



An EMC Testing Facility for ESS

Dr. Harry Walton

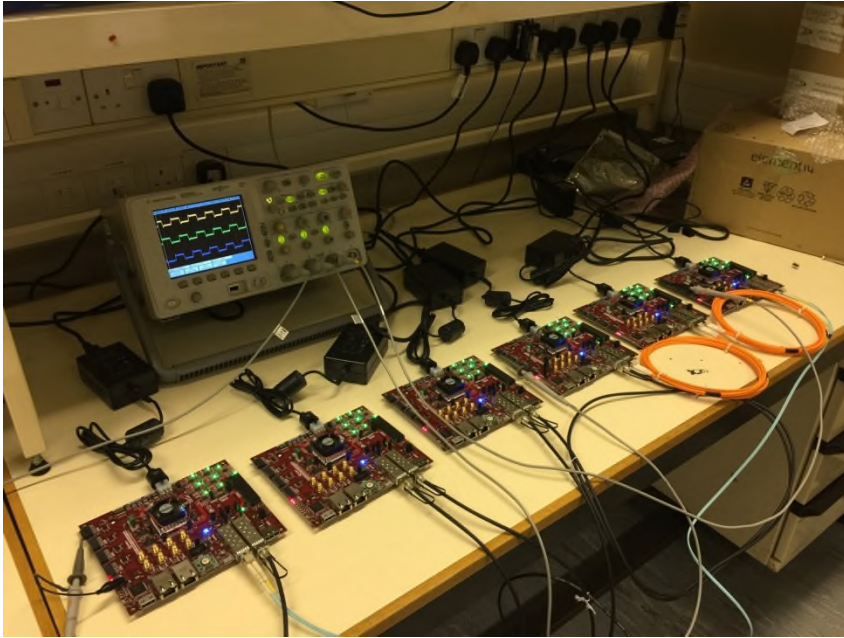
Rutherford Appleton Laboratory

Detectors and Electronics

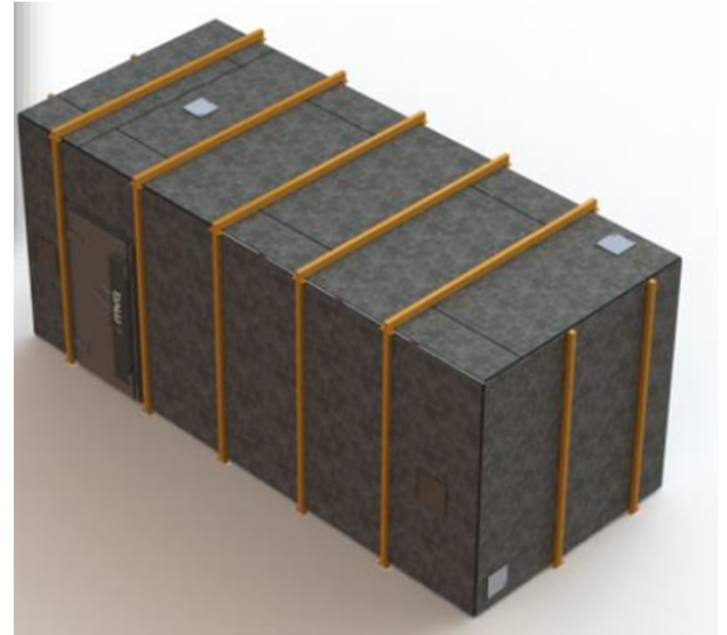


EUROPEAN
SPALLATION
SOURCE

Ongoing contributions



Detector readout electronics



An EMC Test Facility

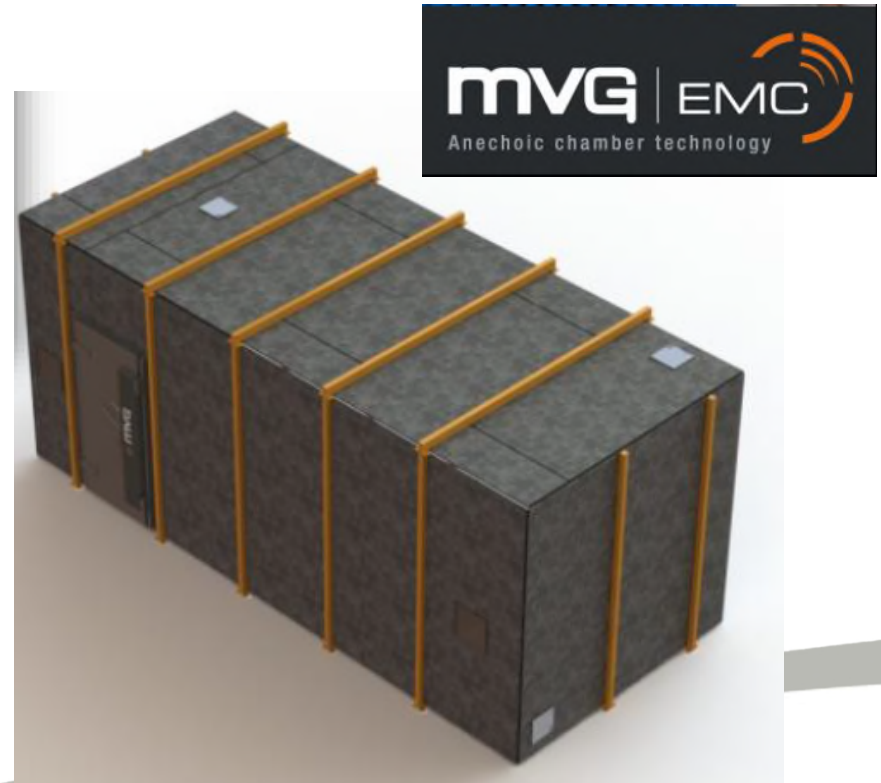
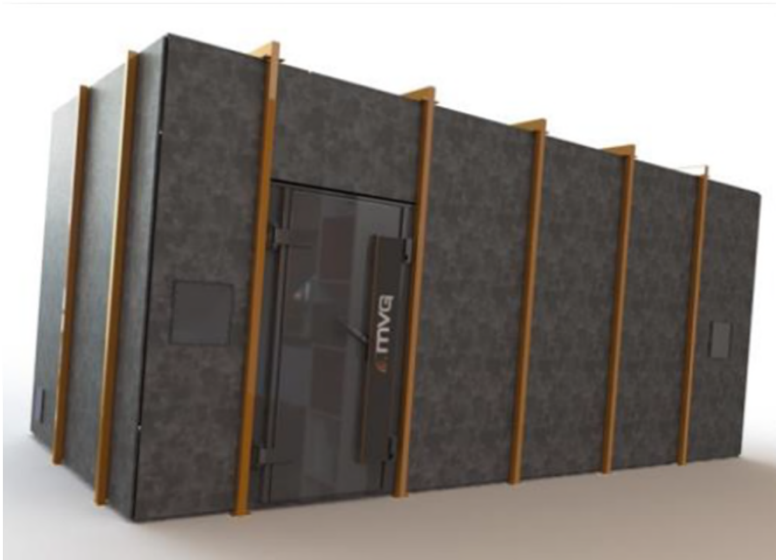
Today (10mins)

- Information Dissemination: Announcing a new EMC Test Facility
- A (very) few words of background for those unfamiliar with EMC Chambers



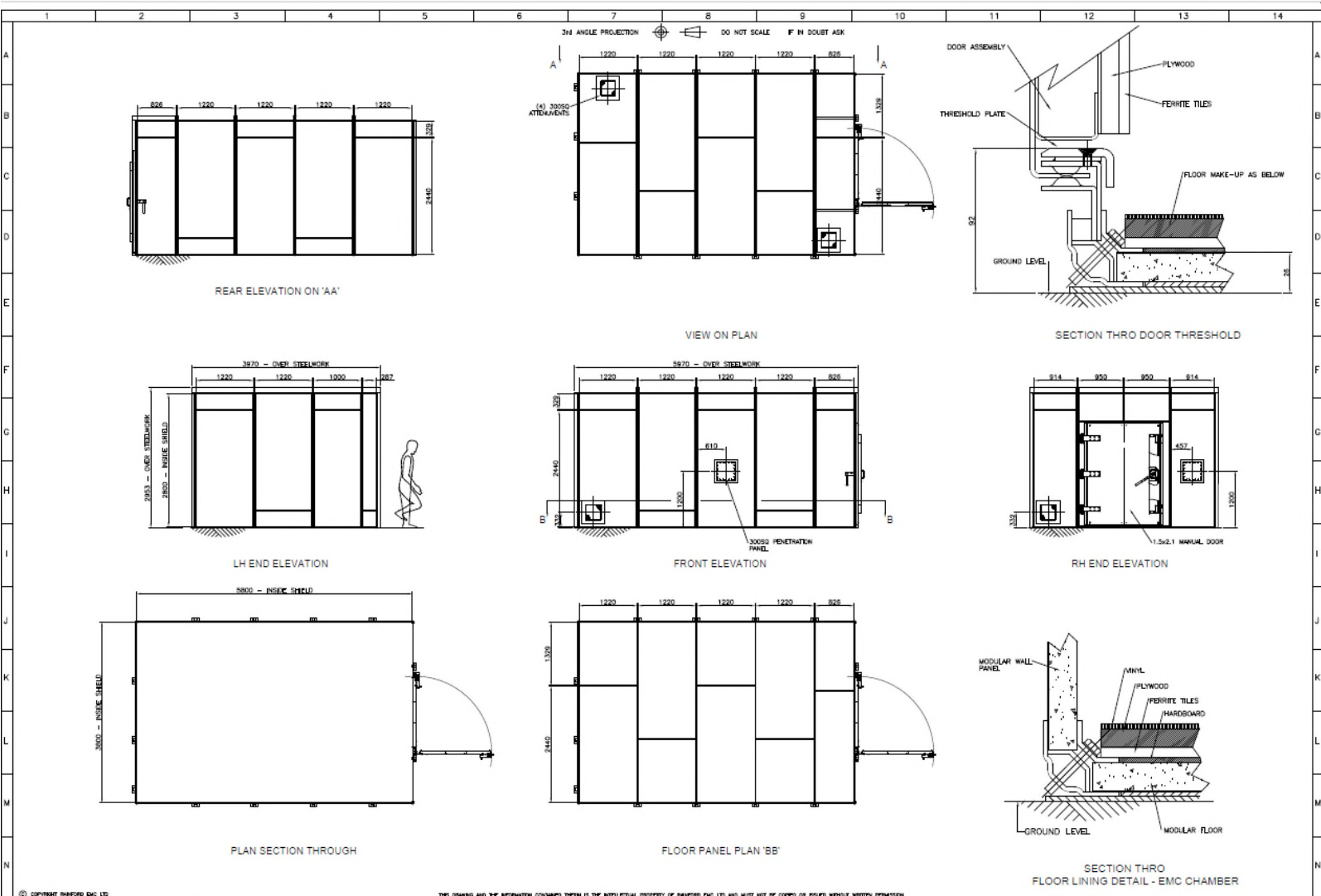


A 6x4x3m Compact Chamber



- On order, scheduled April'18





© COPYRIGHT RAYFORD EMC LTD										THIS DRAWING AND THE INFORMATION CONTAINED THEREIN IS THE INTELLECTUAL PROPERTY OF RAYFORD EMC LTD AND MUST NOT BE COPIED OR ISSUED WITHOUT WRITTEN PERMISSION									
REV					DATE					BY					CHKD				
5					18.01.18					A					JRE/VEV				
62627					62225														
DATE										TITLE									
18.01.18										EMC CHAMBER									
TIME										SHEET									
1.35										1 OF 1									



EUROPEAN
SPALLATION
SOURCE

EMBLA Workshop



Science & Technology
Facilities Council

Ferrite Lined



- Pre-compliant, ferrite tile lined (to maximise internal volume)
- 1.5 x 2m door
- Single and 3-phase filtered power supplies
- Ports: BNC, N-Type, Fibre-optic waveguide, Gb-ethernet

A (very) brief primer on EMC Testing...



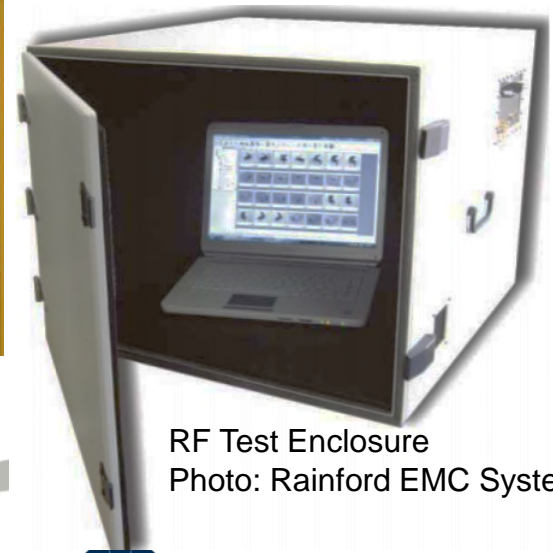


EUROPEAN
SPALLATION
SOURCE

Many varieties of chamber...



Benfield Anechoic Facility, Edwards Airbase
Photo: Wikipedia, Public Domain



RF Test Enclosure
Photo: Rainford EMC Systems



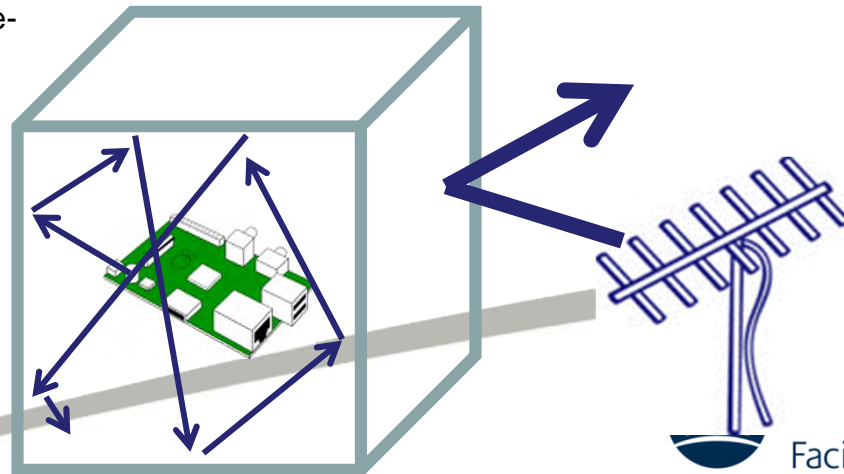
Science & Technology
Facilities Council

Shielded & Reverberation chambers



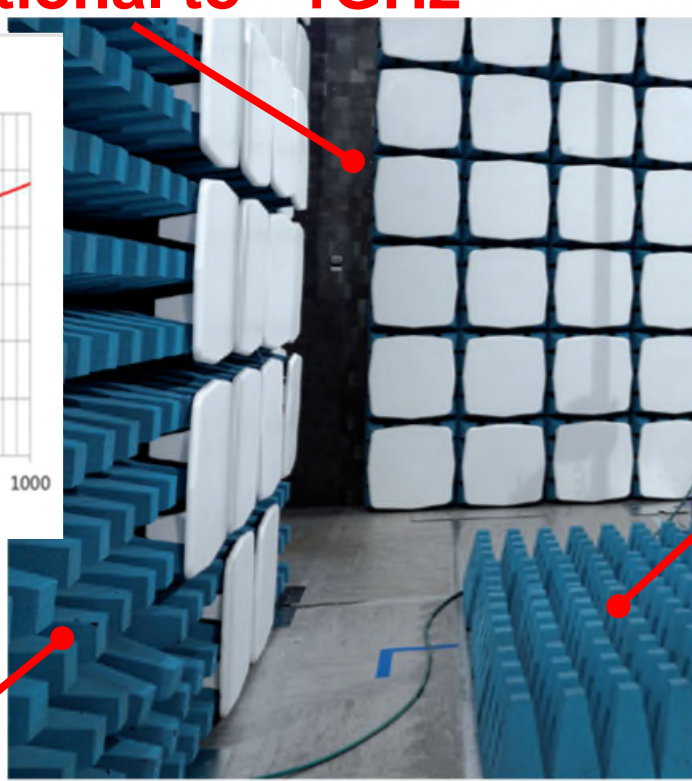
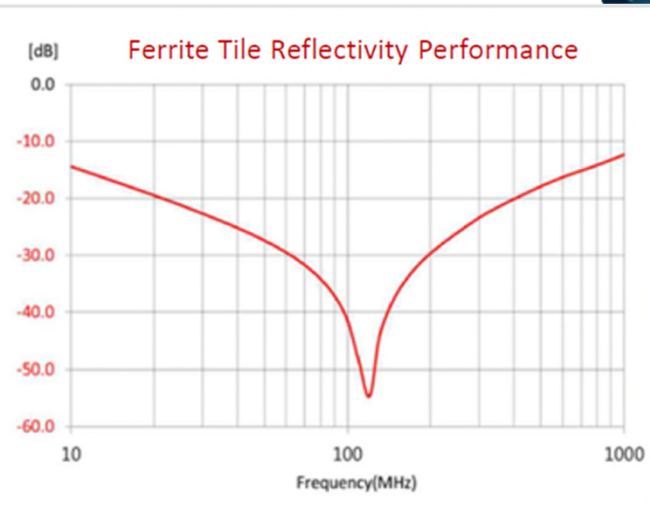
- **Shield against incoming / outgoing EM radiation**
- **Resonance may be used to provide high Vm^{-1} during immunity tests**
- **Not appropriate for some types of EMC test (multiple reflections “scramble” data)**

Reverberation Chamber at the Otto-von-Guericke-University Magdeburg, Germany.
(Wikipedia creative commons)



Anechoic Chambers

Ferrite tiles: Functional to ~1GHz

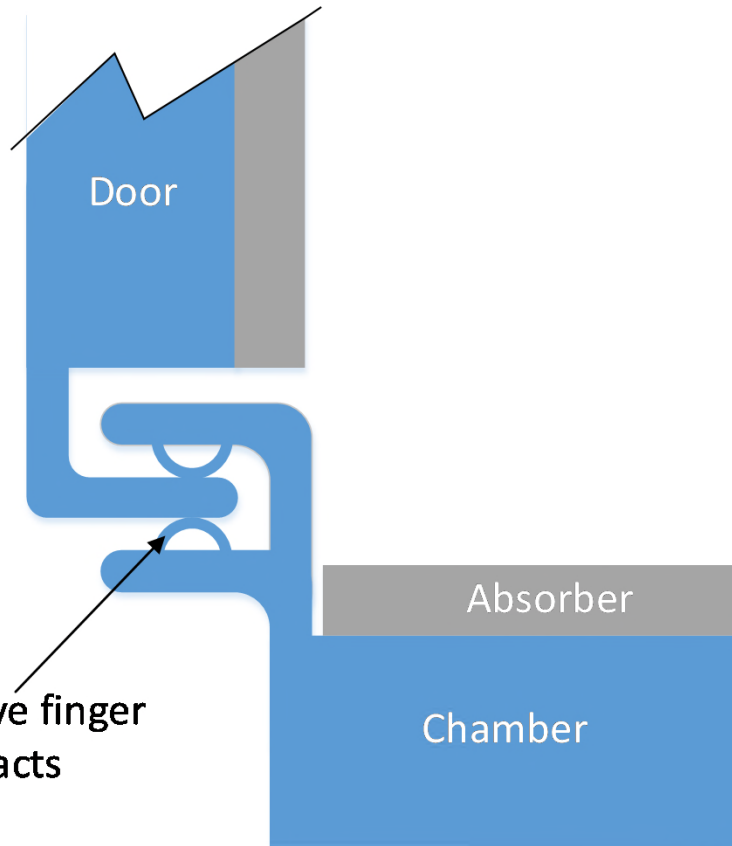


Floor covering dictates Semi- ('SAR') or Fully- ('FAR') anechoic room

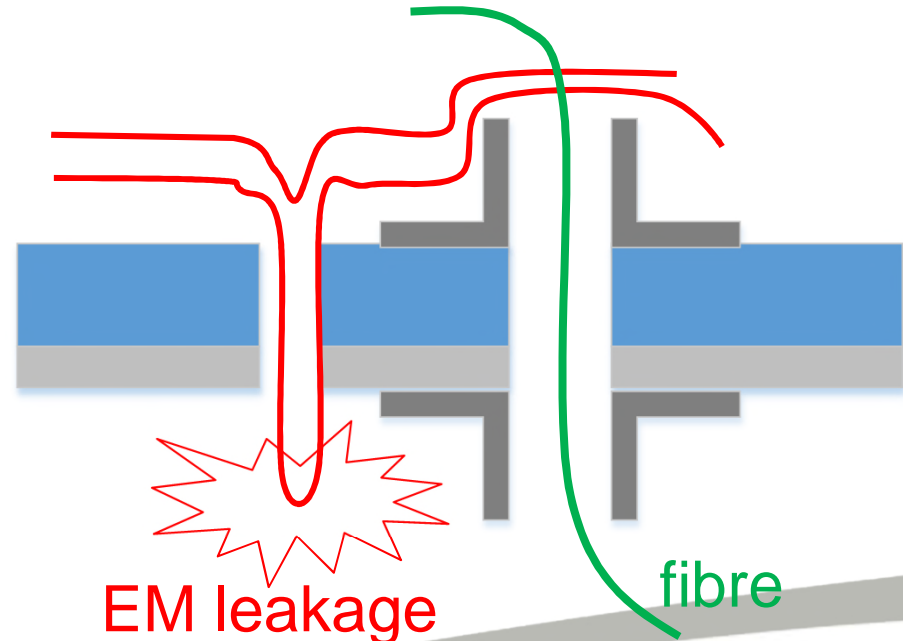
May use Carbon-loaded polyurethane. Tapering minimises impedance discontinuity (=reflections). Functional to >6GHz

Construction Details

Doors must be constructed to provide EM-tight seal



Ports (for e.g. cables) allow EM leakage and must be suitably engineered



EM Emissions & Immunity Testing

Increasingly important in electronic design & test.

A complex field with many guidelines and requirements

CISPR Comité International Spécial des Perturbations Radio:

EC 61000 family: Standardised Measurement practices

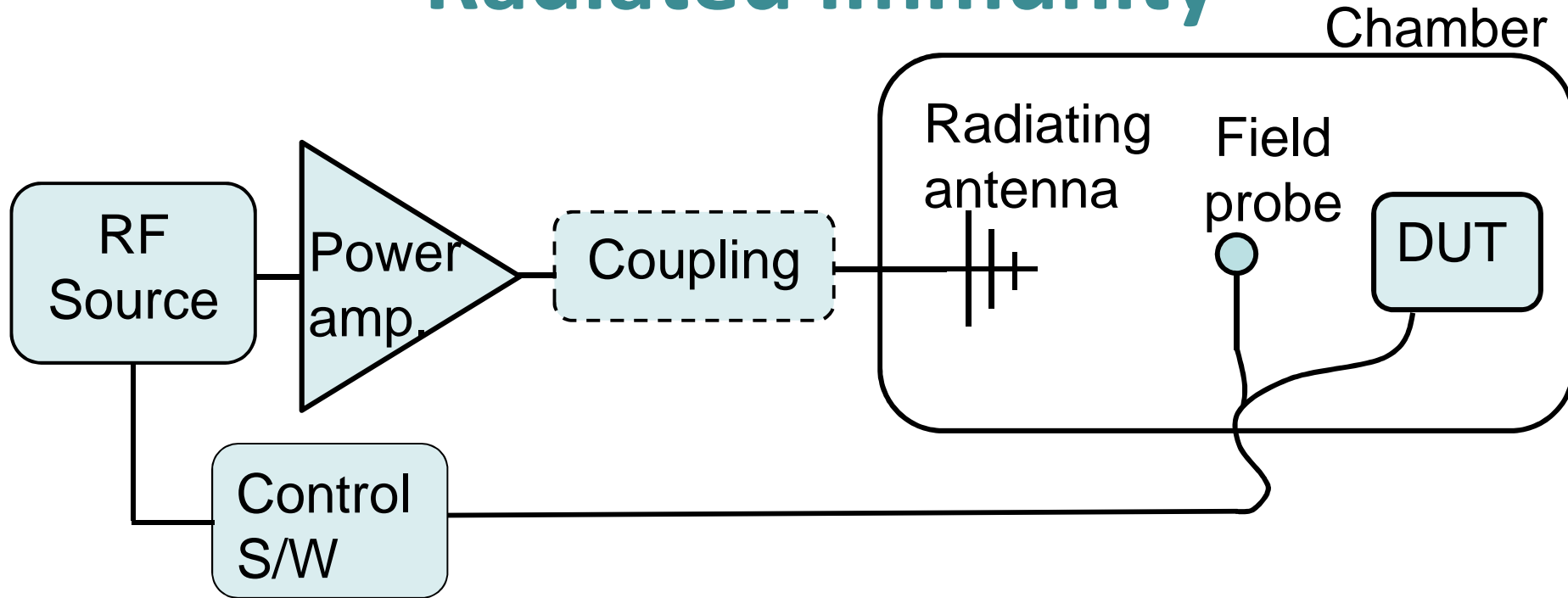
EN : Cenelec European Committee

ISO Standard : Automotive

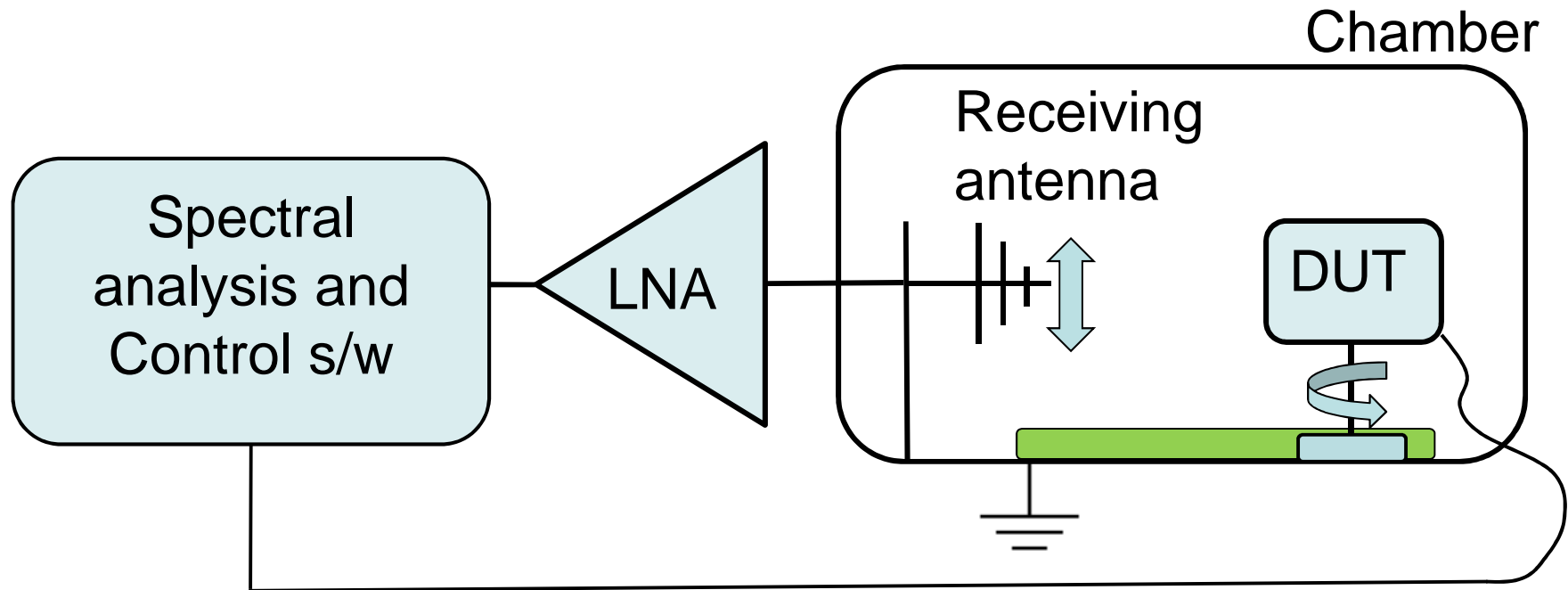
MIL-STD 461,464,449 : US Military



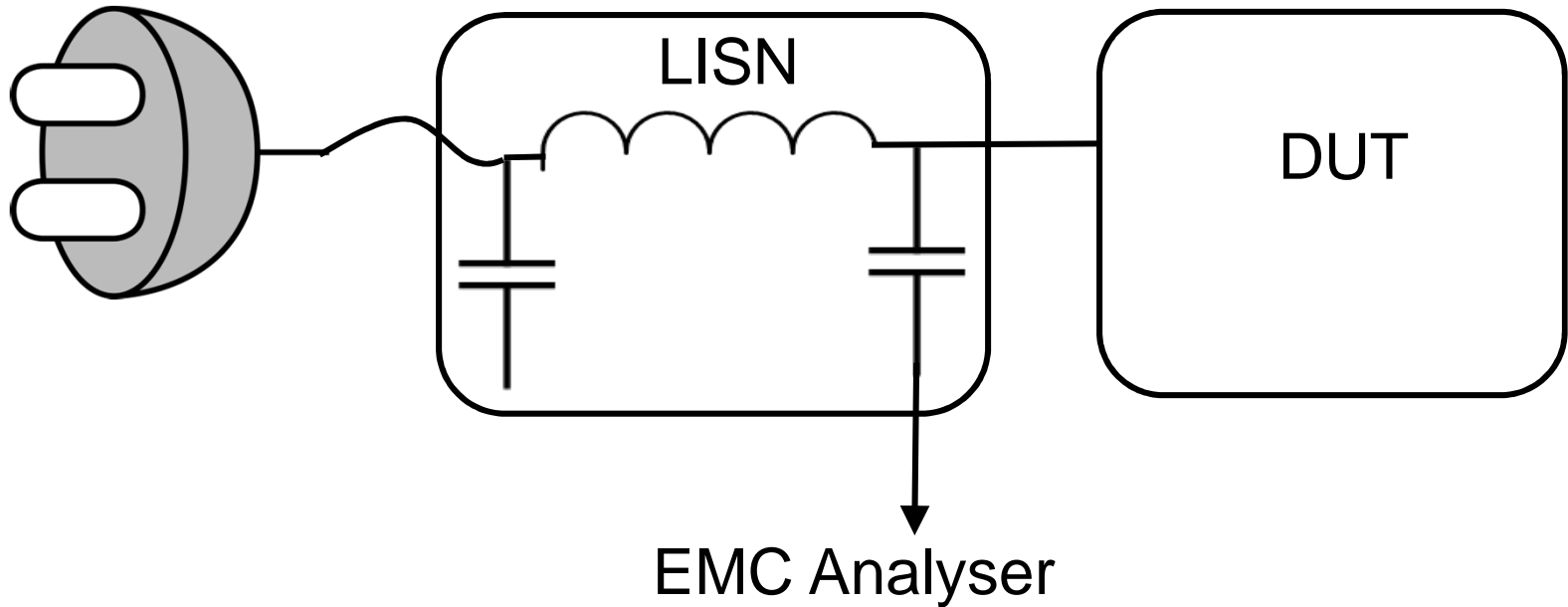
Common Test Scenarios: Radiated Immunity



Common Test Scenarios: Radiated Emissions



(Conducted tests – Typically simpler and may not require chamber)



Summary

- Installation of a ferrite-lined, anechoic, EMC test chamber at is imminent.
- Equipping with test-gear to follow.
- Please contact Detector Group for further information and to offer inputs on your test requirements

