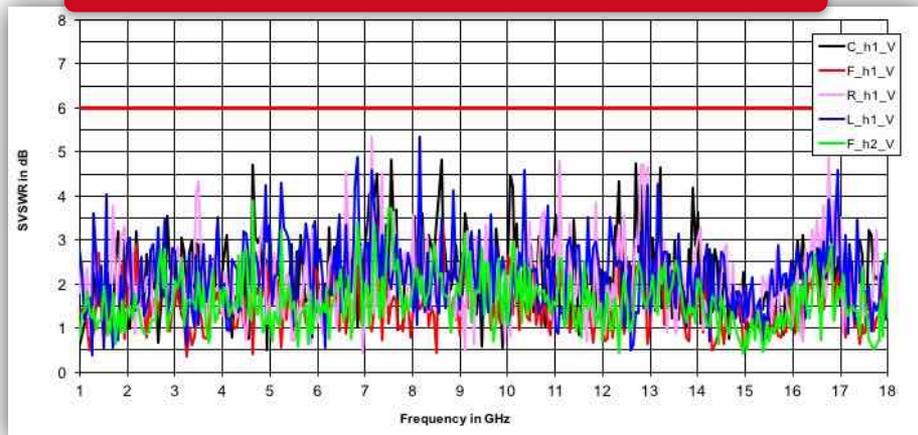
SVSWR at 5m, Horizontal, Axis 1, 1000 MHz – 18000 MHz



SVSWR at 3m, Vertical, Axis 1, 1000 MHz – 18000 MHz



SVSWR at 5m, Vertical, Axis 1, 1000 MHz – 18000 MHz



## Axis 2

### Performance Test Axis 2



Axis 2

#### **Emission (EMI)**

- Emission measurements from 1 GHz to 18 GHz (focus)
- 3,0 m test distance
- Validated for Site Voltage Standing Wave Ratio (SVSWR) according to CISPR 16-1-4 (1 GHz to 18 GHz)

#### **Immunity (EMS)**

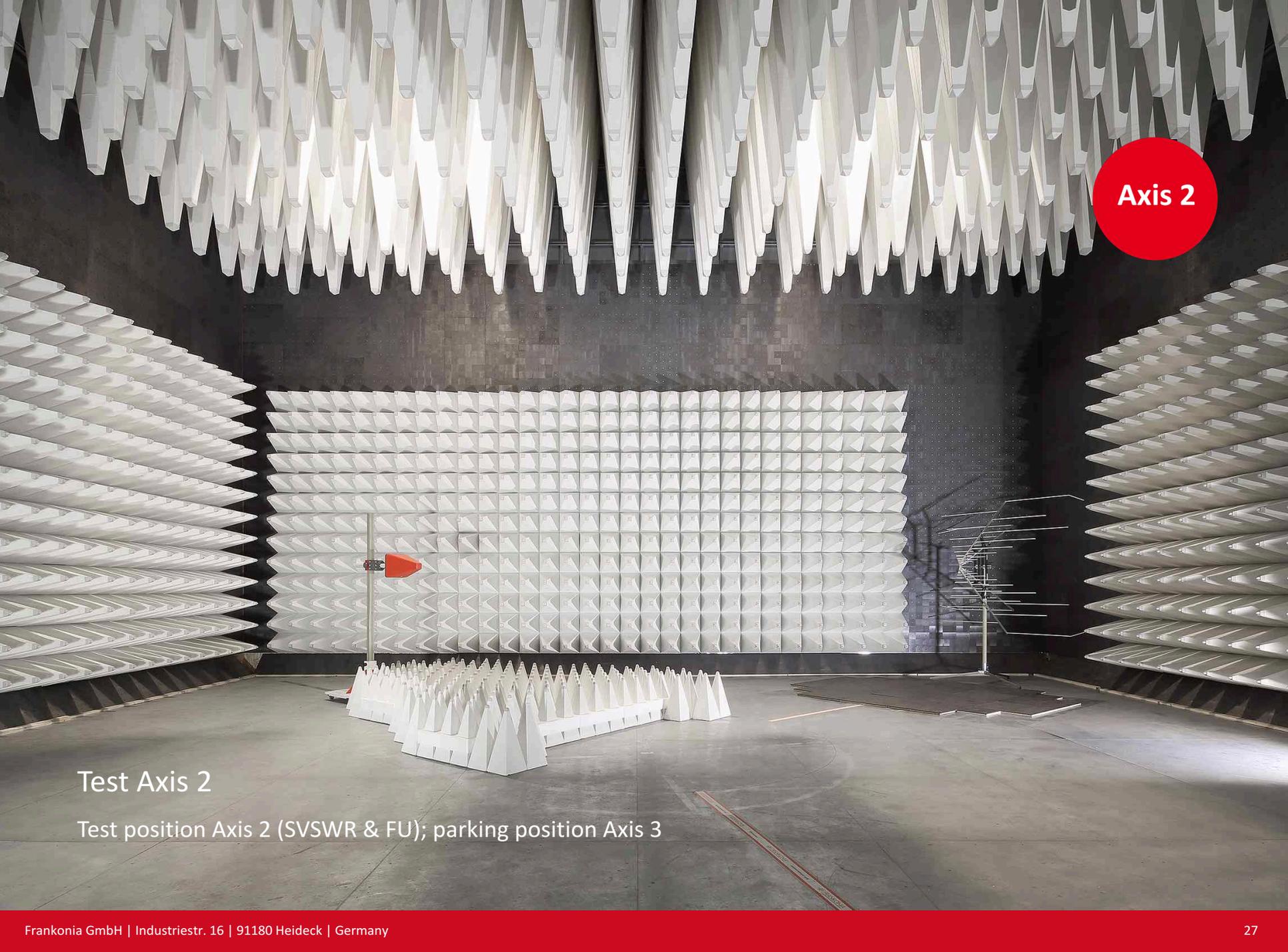
- Immunity tests from 1 GHz to 18 GHz (focus)
- 3,0 m test distance
- Validated for Field Uniformity (FU) acc. to EN 61000-4-3 (1 GHz to 18 GHz)



Axis 2

Test Axis 2

Parking position of Axis 2 and Axis 3



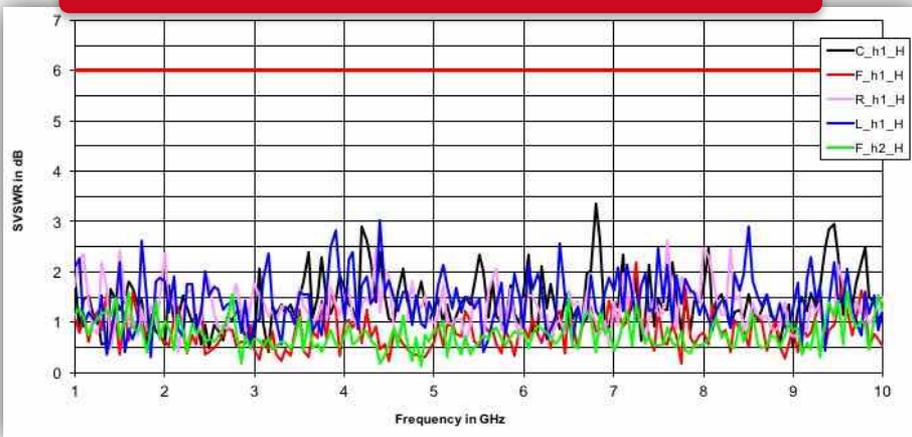
Axis 2

Test Axis 2

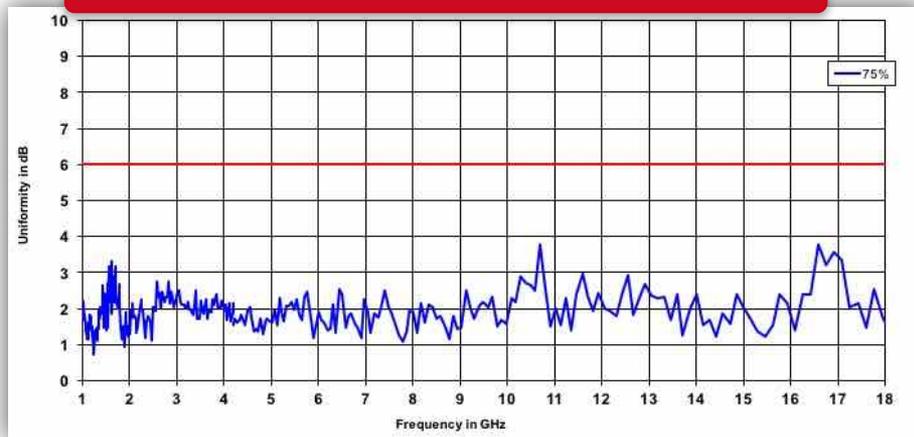
Test position Axis 2 (SVSWR & FU); parking position Axis 3

## Performance Test Axis 2 (SVSWR 3m & FU 3m)

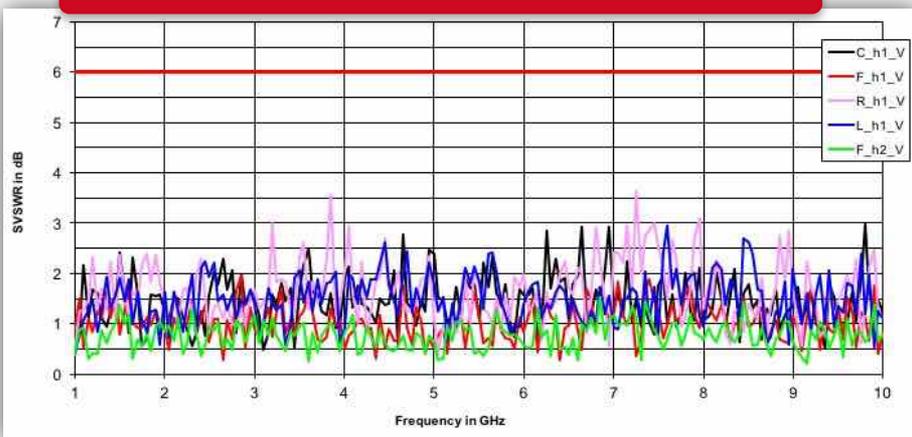
SVSWR at 3m, Horizontal, Axis 2, 1000 MHz – 18000 MHz



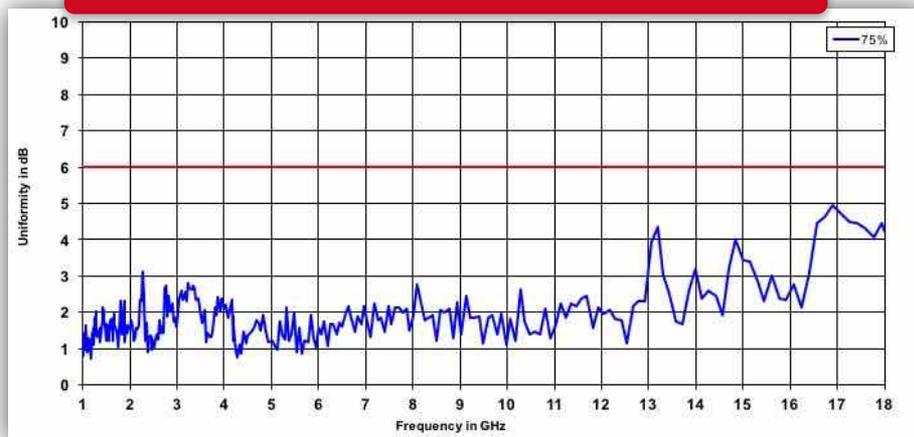
FU at 3m, Horizontal, Axis 2, 1000 MHz – 18000 MHz



SVSWR at 3m, Vertical, Axis 2, 1000 MHz – 18000 MHz



FU at 3m, Vertical, Axis 2, 1000 MHz – 18000 MHz



## Axis 3

### Performance Test Axis 3



Axis 3

#### **Immunity (EMS)**

- Immunity tests from 30/80 MHz to 1 GHz (focus)
- 3,0 m test distance
- Validated for Field Uniformity (FU) acc. to EN 61000-4-3 (30/80 MHz to 1 GHz)
- Validated for Field Uniformity (FU) acc. to EN 61000-4-3 (1 GHz to 18/40 GHz) (option)



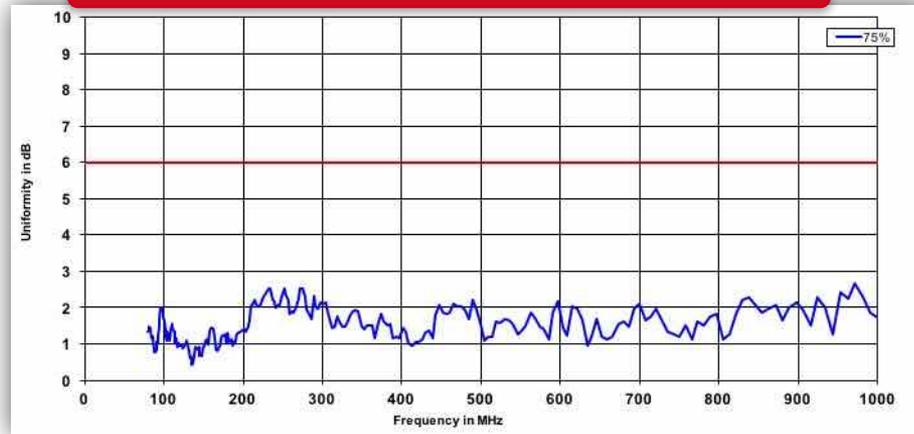
Axis 3

Test Axis 3

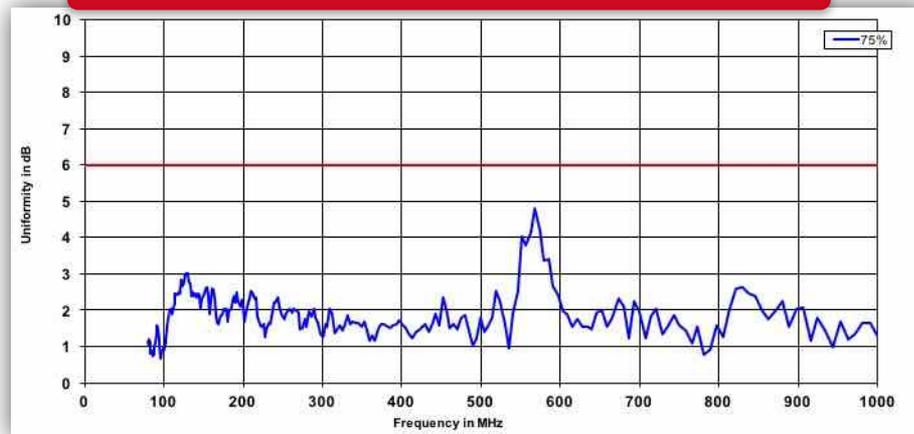
Test position Axis 3 (FU); parking position Axis 2

## Performance Test Axis 3 (FU 3m)

FU at 3m, Horizontal, Axis 3, 80 MHz – 1000 MHz



FU at 3m, Vertical, Axis 3, 80 MHz – 1000 MHz

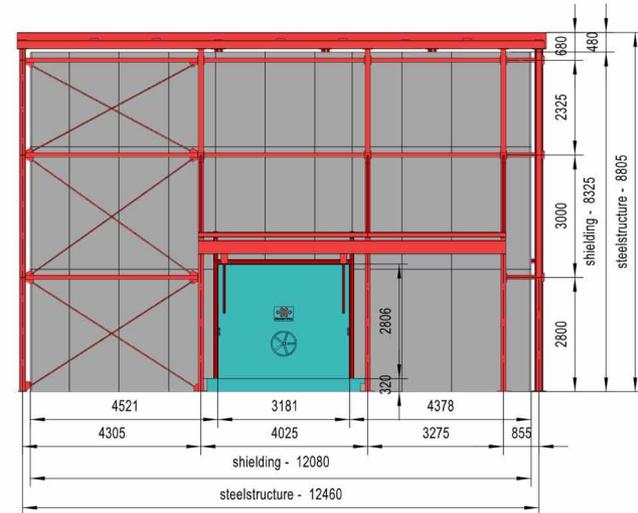
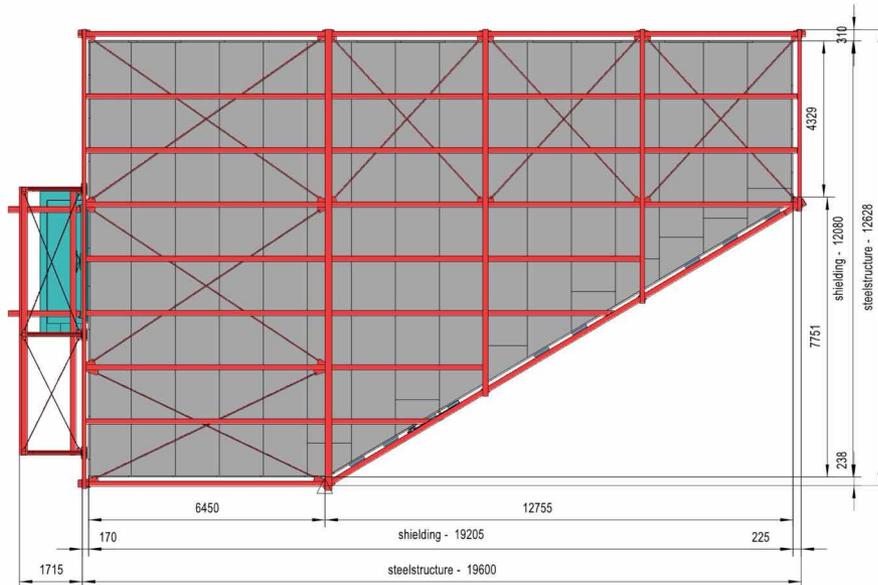


## Technical Specifications

## Technical Specifications

### Anechoic Chamber

External dimension (L x W x H)	19,205 m x 12,080 m x 8,325 m (polygonal shape)
Turntable & Quiet Zone	ø3,0m
Frequency range	30 MHz to 18 GHz (option 40 GHz)

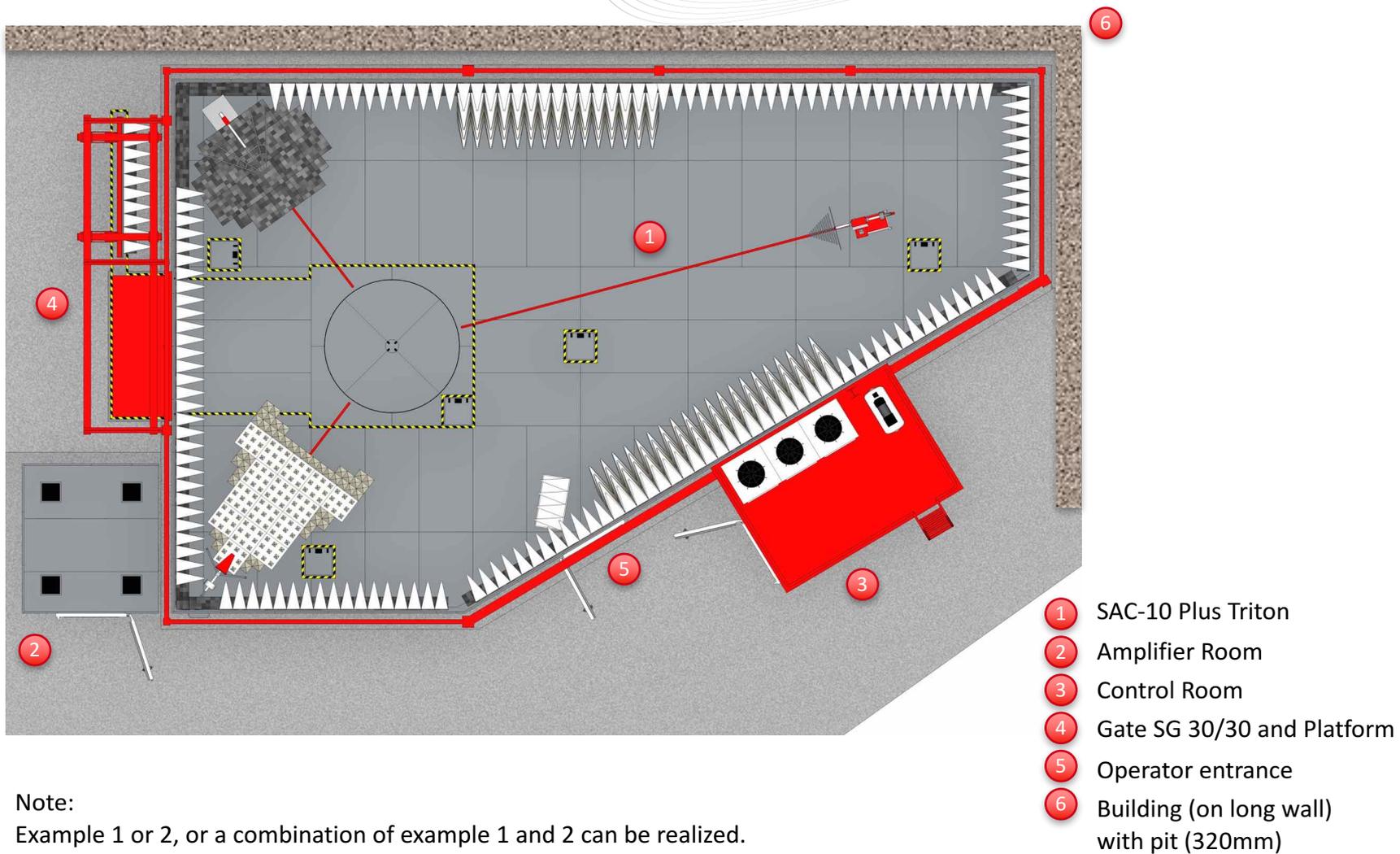


### Absorber Lining

Walls and ceiling	Partial lining with Ferrite absorbers, mix of long and short Frankosorb® pyramid/hybrid absorbers
Floor	Sliding absorber area for immunity and emission test, individual configured for each test axis



## Configuration Example 2



Note:  
Example 1 or 2, or a combination of example 1 and 2 can be realized.

## Summary

## Performance Guarantee

### Performance of Test Axis 1

Deviation NSA at 10 m acc. to CISPR 16-1-4	±3,5 dB from 30 MHz to 100 MHz ±3,0 dB from 100 MHz to 400 MHz ±2,0 dB from 400 MHz to 1 GHz
Deviation NSA at 5 m acc. to CISPR 16-1-4	±3,5 dB from 30 MHz to 100 MHz ±3,0 dB from 100 MHz to 400 MHz ±2,0 dB from 400 MHz to 1 GHz
Deviation NSA at 3 m acc. to CISPR 16-1-4	±3,0 dB from 30 MHz to 200 MHz ±1,0 dB from 200 MHz to 1 GHz

#### Option:

Deviation SVSWR at 3 m acc. to CISPR 16-1-4	+6 dB from 1 GHz to 18 GHz (with additional absorbers)
Deviation SVSWR at 5 m acc. to CISPR 16-1-4	+6 dB from 1 GHz to 18 GHz (with additional absorbers)
Deviation SVSWR at 10 m acc. to CISPR 16-1-4	+6 dB from 1 GHz to 18 GHz (with additional absorbers) <i>Note: limited validation; test up to 6 GHz possible</i>

With its long-term performance Frankosorb® absorbers, Frankonia guarantees a constant performance level of the validated SAC-10 Plus chamber for 10 years.

### Performance of Test Axis 2

Deviation SVSWR at 3 m acc. to CISPR 16-1-4	+5 dB from 1 GHz to 18 GHz
Deviation FU acc. to IEC/EN 61000-4-3	0 dB / +6 dB at 75 %, or 12 out of 16 measuring points from 1 GHz to 18/40 GHz



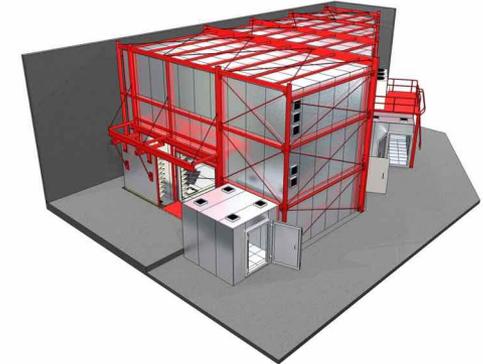
### Performance of Test Axis 3

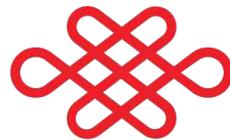
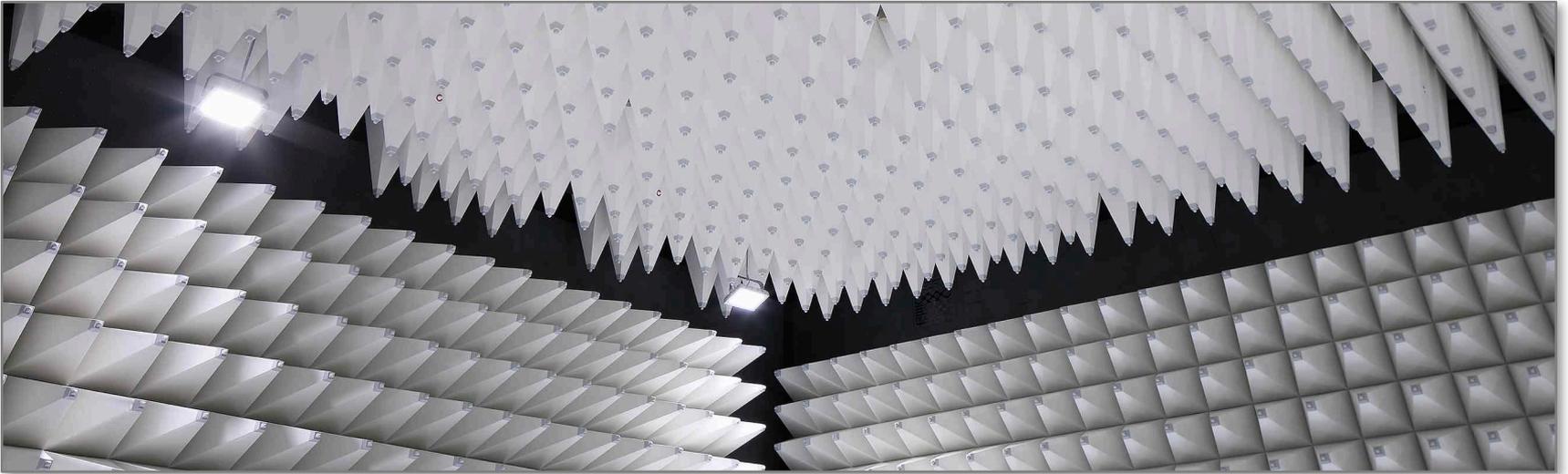
Deviation FU acc. to IEC/EN 61000-4-3	0 dB / +6 dB at 75 %, or 12 out of 16 measuring points from 26/80 MHz to 1 GHz
<i>Option:</i>	
Deviation FU acc. to IEC/EN 61000-4-3 (extended)	0 dB / +6 dB at 75 %, or 12 out of 16 measuring points from 1 GHz to 18/40 GHz (with additional absorbers)

## Summary

- **Full compliant EMC Test Solution**  
Validated according to CISPR 16-1-4, ANSI C63.4 and IEC/EN 61000-4-3
- **Quiet Zone 3,0m at 10m, 5m & 3m test distances**  
Semi-anechoic chamber designed for measuring distances of 10, 5 and 3 meters on a quiet zone of  $\varnothing 3,0$  m.
- **Multiple Test Axes**  
Innovative shape with optimized absorber layout with the use of three axes for emission and immunity tests.
- **Everything in the chamber**  
Antennas and floor absorber areas for each procedure remain in the chamber and specifically move to the test position either in manual or semi-automatized mode.
- **Reproducible and stable quality**  
Quality of every EMC testing remains at a constantly high level, the testing time decreases, malfunction and damage is almost impossible.
- **Turnkey Solutions**  
Anechoic Chamber and Test System from Frankonia

**Frankonia's SAC-10 Plus TRITON. Built for excellence.**





FRANKONIA

The unique and trustworthy partner for EMC solutions worldwide.

A large anechoic chamber with white pyramidal absorbers. A person is visible on a ladder on the left side, and several spotlights are mounted on the ceiling. The floor is a light-colored, polished surface.

Thank you.

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