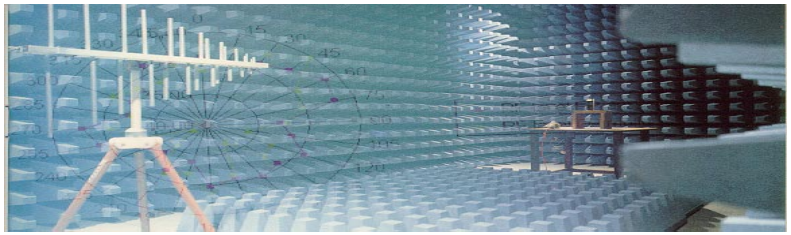
Area tecnica

Lab. EMC



Telit
Mobile Terminals S.p.A.
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Sgonico (Trieste) Data: 11/11/99

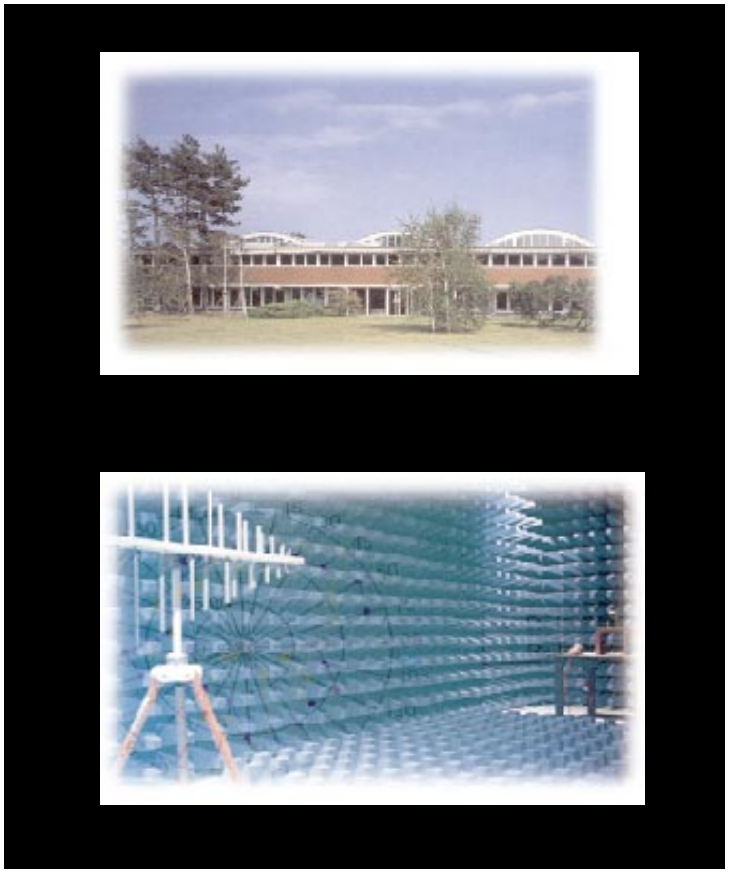
Session 1 - Exercise

Spurious emissions test session on GSM/DCS apparatus performed in Anechoic Chamber.

Sgonico

Group A: 15:15 - 16.00

Group B: 16:30 - 17.15



- Steps of the measurement presentation:
  - **Anechoic chamber description**
  - **Test purpose**
  - **Test set-up description**
  - **Practical demonstration**

- Andrea Fragiacomo, Daniele Scalembra and Francesco Forte

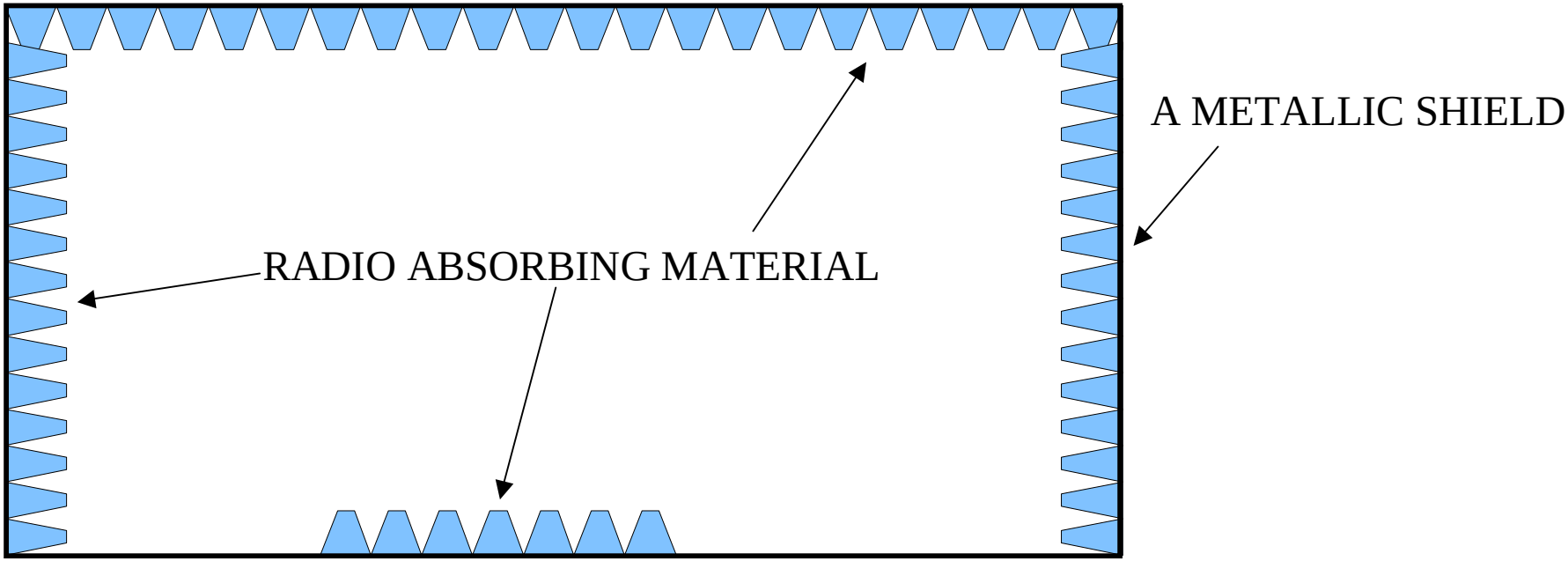
ANECHOIC CHAMBER DESCRIPTION

THE ANECHOIC CHAMBER IS :

• A CHAMBER SHIELDED BY EVERY POSSIBLE EXTERNAL RADIO FREQUENCY IINTERFERENCES.

• A CHAMBER WHERE THE INTERNAL WALLS , FLOOR AN CEILING ARE COVERED WITH RADIO FREQUENCY ABSORBING MATERIEL.

A TYPICAL ANECHOIC CHAMBER IS COMPOSED IN TWO MAIN COMPONENTS:



SHIELDING EFFECT

• THE BENEFITS OF THE SHIELDING ARE CLEAR IF WE CONSIDERING THE SITUATION ON A TYPICAL OPEN AREA TEST SITE (OATS), WHERE THE MEASURE CAN BE INFLUENCED AND COMPROMISED BY ALL RF INTERFERENCE , LIKE TV SIGNAL, GSM, COMMERCIAL RADIO ECC…….

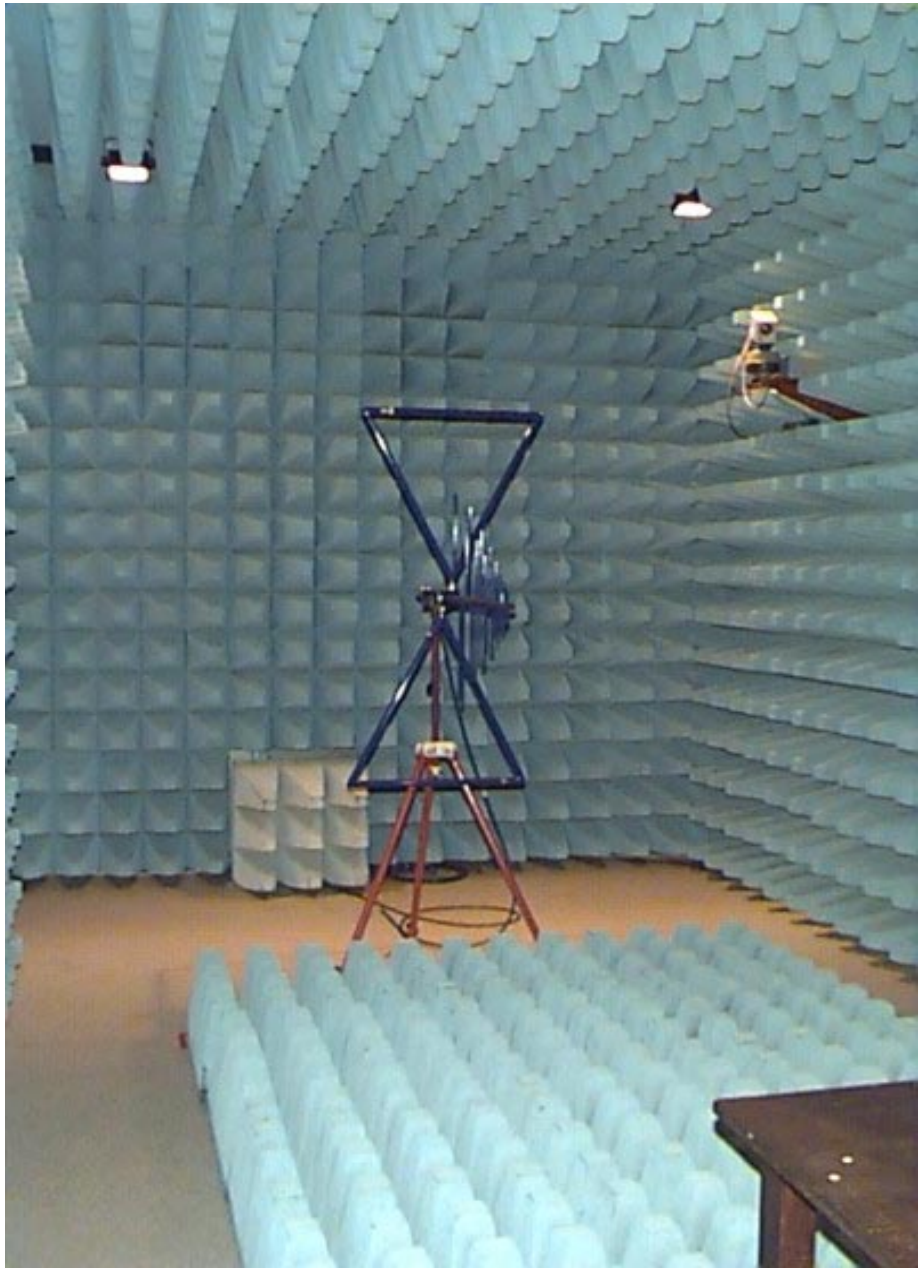
• THE SHIELDING OF THE ANECHOIC CHAMBER OVERCOME THESE PROBLEMS.

• THE SHIELDING OF THE ANECHOIC CHAMBER IS NORMALLY PROVIDE WITH THE WALL, FLOOR AND CEILING BUILT BY METAL PANELS WITH ELECTRICAL CONTACT BETWEEN THEN.

RF ABSORBING MATERIAL

• THE PURPOSE OF THE RADIO FREQUENCY ABSORBENT MATERIAL IS THAT TO REDUCE THE RF REFLECTIONS INSIDE THE ANECHOIC CHAMBER IN ORDER TO CRATE A FREE SPACE CONDITIONS.

• ABSORPTION IS THE IRREVERSIBLE CONVERSION OF THE ENERGY OF AN ELECTROMAGNETIC WAVE INTO ANOTHER FORM OF ENERGY AS A RESULT OF WAVE INTERACTION WITH MATTER.



CHARACTERISTIC OF THE TELIT ANECHOIC CHAMBER

Length: 7.8m Width: 4m Higher: 3.6 m

- **The pyramidal absorber are efficient in the frequency range : 30MHz – 18GHz.**

- **The absorber are manufactured with polyurethane foam integrated with carbon.**

- **The floor is covered with ferrite tiles which are efficient in the frequency range : 30MHz – 1GHz**

- **Turn table**

3 METER MEASUREMENT CHAMBER

FREQ. RANGE : 30MHZ - 18GHZ

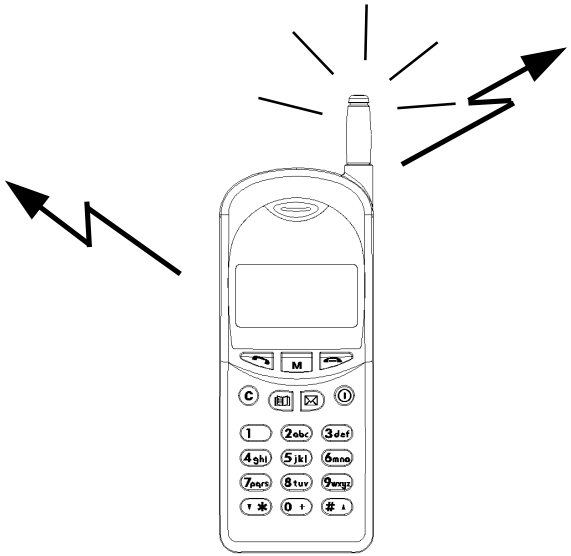
TEST PURPOSE

• THE TEST IN OBJECT IS THE RADIATED SPURIOUS EMISSIONS TEST.

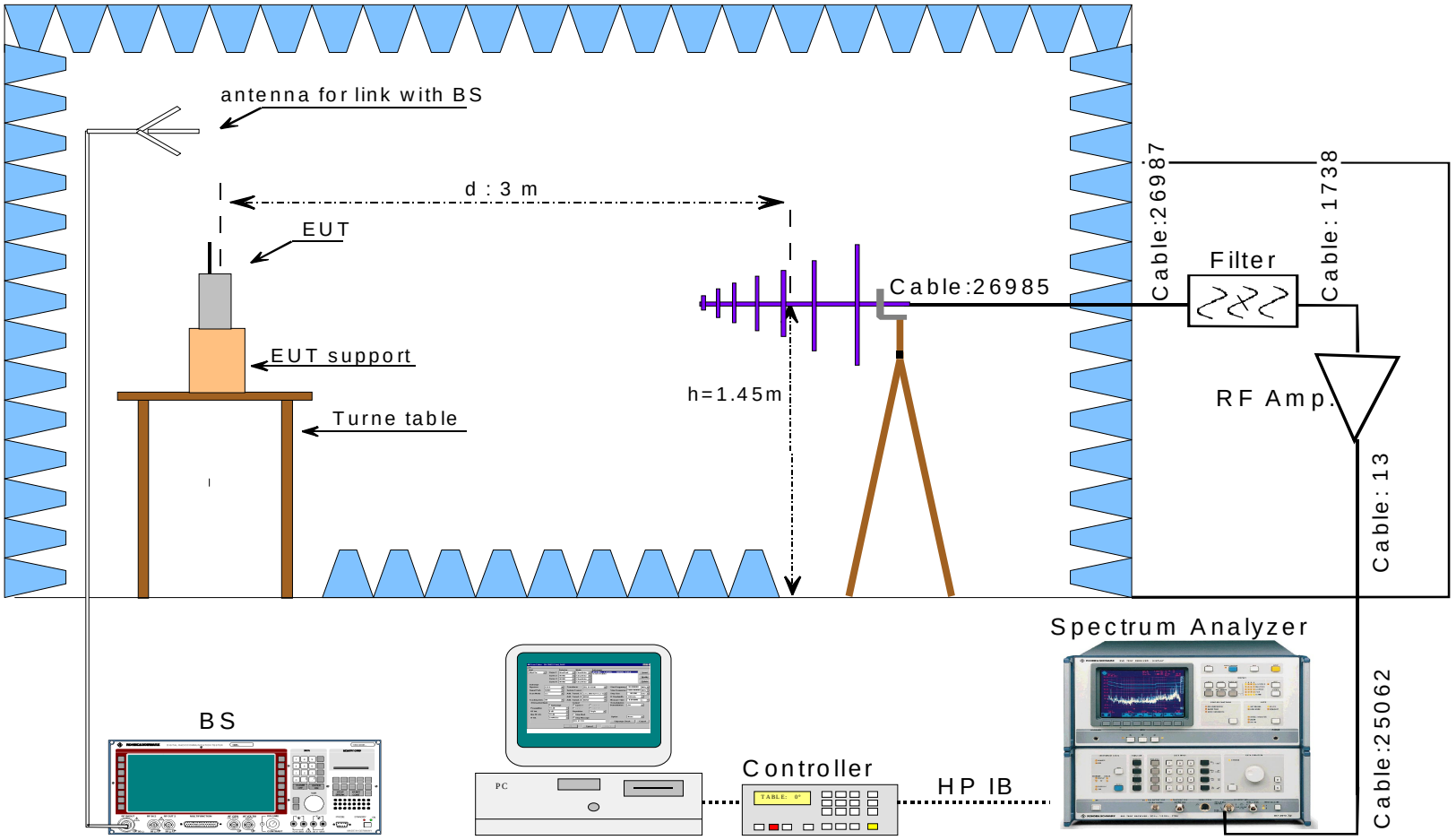
• THE TEST IS CARRY OUT IN ACCORDING WITH : **3GPP TS 51.010-1** PAR. 12.2
(3rd Generation Partnership Project;Technical Specification Group GSM/EDGE Radio Access Network Digital cellular telecommunications system (Phase 2+);Mobile Station (MS) conformance specification;Part 1: Conformance specification(Release 4)).

• PURPOSE OF THIS MEASUREMENT IS TO VERIFY THE RADIATED SPURIOUS EMISSIONS FROM THE GSM/DCS PHONE IN THE FREQUENCY RANGE 30MHZ TO 4GHZ.

• RADIATED SPURIOUS EMISSIONS , ARE ANY EMISSIONS RADIATED BY THE CABINET AND STRUCTURE OF THE PORTABLE GSM/DCS PHONE (LIKE HARMONIC OF THE TX CARRIER).



TEST SET- UP DESCRIPTION



• THE TEST ANTENNA IS CONNECTED TO A SPECTRUM ANALYZER THROUGH A NOTCH FILTER TUNED ON THE TX FREQUENCY CARRIER AND THROUGH A RF AMPLIFIER.

• THE NOTCH FILTER IS NECESSARY TO AVOID OVERLOADING OF THE SPECTRUM ANALYSER.

• THE EQUIPMENT UNDER TEST (GSM/DCS PHONE) IS IN CONVERSATION (RADIO LINK) WITH THE BASE STATION (RADIO COMMUNICATION TEST SET) PUT OUTSIDE THE ANECHOIC CHAMBER

TEST METHOD

THE MEASURE IS PERFORMED (DIVIDED) IN TWO MAIN STEPS :

• IN FIRST STEP THE MEASUREMENT IS CARRY OUT IN THE FREQUENCY RANGE 30-1000MHZ WHIT THE TEST ANTENNA AT 3 METER DISTANCE FROM THE EQUIPMENT UNDER TEST .

• IN THE SECOND STEP THE MEASUREMENT IS CARRY OUT IN THE FREQUENCY RANGE 1-4GHZ WITH ANOTHER TEST ANTENNA AND AT DISTANCE OF 1 METER. IN THIS CASE THE TEST IF PERFORMED AT 1 M INSTEAD OF 3 M TO REDUCE A PATH LOSS ATTENUATION BETWEEN THE EUT AND THE TEST ANTENNA.

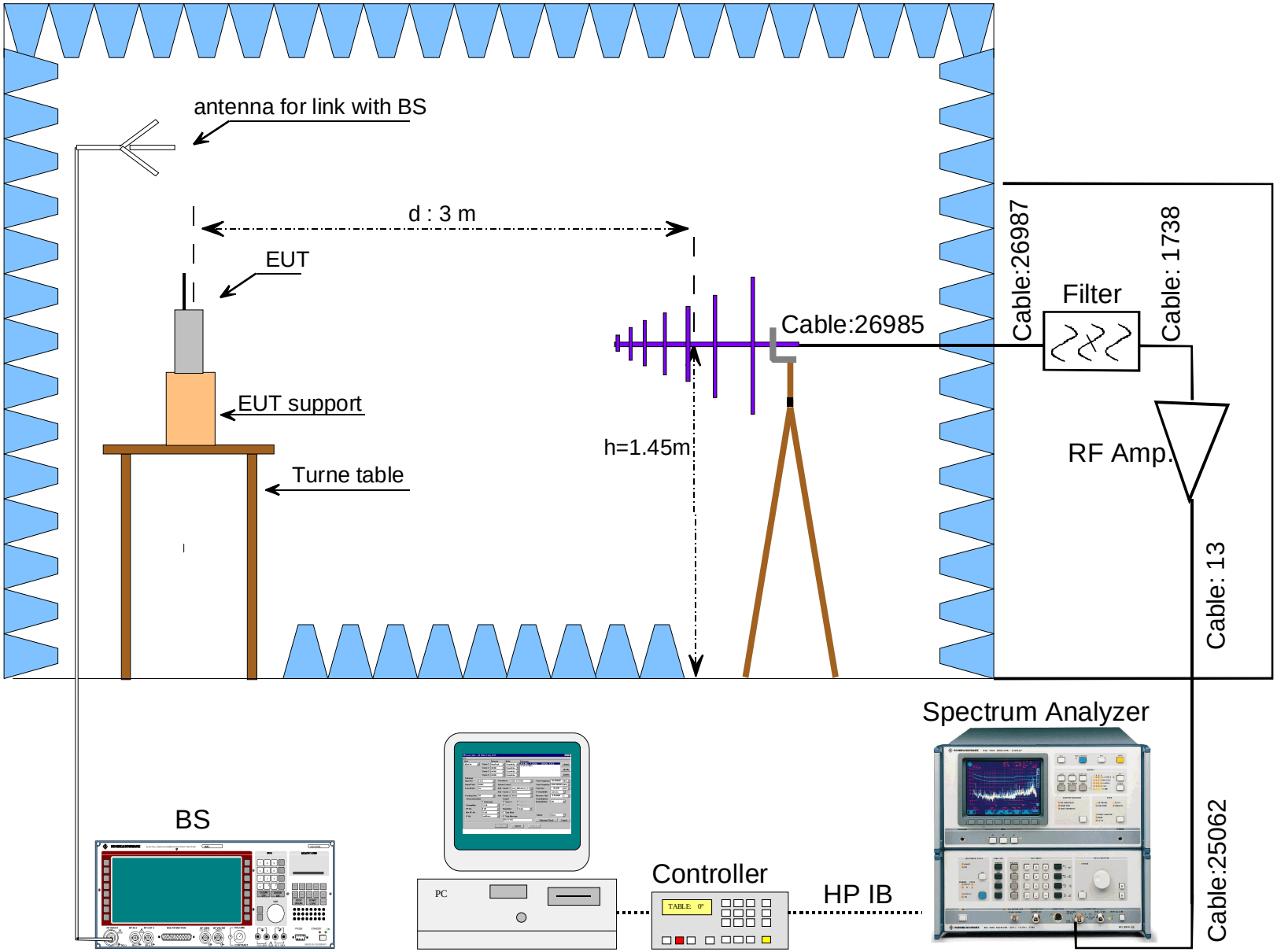
• THE PHONE PUT ON THE TURN TABLE, IS ROTATE TO OBTAIN AND TO FIND THE MAXIMUM RADIATED SPURIOUS EMISSION.

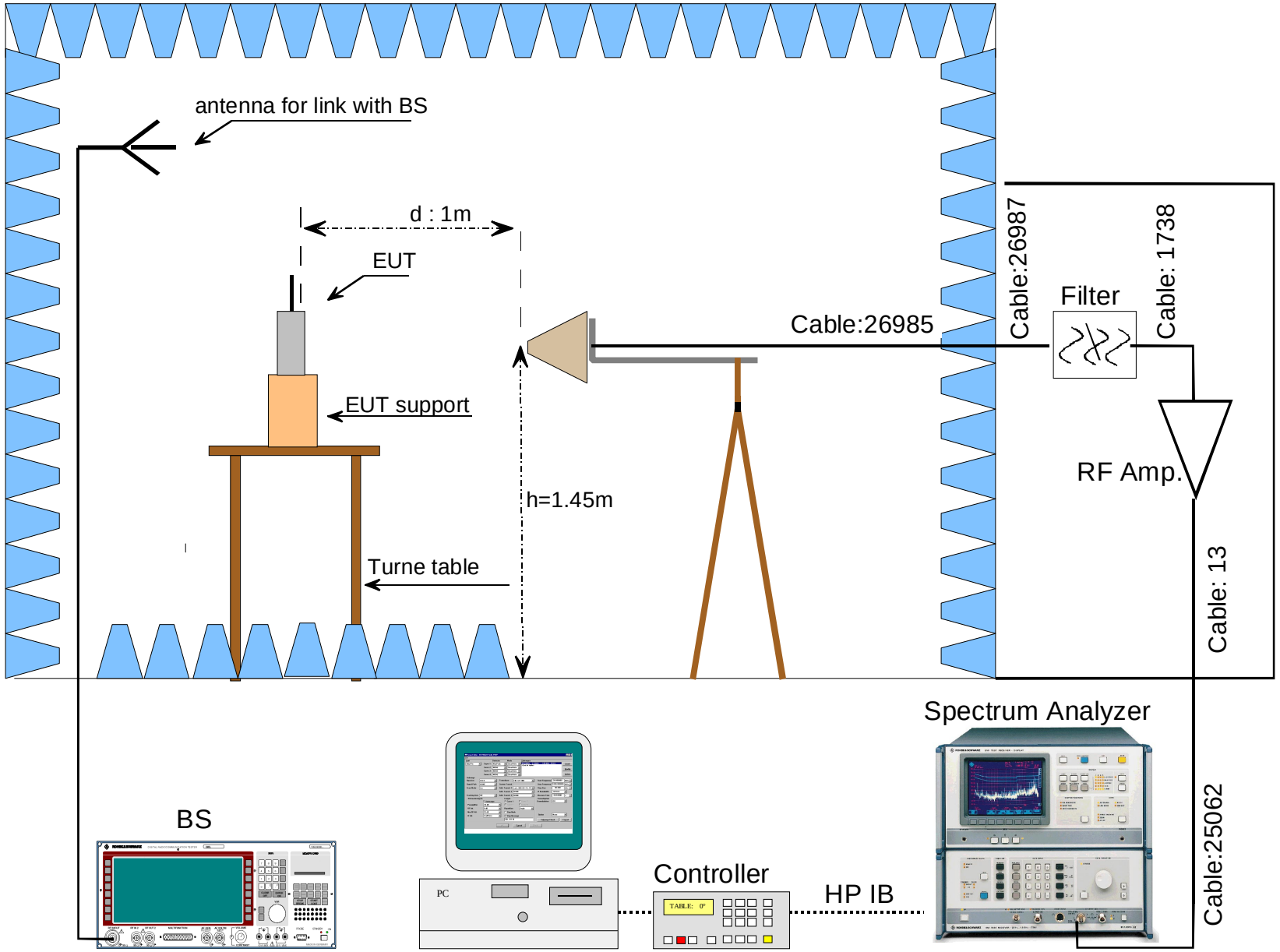
• THE TEST IS CARRY OUT WITH THE TEST ANTENNA IN VERTICAL AND HORIZONTAL POLARISATION.

• THE TEST IS REPEAT WITH THE PHONE IN IDLE MODE.

• THE SPURIOUS VALUES READ ON SPECTRUM MUST BE CORRECT TO HAVE DE CORRECT SPURIOUS VALUE THROUGH THIS FORMULA :

Spurius (dBm) = Read Spourius(dBm) + CableAtt - Aml.Gain. + Filter.Att. - Ant.Gain + PathLoss.


antenna for link with BS
d : 3 m
EUT
EUT support
Turne table
h=1.45m
Cable:26985
Cable:26987
Filter
Cable: 1738
RF Amp.
Cable: 13
Cable:25062
Spectrum Analyzer
BS
PC
Controller
TABLE: 0°
HP IB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