

GTEM 1000

**For emission and immunity testing according to
IEC 61000-4-20 (CEI 210-78)**



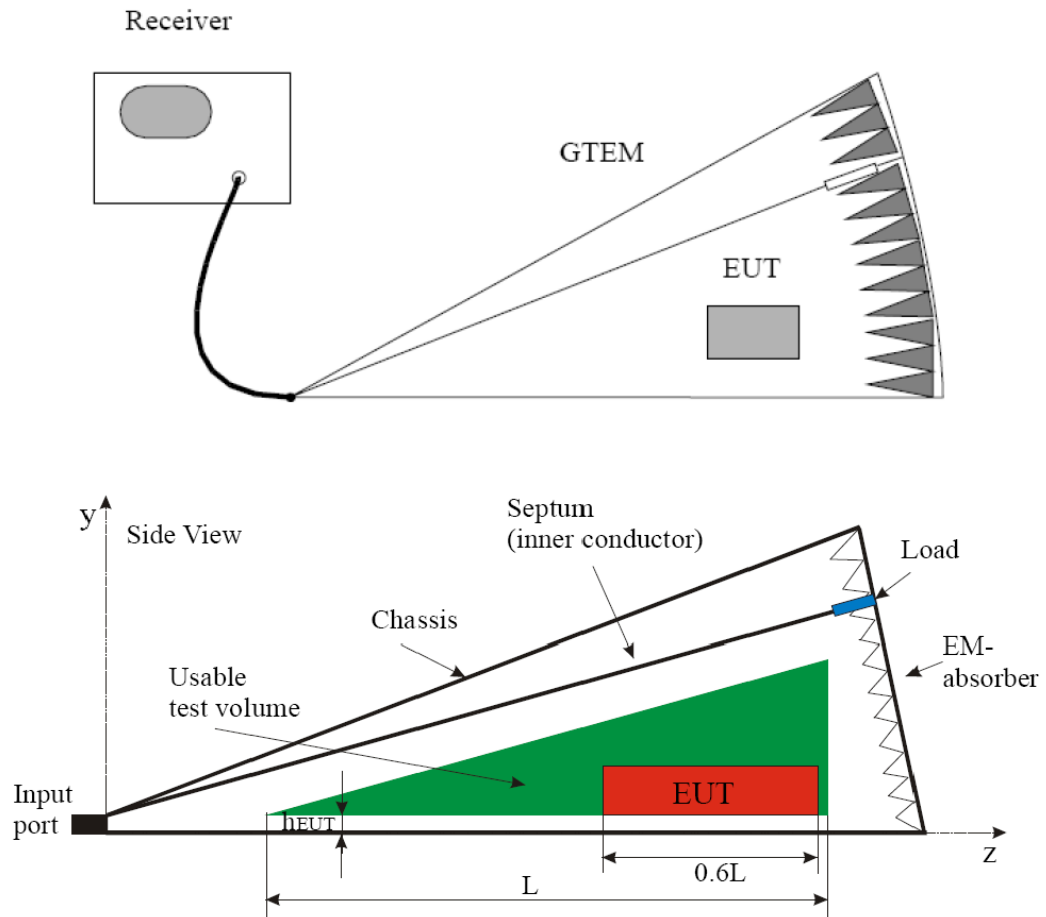
Installation manual and general safety instructions

The GTEM (GigaHertz Transverse Electromagnetic) cell is a precision electromagnetic compatibility (EMC) test instrument primarily intended for use as radiated immunity and radiated emission test facility without environmental electromagnetic interference.

The cell is electrically similar to a coaxial cable with one side open (the apex) and other side closed on the impedance of the generator or receiver connected. In this case with a multi-meter appears as 50 Ohm resistance.

Measurement setup

The setup for emission measurements in a GTEM cell is shown in Fig.1. the EUT is placed inside the GTEM and its radiation is measured with a receiver. The receiver can be software controlled, and some software that includes the GTEM to OATS correlation is commercially available.



TESTING VOLUME

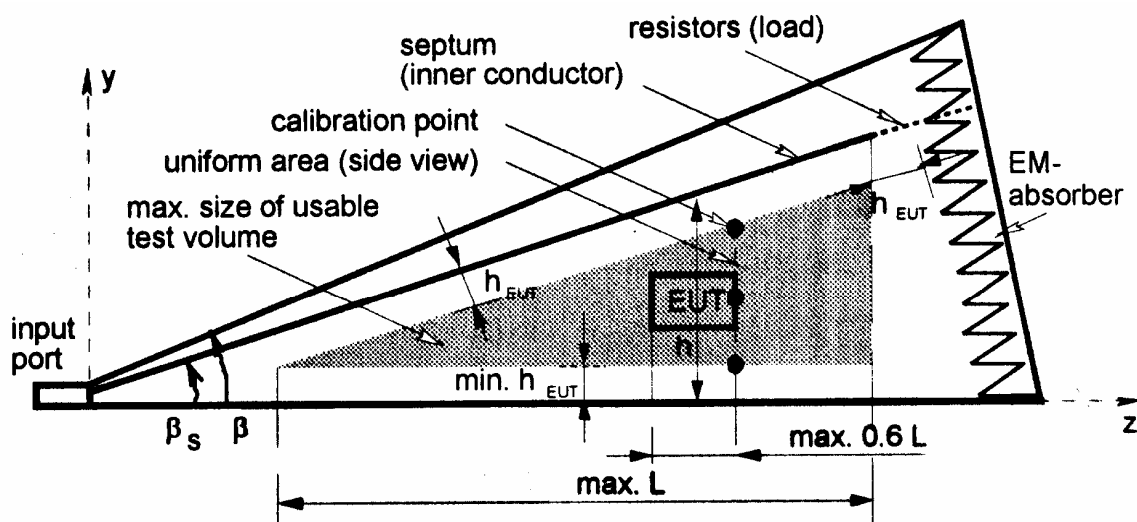


Fig.2 - Maximum EUT size and maximum size of the usable test volume in a GTEM cell, longitudinal section

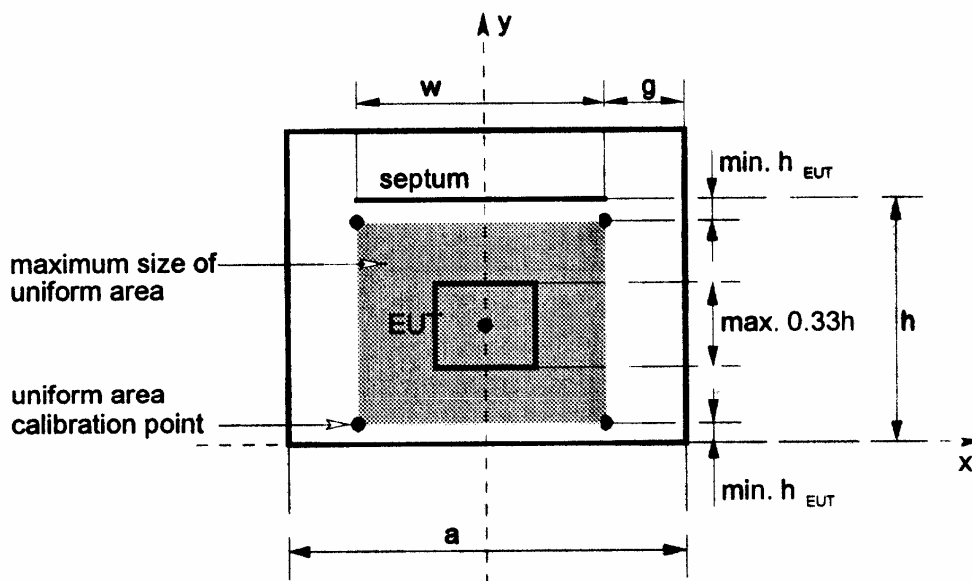


Fig.3 Maximum EUT size and maximum size of the usable test volume in a GTEM cell, cross section

G T E M 1 0 0 0		
Septum Height	1000 mm	
Dimension (L x W x H in m)	5,2 x 2,8 x H 1,85m (+ H 0,25m undercarriage)	
Height of septum in the back of cell	Hh=1310 mm	
Distance of the testing section from back of cell along z axis	$L_s=1500$ mm	
Testing section dimensions [mm]	a=1970, b=1375, h=1000, w=1250	
Maximum testing volume	900 x 1800 x 3000 mm	$(h-2h_{EUT}) \times w \times L$
Maximum testing volume (IEC 61000-4-20)	700 x 700 x 330 mm	$h/3 \times 0.6w \times 0.6L$
Maximum testing volume (0-6 dB)	750 x 750 x 1500 mm	measurement results
h_{EUT}	50mm	0.05h
RF- input connector:	7/16"	50 Ohm
Max input power:	0,8KW continuos	up to 6GHz.

CALCULATING POWER REQUIRED – (Theory)

Basically, we consider the volts per meter, the height of the septum, the allowance of voltage peaks caused by amplitude modulation and the flatness with frequency. Generally allowed flatness is 3 dB, this only takes effect after the first resonance point.

The example below shows 10 V/m with a GTEM 1000

GTEM 1000

Septum height = 1 m

Flatness = 3 dB = 2

Power Required = $(E \times h)^2 / R \times \text{Flatness} \times \text{Modulation Allowance}$

Where E = required field strength: h = septum height: R = GTEM input impedance (50Ohm)

Power Required = $(10 \times 1)^2 / 50 \times 2 \times 3.24 = 12.96 \text{ Watt}$

G T E M 1 0 0 0 - Power requirements				
Field Strenght [E]	Flatness	Modulation allowance	Required power modulated	Required power CW
V/m	3dB = 2	80% AM	Watts	Watts
3	2	3,24	1,17	0,36
10	2	3,24	13	4
30	2	3,24	116	36
100	2	3,24	1296	400

CHECKS PERFORMED AT THE FACTORY

Performance tests

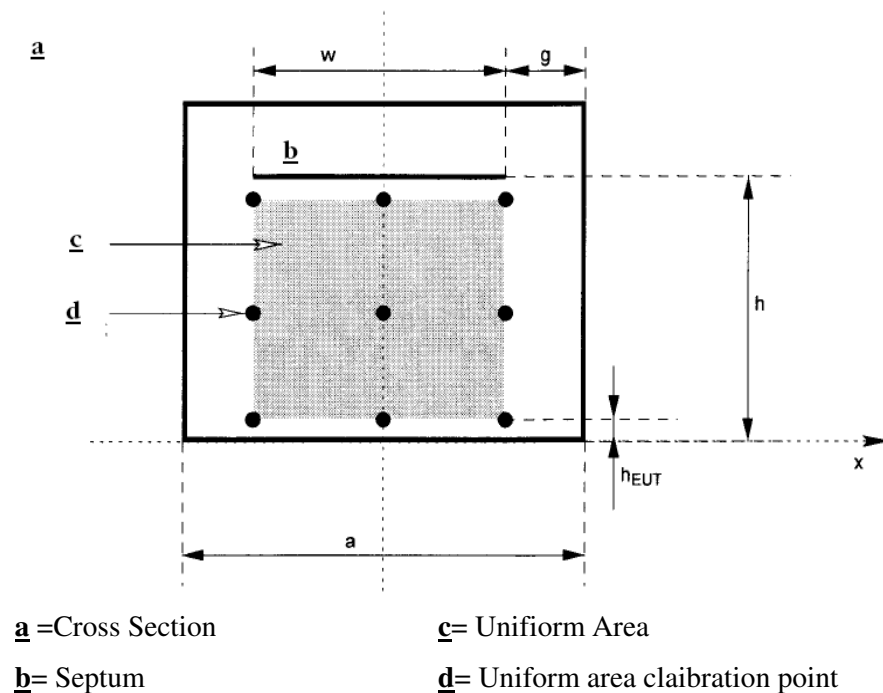
A verification test was performed at 1mt. height cross section. Test was performed at 900MHz frequency.

A test plane with a 3 x 3 points matrix has been sampled.

A template placed in the middle of the section was delimiting a 50 x 50cm. test area.

Instruments used for the tests

- Advantest Network analyzer 40Mhz-3,8GHz
- R&S generator 9KHz-3,6GHz
- Minicircuit 900MHz. 10W amplifier
- Triaxial Isotropic sensor EMCO.
- Bird Mod. Analyst, RF wattmeter

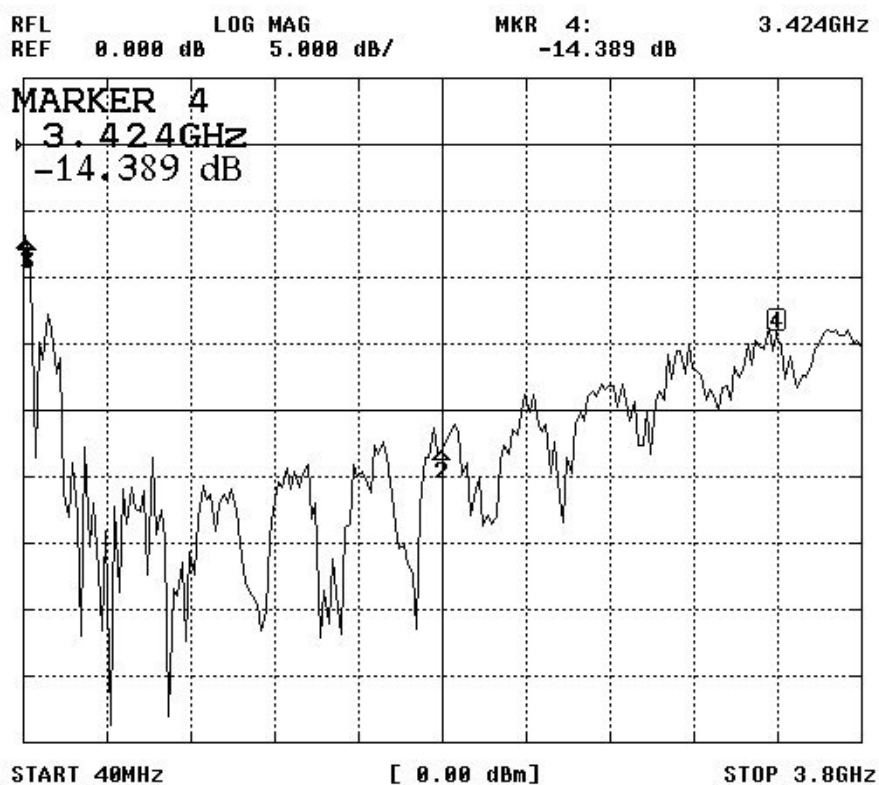


Uniform Area Calibration Points (1m Cross Section)		
1	2	3
4	5	6
7	8	9

Power required vs Field				
Point		Field at 900 Mhz		
		3 V/m	10 V/m	18,5V/m
1	dBm	22,1	31,9	-
	W	0,16	1,56	-
2	dBm	23,8	32,8	-
	W	0,24	1,93	-
3	dBm	23	32,4	-
	W	0,20	1,74	-
4	dBm	23,8	32,8	-
	W	0,24	1,94	-
5	dBm	24,3	33,7	39,7
	W	0,27	2,35	9,44
6	dBm	24,4	34	-
	W	0,3	2,53	-
7	dBm	24,5	34,1	-
	W	0,29	2,55	-
8	dBm	24,1	33,7	-
	W	0,26	2,34	-
9	dBm	25,1	34,8	-
	W	0,33	3,02	-

G T E M 1 0 0 0 – Power requirements verified at 900 Mhz at Test Point N.5			
Field Strenght E	Modulation allowance	Required power modulated	Required power CW
V/m	80% AM	Watts	Watts
3	3,24	0,81	0,27
10	3,24	7,61	2,35

REFLECTION COEFFICIENT S11



G T E M 1 0 0 0 - Guaranteed reflection coefficient S11.	
Reflection coefficient S11	S11 accuracy magnitude/phase
<-14 dB in 100 MHz-3,8 GHz	± 2 dB / 1 degrees

Before using the GTEM 1000 please read the following instructions



The cell is made to work in Horizontal position.

The Input port N connector at the top of the pyramid is very delicate: please take care avoiding to break the internal pin. For frequent use leave a coax cable in a stable connection.

The internal coaxial semi-rigid cable require care during handle, don't make torsion or fold too much .

The filter and the technical panel units contents feed-through connections Pin-to-pin to supply EUT (Equipments under test) with AC or DC source or I/O connection. Please refer to the max limit stated in the specification section.

Don't apply over currents and over-voltage.



The unit must be separately earthed, or connected to an AC main source with a hearth connection.

Possibly supply energy from a tapes source equipped with earth connection and differential magneto- thermic protection switch



During immunity test, Don't leave open door, Radio frequency could interfere with civil communications. Long term Expositions at High RF levels could be dangerous for the health.



Maintenance require periodically check of the gaskets and the lock system. Don't apply strong pressure on to the gaskets. Leave the door open when the cell is stored for a long time, it preserve the gaskets. Keep clean the internal ambient of the cell from the carbon residual, it could cause short circuit in the E.U.T. and between the connections! If necessary help you with an air vacuum cleaner.