

Dual TEM Cell for Shielding Effectiveness Measurements up to 1GHz

DTEM



FEATURES

- Electromagnetic, electric and magnetic shielding effectiveness measurement
- Frequency up to 1 GHz
- Dynamics up to 80 dB

GENERAL INFORMATIONS

The TEM cell consists of a section of rectangular coaxial transmission line (RCTL) with two tapered sections at each ends. The taper is used as a transition to match the RCTL to standard coaxial cable characteristic impedance connectors at the two ports of the cell.

The center inner conductor, consisting of a tin metallic septum, is fixed by two dielectrical supports.

The cell is used as a broadband amplitude and phase linear transducer of RF signals into field strengths.

The field inside the cell is uniform and so it is a good approximation to simulate a plane wave in open space (far field).

Since the TEM cell operates in bi-directional mode it is assumed that two cells coupled through a common aperture may be used as a radiated field measurement system.

The coupling between cells through their common aperture yields the basic result which the dual-cell correct operation relies on.

Providing the upper side of the TEM cell with an aperture, the generated field, which is known and uniform, couples into a second similar above-standing cell.

When mounting the shielding material sample on the aperture, the coupling between the source cell and the transducing one is reduced.

The amount of this coupling reduction is a direct measure of the shielding effectiveness of the sample material under test.

MEASUREMENT SYSTEM

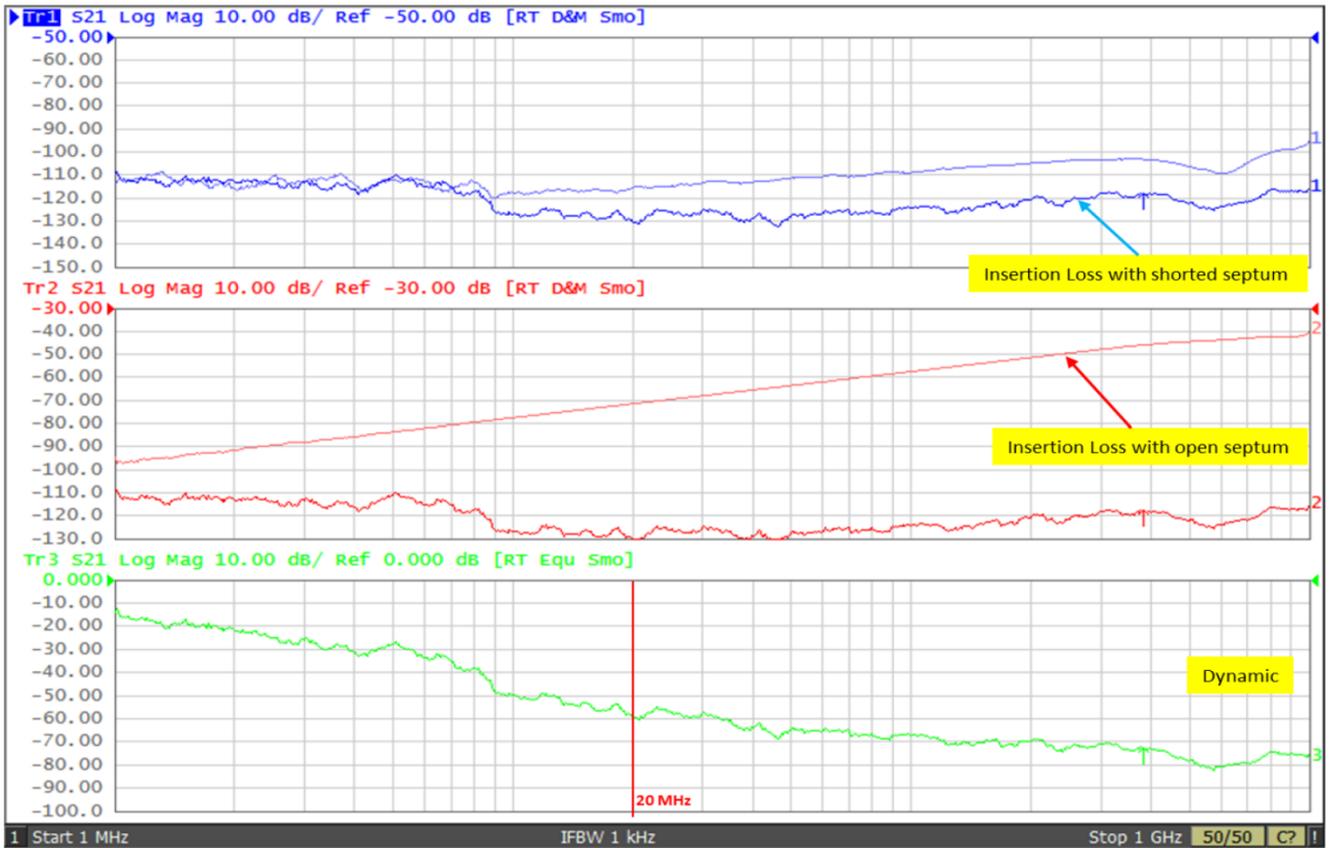
The measurement system is made-up with:

- A dual TEM cell
- A signal generator
- A receiving unit

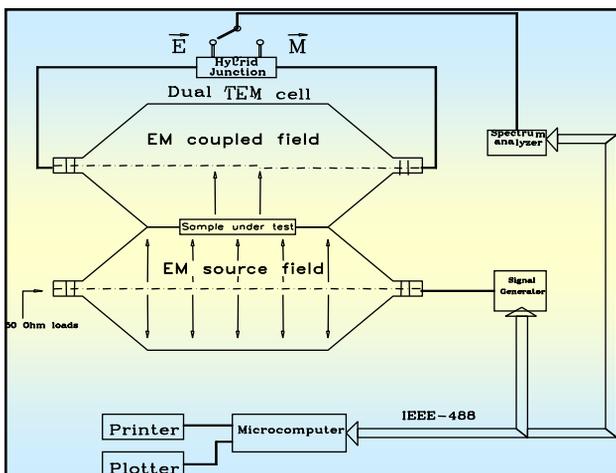
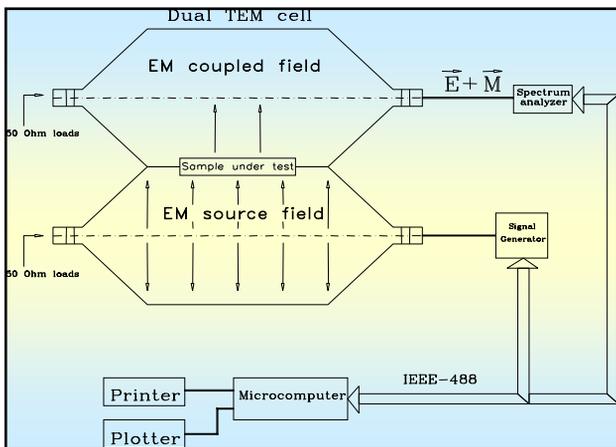
Both cells are terminated on their characteristic impedance to ensure a low VSWR level and to allow for the TEM mode propagation only.

An automated PC-based control system handles both exchanging transmissions between instruments and data collection.

TYPICAL DYNAMICS



MEASUREMENT SET-UP



SHIELDING EFFECTIVENESS DEFINITION

The measurement has a substituting approach and therefore is performed through two phases:

in the first phase, called calibration phase, the transduced signal power level is measured in a free aperture condition;

in the second phase the same measurement is accomplished by mounting the sample on the aperture.

The shielding effectiveness (SE) is so defined as:

$$SE = 10 \text{ Log } A/B$$

where:

A = signal power level measured without test sample

B = signal power level measured with test sample mounted

MECHANICAL CHARACTERISTICS

- Dimensions: 400 x 220 x 260 mm (L x W x H)
- Weight: approximated 15 kg

SYSTEM PARTS

DTEM	Dual TEM cell
HJ	Hybrid Junction (OPTION)
MDSC	Set of two matched double-shielded BNC-BNC coaxial cables (OPTION)
DSC	Double shielded BNC coaxial cable (OPTION)
PT2	Set of two 50-Ohm resistive loads (OPTION)

Electric and aesthetic characteristics may change without notice