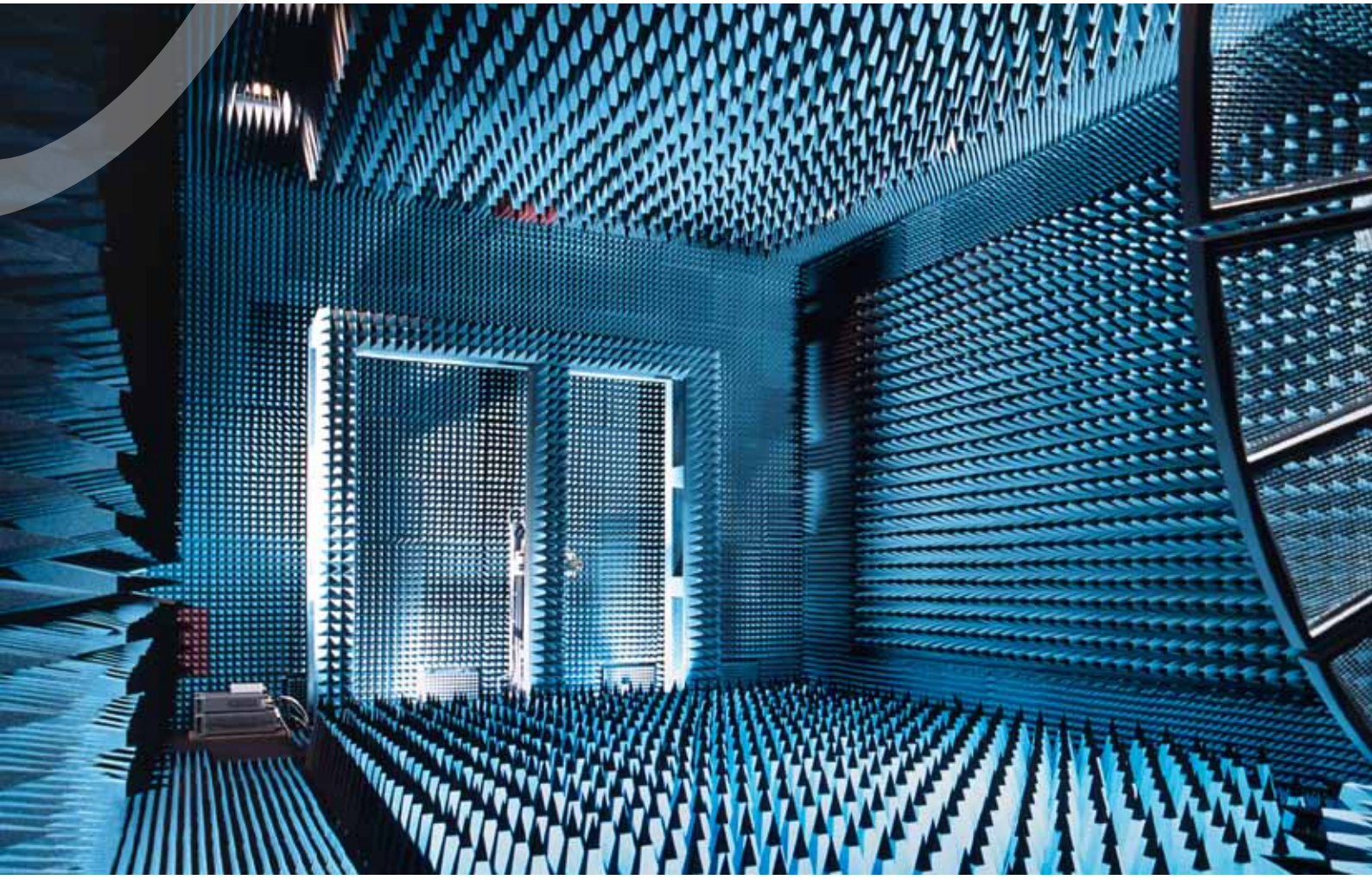
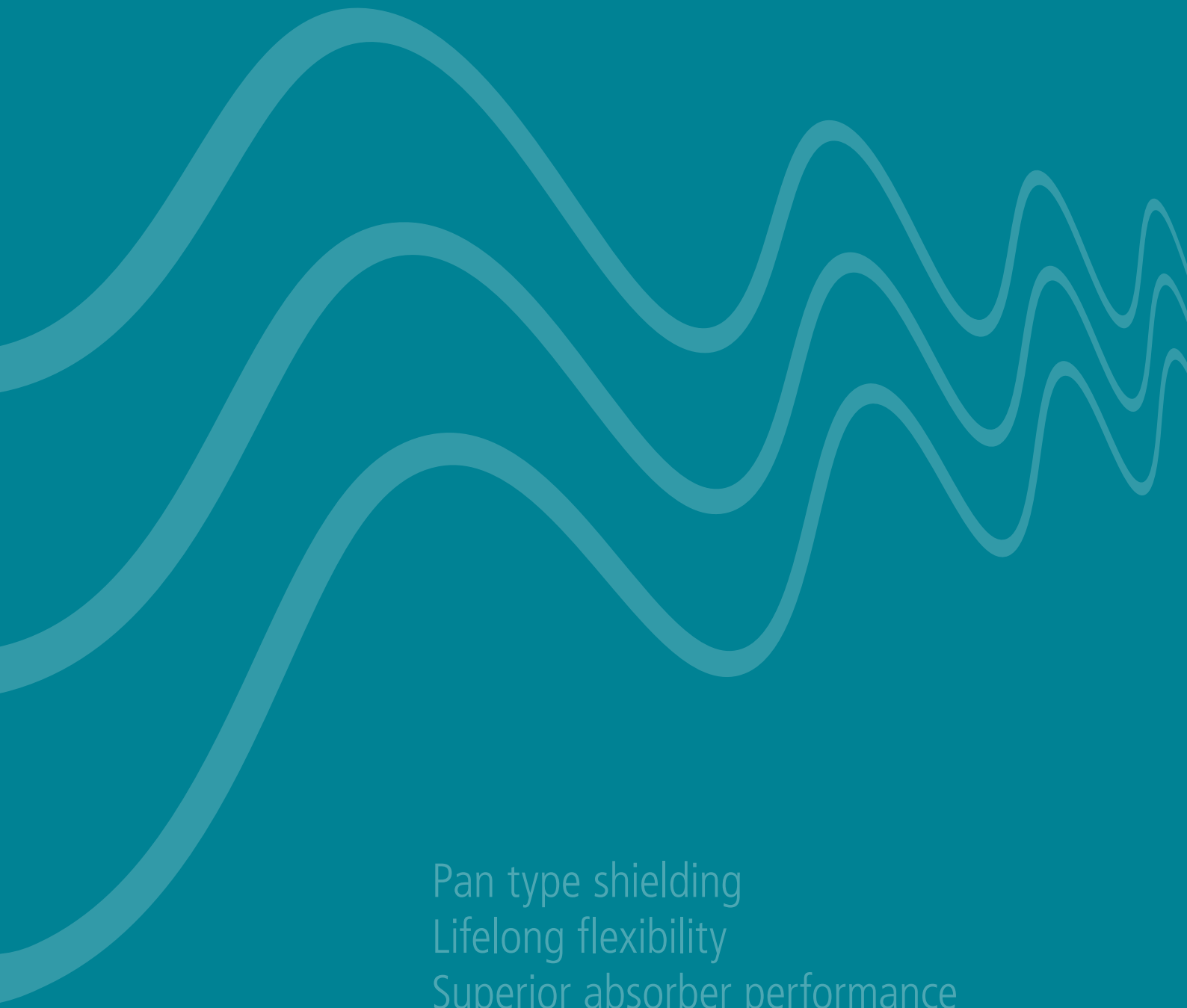
AlbatrossProjects



Microwave

OTA | RFID | ANTENNA MEASUREMENT



Pan type shielding
Lifelong flexibility
Superior absorber performance
Benefit from over 50 years
of microwave know-how

Our EMC Test Sites offer much more than the sum of components, products, services and integration. Our solution philosophy begins with the initial customer inquiry and continues through the entire process to include maintenance service and a lifelong commitment to our customer's EMC facilities.

Chamber Overview

STANDARDIZATION MAKES CUSTOMIZED SOLUTIONS AFFORDABLE.

Today, we directly control the R&D and manufacturing of the two principal components found in any microwave facility solution namely the shielding and the RF absorbers. Additionally, we work closely with our suppliers in the development of the components (i.e. RF filters, positioner, turntables, antenna masts, etc.), to insure they meet our stringently defined specifications.

Microwave chambers usually are built to test and qualify specific equipment under test (EUT). The design of each microwave chamber is unique and is specific to the tests methods and procedures for the equipment that is to be tested in that chamber.

Very often it is required to shield the microwave chamber against RF interference. We can easily realize shielding effectiveness (SE) value of 80 dB to 100 dB in a wide frequency range. Our pan type shielding system offers value even beyond those requirements. By using different shielding principles, different level of shielding effectiveness can be achieved.

Absorbers for microwave chambers are developed and manufactured by our subsidiary E&C Anechoic Chambers N.V. (www.ecanechoicchambers.com).

Microwave chambers designed to test OTA and RFID usually cover the frequency range from a few 100 MHz up to several GHz. Our absorber design which will cover this frequency range, make our chambers suitable for ETSI applications.

Chamber Validation

A WIN-WIN SITUATION FOR BOTH CUSTOMER AND SUPPLIER.

The chamber validation procedure and the test reports serve many functions but most importantly, are proof positive that we fulfill our contractual obligation to the client by providing a high performance RF chamber.

In order for the customer to receive accreditation for their chamber it is necessary for the chamber undergo final verification testing. This verification can be performed either by third-party test laboratories or by qualified chamber suppliers.

We consider the chamber validation to be the final acceptance of the overall design and installation of the finished product. Since day one we have invested considerable resources in the capability of performing chamber validation tests with extremely high accuracy.

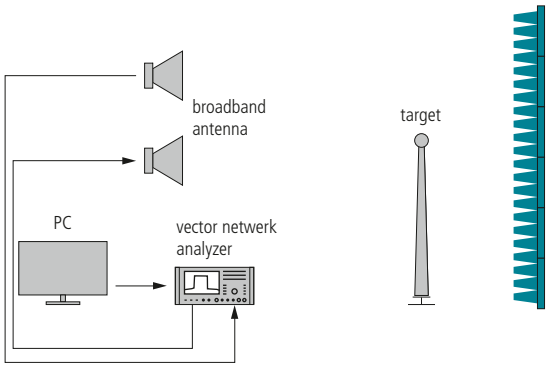
To describe the RF-performance of a microwave chamber at the location of the antenna under test (AUT) usually a sphere with a specific diameter is defined as well as the measurement distance between the measurement antenna and this sphere. The AUT must fit completely into this sphere. Often this sphere is called "Quiet Zone" (QZ).

The AUT is then positioned in that place. The most common validation procedures recognized and accepted in the microwave market are:
– Free Space VSWR
– Field probe procedure for antenna range evaluation

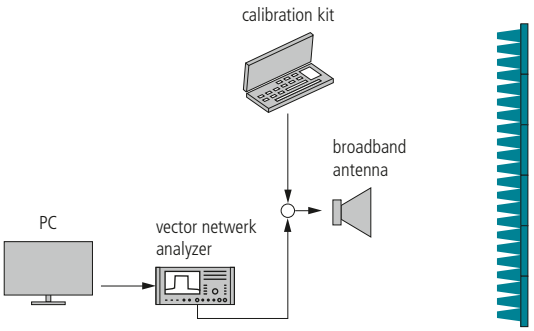
Acceptance procedures for compact range applications foresee the validation of the absorber reflectivity values which the system supplier has included in his overall performance simulation. This validation is performed according to:
– AVSWR method (advanced VSWR) from 0.5 to 6 GHz
– RCS method from 6 to 18 GHz

Chambers for mobile communication measurements are called over-the-air (OTA) chambers and are validated in accordance with the procedure set in the CTIA standard. The measurement of the site attenuation (SA) and the deviation from it refer to a given QZ in which the EUT (cell phone, notebook etc.) is placed. For RFID applications, the chamber performance is validated by measuring the FS NSA (free space normalized site attenuation) according to the ETSI TR 102 273.

We can provide all of these services with our experience and expertise in microwave chamber validation.



RCS measurement method



AVSWR measurement method

Purpose & Standards

WHAT IS THIS SOLUTION FOR?

Aerospace, mobile communication, RFID, antenna development, and electronic warfare are the driving activities for the microwave chamber market. The working frequency range is more oriented toward the GHz, even though some applications start in the 100s MHz range.

Many factors in the GHz frequency range must be taken into account during design of a suitable anechoic chamber. The normal paint finish on the absorbers becomes an issue and cannot be used at very high frequencies range, thus leading to special lighting design. The required test accuracy not only calls for absorbers with very high RF-absorption properties, but also, accurate geometry of the chamber design and of the positioning systems for the EUT. Selection of auxiliary materials and accessories with regard to their behavior in the GHz frequency range is a must.

High performance resistive absorbers in the GHz frequency range show a certain degree of shielding properties sufficient for several applications, making classical shielding obsolete.

The solutions we offer are for applications and sites which require a shielding effectiveness (SE) near to the EMC requirements (i.e. values in the electric field and plane wave of about 80 dB to 100 dB).

For wireless over-the-air (OTA) and RFID applications, the following standards are internationally recognized and accepted for test site validation:
– CTIA
– ETSI TR 102 273

Quality Management

QUALITY MEANS DOING IT RIGHT FROM THE VERY FIRST THOUGHT.

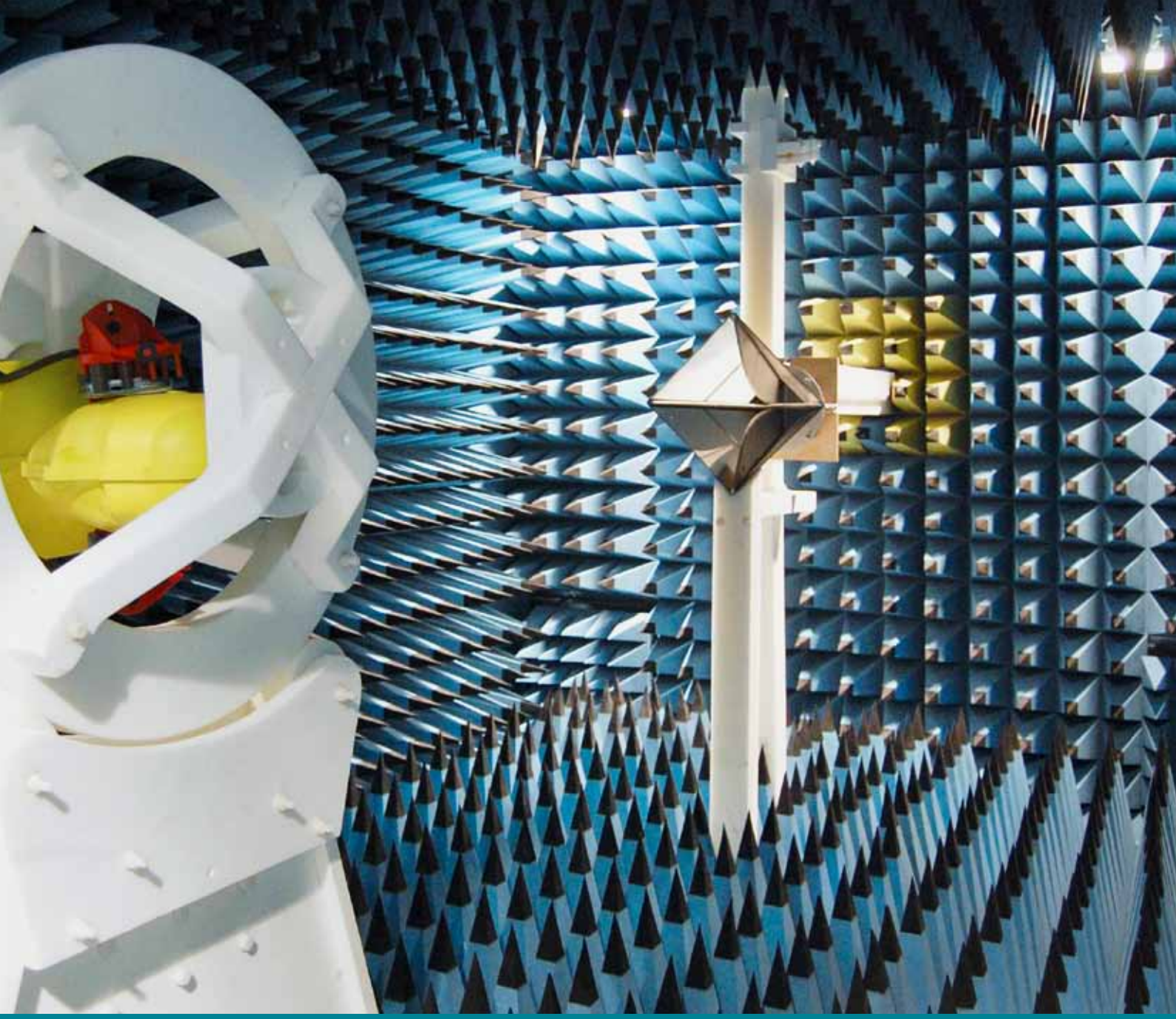
Our quality management ensures a most efficient quality control over products, management and organizational systems.

The organization ensures the availability of resources and information necessary to support the operation and monitoring of these processes. All relevant processes are defined in our management system. Through monitoring, analysis, and improvement, the highest quality and customer satisfaction is our target.

In an effort to improve our quality assurance systems, we ask our customers to provide an evaluation of our performance at the conclusion of each project. This feedback, coupled with input from the market and the Standards Committees, gives continuous enhancement to our systems and correction to any non-conformity found.

Product purchasing and sourcing is a priority in our role as system integrator, so much that it encompasses one of sixteen chapters in our quality management system. Key process figures are:
– audit & approval of suppliers
– evaluation of products by our technical team
– technical reporting on delivered products
– project related factory acceptance by the project manager.

Our ISO 9001 certification guarantees that our designs, products, and solutions will always meet the highest quality standards. It's our goal to provide you the very best of expertise, project management, and products. The main system components like shielding, absorbers etc. are manufactured by daughter companies or by our shareholders. This ensures a full control with regard to quality and delivery time.



OTA

OTA

For wireless over-the-air (OTA) applications, rectangular fully anechoic rooms are the most suitable test sites. The size and configuration of the fully anechoic room is dependent upon the space available and antenna position to the EUT. The use of spherical arch scanners especially influences chamber height.

Basic Outline OTA

KEY FEATURES

– Self-supporting modular pan shielding for floor, walls and ceiling inclusive of an earthing stud
– Wooden floor with distributed load of 1 t (2,205 lb)
– Floor connection points and wall access panels as to chamber size
– Honeycomb vents in walls and ceiling 0.33 m x 0.33 m (12 in x 12 in) as to the chamber size
– One pneumatically operated RF shielded door 1.2 m x 2.05 m (4 ft x 7 ft) for conical cut chamber
– Two manually operated RF shielded doors 0.9 m x 2.05 m (3 ft x 7 ft) for great circle chamber
– Door maintenance kit as appropriate
– Pyramidal absorber lining for floor including walkway, walls and ceiling, as to the chamber performance
– Fully functional low reflection positioning system including controller and antenna stand for great circle chamber
– Fully functional low reflection positioning system for conical cut chamber
– EMC power line filters: one filter 2 phases 16 A for EUT supply and one 2 phases 32 A for internal use
– Connectors including one six-fold fiber optic connector, ten N-precision connectors and two SMA connectors
– Standard electrical package: electrical distribution, lighting, emergency and signal lamps
– Installation of the OTA chamber including leakage test after shielding installation

Options OTA

CUSTOMIZABLE UPGRADES

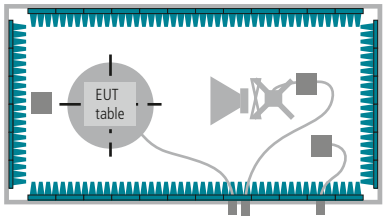
– Fully functional shielded control room
– Access ramp for entrance door
– Honeycomb fan for forced ventilation
– Digital CCTV monitoring system
– FO converter for Ethernet, GPIB, RS232, VGA, USB, MM and Digi 88
– EMC filters for control- and communication lines
– Fire detection and extinguishing system
– Exterior paint on the visible shielding surfaces
– SE measurement according to EN 50147-1, IEEE 299
– Chamber validation according to CTIA test plan for mobile station

OTA Chamber

ROOM DIMENSIONS

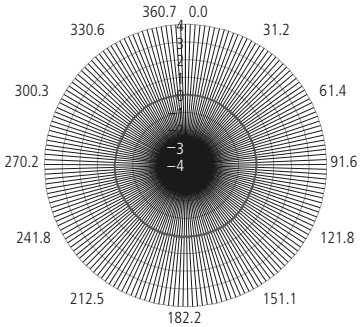
Room type	Total required space[1)]	Shielding external[2)]	Clear internal[3)]
OTA – 0.3 m Ø Great circle	6.7 m x 4.3 m x 3.2 m 22 ft x 14.1 ft x 10.5 ft	6.7 m x 3.4 m x 3.0 m 22 ft x 11.2 ft x 9.8 ft	5.5 m x 2.2 m x 1.8 m 18.0 ft x 7.2 ft x 5.9 ft
OTA – 0.3 m Ø Conical cut	5.1 m x 5.9 m x 5.3 m 16.7 ft x 19.4 ft x 17.4 ft	4.9 m x 4.9 m x 5.1 m 16.1 ft x 16.1 ft x 16.7 ft	3.7 m x 3.7 m x 3.9 m 12.1 ft x 12.1 ft x 12.8 ft

L x W x H [1)]Dimensions including steel structure, gate drive track and HVAC ducts. [2)]Dimensions excluding steel structure. [3)]Absorber to absorber, i.e. ground plane to absorber.

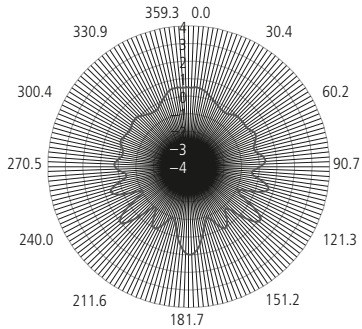


PERFORMANCE

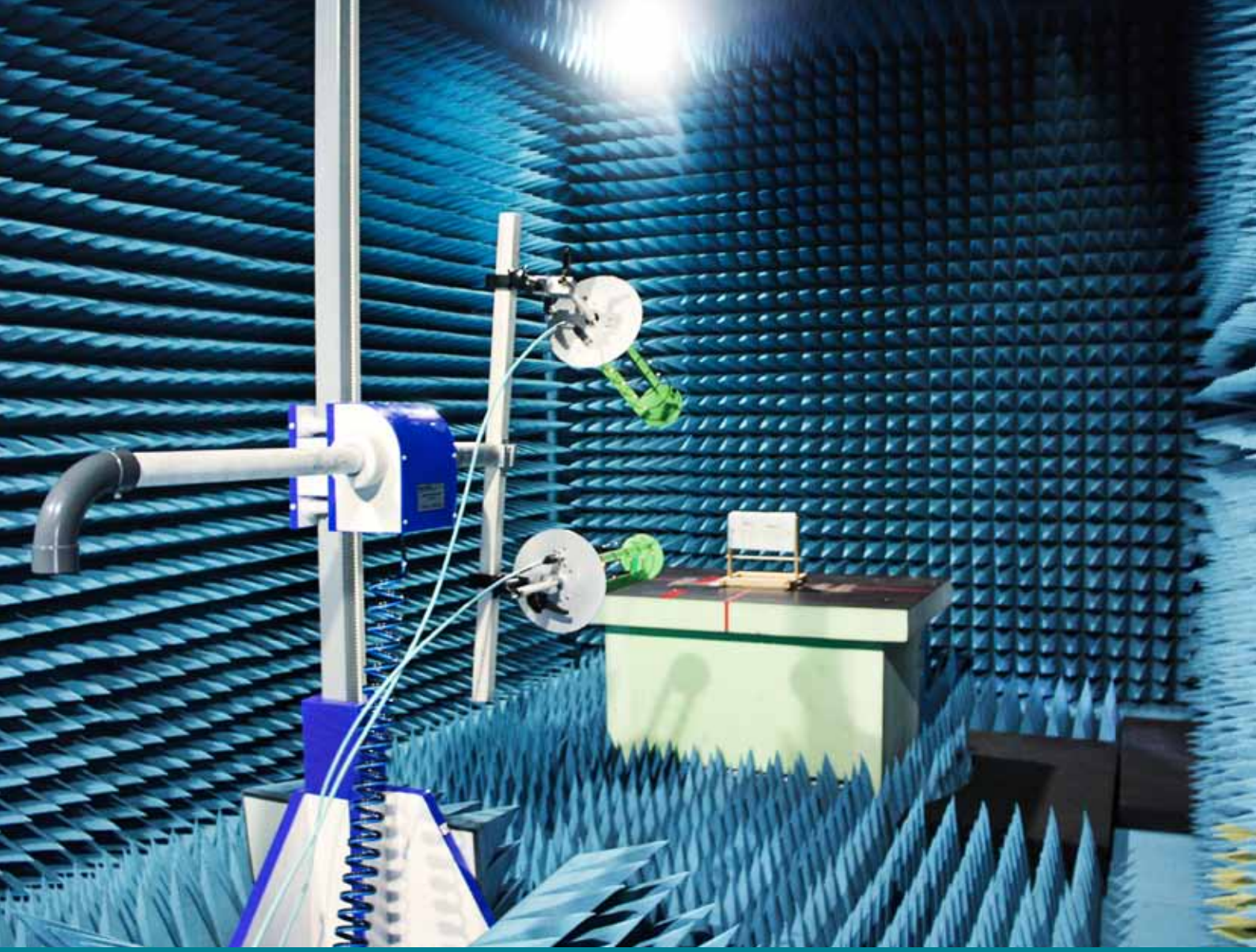
	Ripple Test
Standard	CTIA Test Plane for Mobile Station
Frequency range	836.5 MHz – 1.88 GHz
Test distance	2.3 m
Test volume	0.3 m
Test axis	In axis
Maximum standard uncertainty	< 0.5 dB



Typical ripple with loop, average normalized (1880 MHz)



Typical ripple with dipole, average normalized (1880 MHz)



RFID

RFID

For RFID applications, rectangular fully anechoic rooms lined with high performance resistive pyramidal absorbers are the most suitable test site. Two entrance doors are recommended to avoid lower performing walkway absorbers in the critical floor area and easy access to EUT and antenna.

Basic Outline RFID

KEY FEATURES

– Self-supporting modular pan shielding for floor, walls and ceiling inclusive of an earthing stud
– Wooden floor with distributed load of 1 t (2,205 lb)
– Floor connection points and wall access panels as to chamber size
– Honeycomb vents in walls and ceiling 0.33 m x 0.33 m (12 in x 12 in) as to the chamber size
– Two manually operated RF shielded doors 0.9 m x 2.05 m (3 ft x 7 ft)
– Two door maintenance kits
– Pyramidal absorber lining for floor including walkways, walls and ceiling, as to the chamber performance
– Fully functional positioning system including controller, turntable as to test volume size and antenna stand
– EMC power line filters: one filter 2 phases 16 A for EUT supply and one 2 phases 32 A for internal use
– Connectors including one six-fold fiber optic connector, two N-precision connectors and two SMA connectors
– Standard electrical package: electrical distribution, lighting, emergency and signal lamps
– Installation of the RFID chamber including leakage test after shielding installation

Options RFID

CUSTOMIZABLE UPGRADES

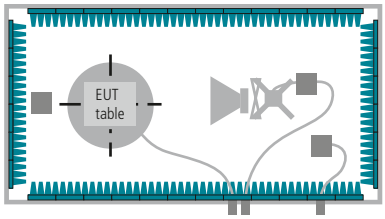
– Fully functional shielded control room
– Access ramp for entrance door
– Honeycomb fan for forced ventilation
– Low reflection EUT test table
– Digital CCTV monitoring system
– FO converter for Ethernet, GPIB, RS232, VGA, USB, MM and Digi 88
– EMC filters for control- and communication lines
– Fire detection and extinguishing system
– Exterior paint on the visible shielding surfaces
– SE measurement according to EN 50147-1, IEEE 299
– Chamber validation according to ETSI TR 102 273

RFID Chamber

ROOM DIMENSIONS

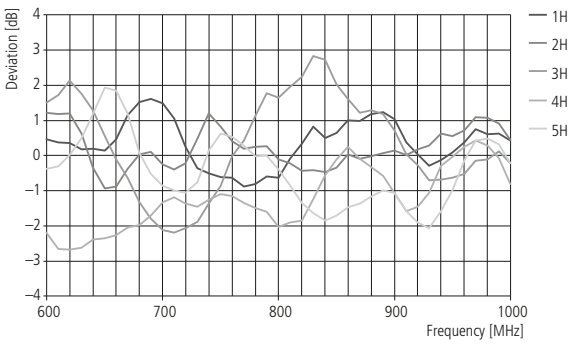
Room type	Total required space[1)]	Shielding external[2)]	Clear internal[3)]
RFID – 1.5 m Ø	7.6 m x 4.6 m x 3.8 m 24.9 ft x 15.9 ft x 12.5 ft	7.6 m x 3.7 m x 3.6 m 24.9 ft x 12.1 ft x 11.8 ft	6.4 m x 2.5 m x 2.4 m 21.0 ft x 8.2 ft x 7.9 ft

L x W x H [1)]Dimensions including steel structure, gate drive track and HVAC ducts. [2)]Dimensions excluding steel structure. [3)]Absorber to absorber, i.e. ground plane to absorber.

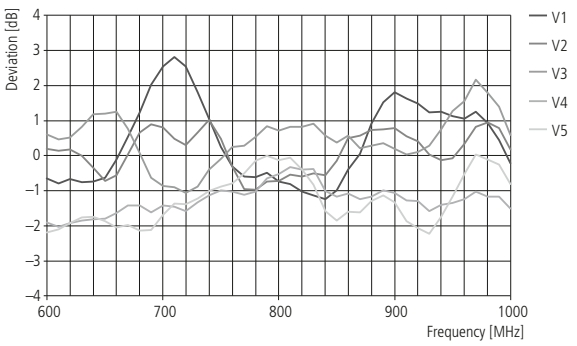


PERFORMANCE

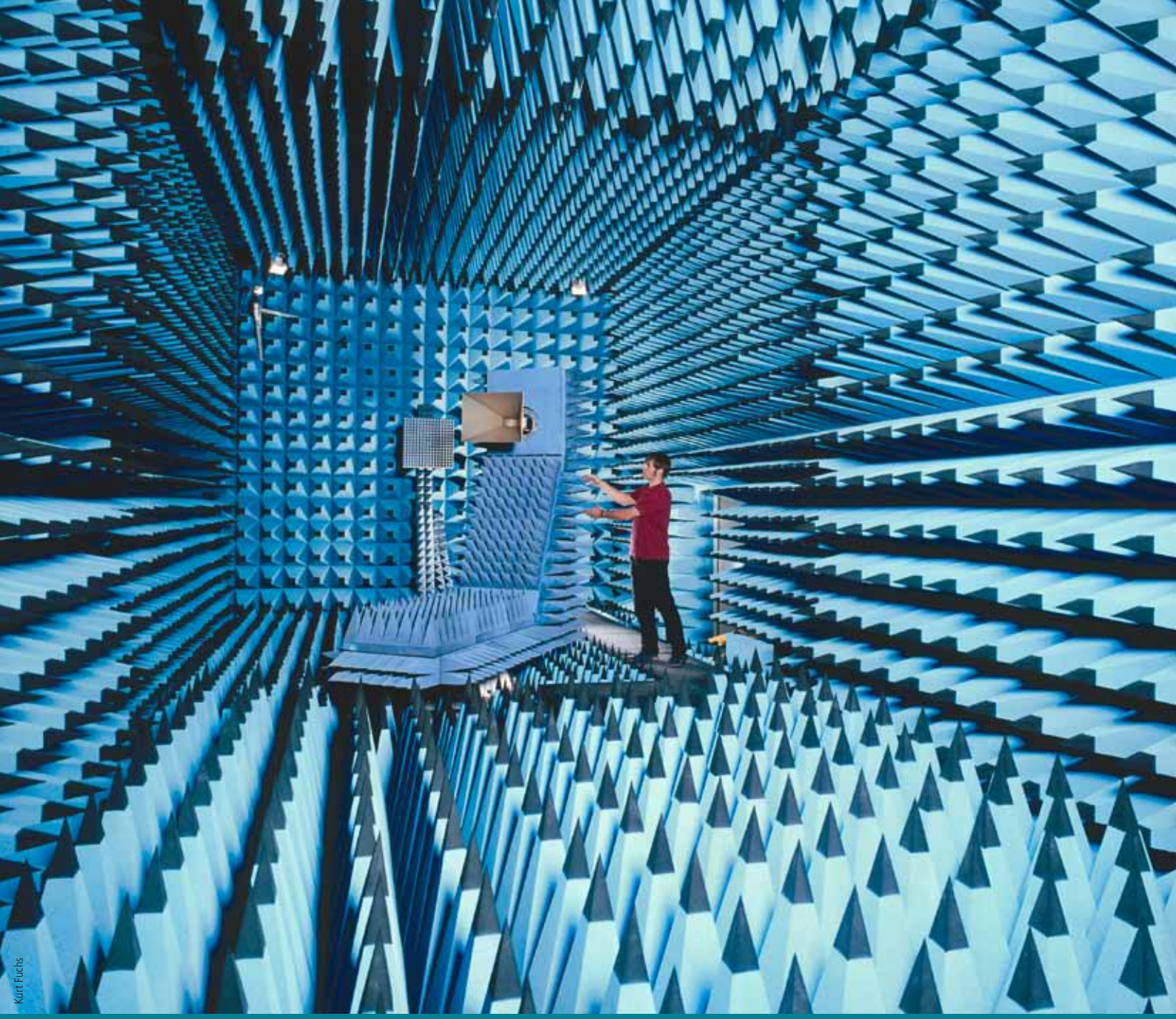
	Free Space NSA
Standard	ETSI TR 102 273
Frequency range	600 MHz – 1 GHz
Test distance	3.0 m
Test volume	1.5 m
Test axis	In axis
Maximum standard uncertainty	≤ ±3.0 dB



Typical performance RFID 3 m (FS NSA) horizontal



Typical performance RFID 3 m (FS NSA) vertikal



Kurt Fuchs

Antenna

Antenna

The test sites dedicated to the classical antenna measurement market are almost unique pieces of test site with specific shape, size, and absorber design. The free space environment is created by using a fully anechoic lining with high performance resistive pyramidal absorbers. Tall entrance gates are provided for aerospace applications.

Basic Outline Antenna

KEY FEATURES

- Self-supporting modular pan shielding for floor, walls and ceiling inclusive of an earthing stud
- Wooden floor with distributed load of 1 t (2,205 lb)
- Floor connection points and wall access panels as to chamber size
- Honeycomb vents in walls and ceiling 0.33 m x 0.33 m (12 in x 12 in) as to the chamber size
- One manually operated RF shielded personnel door 0.9 m x 2.05 m (3 ft x 7 ft)
- One manually operated RF shielded EUT double winged door 2.7 m x 2.5 m (9 ft x 8 ft)
- Two door maintenance kits
- Pyramidal absorber lining for floor including walkways, walls and ceiling, as to the chamber performance
- EMC power line filters: one filter 3 phases 16 A for EUT supply and one 2 phases 32 A for internal use
- Connectors including one six-fold fiber optic connector, two N-precision connectors and two SMA connectors
- Standard electrical package: electrical distribution, lighting, emergency and signal lamps
- Installation of the antenna chamber including leakage test after shielding installation

Options Antenna

CUSTOMIZABLE UPGRADES

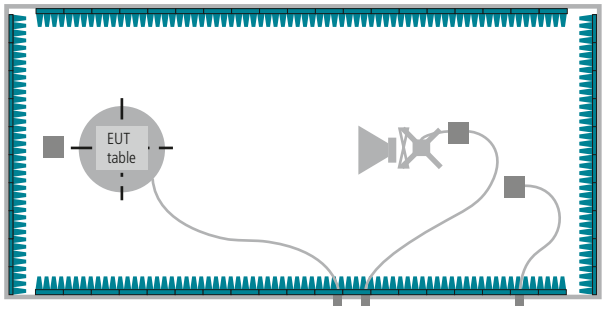
- Fully functional shielded control room
- Large entrance gate as required
- Access ramp for entrance gate
- Honeycomb fan for forced ventilation
- EUT positioning device
- Crane for EUT positioning
- Digital CCTV monitoring system
- FO converter for Ethernet, GPIB, RS232, VGA, USB, MM and Digi 88
- EMC filters for control- and communication lines
- Fire detection and extinguishing system
- Exterior paint on the visible shielding surfaces
- SE measurement according to EN 50147-1, IEEE 299
- Chamber validation according to the defined acceptance procedure, e.g. quiet zone reflectivity or AVSWR

Multipurpose antenna chamber

ROOM DIMENSIONS

Room type	Total required space[1)]	Shielding external[2)]	Clear internal[3)]
Far Field + EMC measurements	23.0 m x 12.4 m x 8.6 m 75.5 ft x 40.7 ft x 28.2 ft	22.0 m x 10.9 m x 8.1 m 72.2 ft x 35.8 ft x 26.6 ft	20.1 m x 8.9 m x 7.0 m 65.9 ft x 29.2 ft x 23.0 ft

L x W x H [1)]Dimensions including steel structure, gate drive track and HVAC ducts. [2)]Dimensions excluding steel structure. [3)]Absorber to absorber, i.e. ground plane to absorber.



PERFORMANCE

Antenna	QZ reflectivity	Multi path loss	Cross polarisation
Standard	FS VSWR validation	FS VSWR validation	FS VSWR validation
Frequency range	1 GHz – 18 GHz	1 GHz – 18 GHz	1 GHz – 18 GHz
Test distance	10 m	10 m	10 m
Test volume	2 m	2 m	2 m
Test axis	In axis	In axis	In axis
Deviation		±0.2 dB	≥ 30 dB

EMC	NSA	Transmission Loss	Field Uniformity
Standard	CISPR 16-1-4 ANSI C63.4	analogy CISPR 16-1-4 Ed.2	IEC 61000-4-3 EN 61000-4-3
Frequency range	30 MHz – 1 GHz	1 GHz – 40 GHz	80 MHz – 40 GHz
Test distance	3 m	3 m	3 m
Test volume	2 m	2 m	1.5 m x 1.5 m (vertical plane)
Test axis	Off axis	Off axis	In axis
Deviation	±4 dB	±4 dB	0 to +6 dB / 75% rule

Antenna chamber

ROOM DIMENSIONS

Room type	Total required space[1)]	Shielding external[2)]	Clear internal[3)]
Near field measurements	16.0 m x 7.7 m x 6.3 m 52.5 ft x 25.3 ft x 20.7 ft	15.4 m x 6.1 m x 5.6 m 50.5 ft x 20.0 ft x 18.4 ft	13.4 m x 4.1 m x 4.4 m 44.0 ft x 13.5 ft x 14.4 ft

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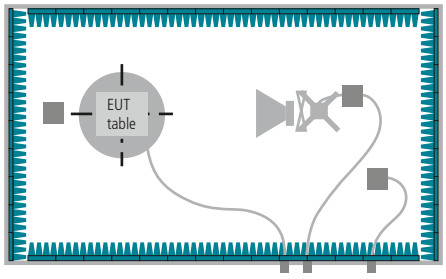
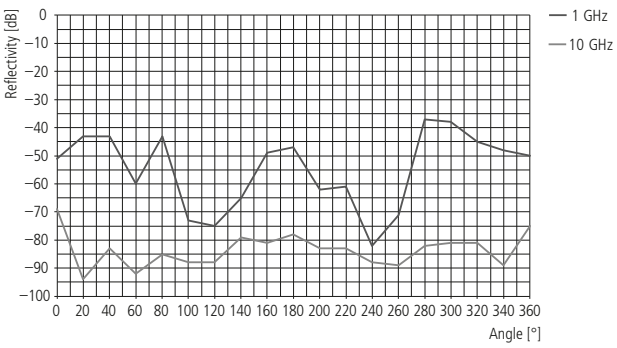


PERFORMANCE

	QZ reflectivity	Multi path loss	Cross polarisation
Standard	FS VSWR validation	FS VSWR validation	FS VSWR validation
Frequency range	1 GHz – 18 GHz	1 GHz – 18 GHz	1 GHz – 18 GHz
Test distance	7 m	7 m	7 m
Test volume	2 m	2 m	2 m
Test axis	In axis	In axis	In axis
Deviation	≥ –38 dB	± 0.3 dB	≥ 25 dB



Typical QZ reflectivity 7 m distance, 2 m QZ size

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