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!
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. Test Axis 1 (EMI)
2. Test Axis 2 (EMI/EMS)
3. Test Axis 3 (EMS)
4. Turntable & Quiet Zone ø3,0m
5. Optimized RF-shielding Design
6. Frankosorb® Absorber Lining
Test Axis 1 (NSA 10m, 5m & 3 m)
Test Axis 2 (SVSWR & FU)
Test Axis 3 (FU)
Test Axis 1 (NSA 10m, 5m & 3 m)
Test Axis 2 (SVSWR & FU)
Test Axis 3 (FU)
Multiple Test Axes

• All required EMI/EMS tests in one chamber
• 10m, 5m & 3m measuring distances with a Quiet Zone of ø3,0 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
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/m² or 850 V/m (continuous duty); 3.5 kW/m² 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/m² or 600 V/m (continuous duty); 2.6 kW/m² 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-hygrosopic 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
Overview test Axis

1. Test Axis 1 (10m, 5m & 3m)
2. Test Axis 2 (3m)
3. Test Axis 3 (3m)
Performance Test 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)
Test Axis 1
10m (NSA)
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
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
Performance Test 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)
Test Axis 2

Parking position of Axis 2 and Axis 3
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
Performance Test 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)
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

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>External dimension (L x W x H)</td>
<td>19,205 m x 12,080 m x 8,325 m (polygonal shape)</td>
</tr>
<tr>
<td>Turntable &amp; Quiet Zone</td>
<td>ø3,0m</td>
</tr>
<tr>
<td>Frequency range</td>
<td>30 MHz to 18 GHz (option 40 GHz)</td>
</tr>
</tbody>
</table>

![Diagram of Anechoic Chamber](image)

### Absorber Lining

<table>
<thead>
<tr>
<th>Location</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walls and ceiling</td>
<td>Partial lining with Ferrite absorbers, mix of long and short Frankosorb® pyramid/hybrid absorbers</td>
</tr>
<tr>
<td>Floor</td>
<td>Sliding absorber area for immunity and emission test, individual configured for each test axis</td>
</tr>
</tbody>
</table>
Configuration Example 1

1. SAC-10 Plus Triton
2. Amplifier Room
3. Control Room
4. Gate SG 30/30 and Ramp
5. Operator entrance
6. Building (on short wall) without pit
Configuration Example 2

1. SAC-10 Plus Triton
2. Amplifier Room
3. Control Room
4. Gate SG 30/30 and Platform
5. Operator entrance
6. Building (on long wall) with pit (320mm)

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)  
*Note: limited validation; test up to 6 GHz possible*

## 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 |

**Option:**

| 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) |

With its long-term performance Frankosorb® absorbers, Frankonia guarantees a constant performance level of the validated SAC-10 Plus chamber for 10 years.
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 ø3,0 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.
The unique and trustworthy partner for EMC solutions worldwide.
Thank you.

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