



FRANKONIA

- ANECHOIC CHAMBERS & SHIELDED ROOMS
- ACCESSORIES FOR ANECHOIC CHAMBERS / SHIELDED ROOMS
- RADIATED IMMUNITY TEST SYSTEMS
- RF-POWER-AMPLIFIERS
- BROADBAND ANTENNAS
- EMC TEST & MEASUREMENT INSTRUMENTS
- GTEM-CELLS

GTEM Cells



ACCORDING TO
IEC / EN 61000-4-20

GTEM-Cells acc. to IEC/EN 61000-4-20

Septum-height: 250mm to 2000mm / 0.1 MHz to 18 GHz



Description

The GTEM-cell is a TEM waveguide with the upper frequency limit extended to the GHz range. It is a low-cost alternative measurement facility for both radiated emission and immunity measurements. It is included in the published standard IEC/EN 61000-4-20 "Emission and Immunity Testing in Transverse Electromagnetic (TEM) Waveguides". Compared to other measuring methods like EMC test in anechoic chambers or OATS (Open Area Test Sites), GTEM-cells offer some significant advantages for the testing of small and medium sized EUT's (Equipment

Under Test) up to a frequency range of 18 GHz. Quick turnarounds of the EUT as well as numerous testing variations are easy and fast to handle. Switching from emission to immunity testing requires only simple adjustments from receiver input to amplifier output. You are irrespective of long waiting times associated with off-site test labs or weather and ambient delays that can occur at OATS facilities. Whether you are at the design qualification, pre-compliance, compliance, or production sampling stage, the GTEM is the right choice for you.

Calculation of the required forward power for radiated immunity tests:

$P = (E \times h)^2 / R \times \text{flatness factor (2)} \times \text{modulation factor (3.24 for 80 \%AM)}$
E= required field strength; h=septum height in meter; R= input impedance 50 Ω

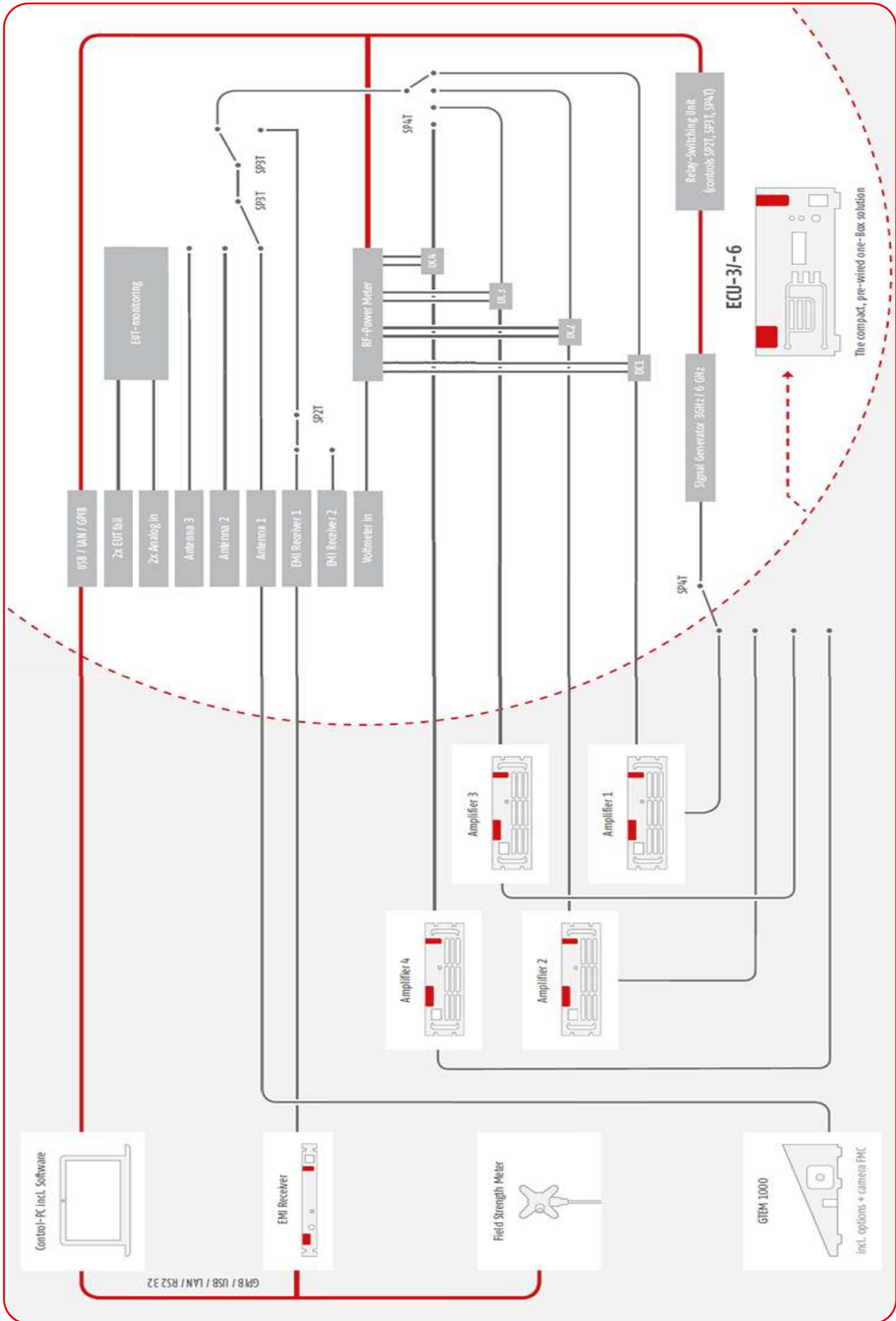
Example:

Field strength 10 V/m, 80 %AM with GTEM 1000:
 $P = (10 \times 1.0 \text{ m})^2 / 50 \times 2 \times 3.24 = 12.96 \text{ W}$



GTEM Test Set-up

for Radiated Immunity Test and Emission Measurement



GTEM-Cells acc. to IEC/EN 61000-4-20

Technical specifications	250	400	500	750	1000
Electrical Data					
Input connector	N	N	N	N	N
Nominal impedance	50	50	50	50	50
Frequency range	0.01 MHz-20 GHz	0.01 MHz-20 GHz	0.01 MHz-20 GHz	0.01 MHz-20 GHz	0.01 MHz-20 GHz
Typical VSWR	1:1.2	1:1.2	1:1.2	1:1.2	1:1.2
Typical VSWR at critical frequency	≤1:1.6	≤1:1.6	≤1:1.6	≤1:1.6	≤1:1.6
Max. input power, W continuous*/pulsed	500*/2 KW	500*/2 KW	500*/2 KW	700*/2.5 KW	700*/2.5 KW
Electrical Equipment / Options					
Mains connectors	Fix/CEE	Fix/CEE	Fix/CEE	Fix/CEE	Fix/CEE
Main Switch 16A magneto-thermal	●	●	●	●	●
Input Socket IEC plug 16Ac (Single phase + ground)	●	●	●	●	●
Input Socket IEC plug 16Ac (Three phases + ground)	○	○	○	○	○
Out. Sock. Schuko tape 16Ac (S. ph. + gnd) for EUT	●	●	●	●	●
Additional EUT sockets: Schuko, IEC.	○	○	○	○	○
Ground connection M6	●	●	●	●	●
AC mains filter 16A 250V /2 wires +ground	●	●	●	●	●
AC/DC filter 6A/2 wires 250V	●	●	●	●	●
AC filter 30A/3 wires (2PH+Ground)	○	○	○	○	○
AC filter 16A/5 wire (3PH+N+Ground)	○	○	○	○	○
AC filter 32A/5 wires (3PH+N+Ground)	○	○	○	○	○
AC filter 64A/5 wires (3PH+N+Ground)	○	○	○	○	○
Custom AC or DC I/O filters	○	○	○	○	○
Electrical safety interlock	○	○	○	○	○
Indoor lighting 4W LED (GTEM-B09L4)	○	N.A.	N.A.	N.A.	N.A.
Indoor lighting 20W LED (GTEM-B09)	N.A.	○	○	○	○
9-poles signal filter (DB9) (GTEM-B25)	○	○	○	○	○
25-poles signal filter (DB25) (GTEM-B14)	○	○	○	○	○
XX-poles signal filter on demand	○	○	○	○	○
USB feed-thru connector	○	○	○	○	○
RJ45 (RJ11) feed-thru connector (GTEM-B32)	○	○	○	○	○
Wave guide for fibre optic leads (3 couple)	●	●	●	●	●
Media RF feed-thru N type connector	1	1	1	1	1
Media RF feed-thru SMA type connector	2	2	2	2	2
Additional RF feed-thru SMA connector	○	○	○	○	○
Additional RF feed-thru N type connector	○	○	○	○	○
Apex Input 7/16 connector or 7/8"	○	○	○	○	○
Video camera system	○	○	○	○	○
Shielded glass for Ext. Video camera (GTEM-B40S)	○	○	○	○	○
Manipulator X-Y-Z	N.A.	○	○	○	○
Option SAE 1752/3, IEC 62132-2 and IEC 61967-2	○	○	○	○	○

** Other sizes are available on request

*6 GHz standard, 18 GHz optional

● Standard

○ Costed option

N.A. Not provided

GTEM-Cells acc. to IEC/EN 61000-4-20

Technical specifications	250	400	500	750	1000
Mechanical Equipment / Options					
Secondary small door next to input	N.A.	N.A.	N.A.	○	○
SAE 31 752/3 Fixture	○	○	○	○	○
Window in door (WxH) 25cm. Diam.	24x14,5cm ○	○	○	○	○
Gas / Water feed through plates	○	○	○	○	○
Honeycomb panel	N.A.	○	○	○	○
Fans kit: N.2 12x12cm	N.A.	○	○	○	○
Technical panel pre-drilled for options	●	●	●	●	●
Empty Technical panels	N.A.	N.A.	1	2	2
Mechanical Dimensions / Max. EUT size					
Outer (LxWxH) cm	127x64x44	220x122x83	300x168x115	400x220x150	500x271x188
Door (WxH) cm	30x23	40x40	40x40	60x60	80x80
Wheeled undercarriage – Trolley	○	●	●	●	●
Weight Kg. Approx.	40	200	250	400	700
Max. test volume (LxWxH)cm	20x20x15	35x40x25	40x40x30	60x60x50	75x75x70
Defined test Vol. +/-3dB <1000MHz (LxWxH)cm	8,5x8,5x8,5	13,5x13,5x13,5	17x17x17	25x25x25	33,5x33,5x33,5
Septum height (mm)	250	400	500	750	1000
Technical specifications	1250	1500	1750	2000	2500
Electrical Data					
Input connector	N	N	N	N	N
Nominal impedance Ohm	50	50	50	50	50
Frequency range	0.01 MHz–20 GHz	0.01 MHz–20 GHz	0.01 MHz–20 GHz	0.01 MHz–20 GHz	0.01 MHz–20 GHz
Typical VSWR	1:1.2	1:1.2	1:1.2	1:1.2	1:1.2
Typical VSWR at critical frequency	≤1:1.6	≤1:1.6	≤1:1.6	≤1:1.6	≤1:1.6
Max Input power, W continuous/*pulsed	800/2.5kW*	900/2.5kW*	1000/2.5kW*	1000/2.5kW*	1000/2.5kW*
Electrical Equipment / Options					
Mains connectors	Fix/CEE	Fix/CEE	Fix/CEE	Fix/CEE	Fix/CEE
Main Switch 16A magneto-thermal	●	●	●	●	●
Input Socket plug 16Aac (Single phase + ground)	●	●	●	●	●
Out. Socket Schuko 16Aac (Single ph. + gnd) for EUT	●	●	●	●	●
Additional EUT sockets	○	○	○	○	○
Ground connection M6	●	●	●	●	●
AC/DC filter 6A/2wires (2PH+Ground)	●	●	●	●	●
AC filter 16A/5 wire (3PH+N+Ground)	○	○	○	○	○
AC filter 30A/5 wires (3PH+N+Ground)	○	○	○	○	○
AC filter 64A/5 wires (3PH+N+Ground)	○	○	○	○	○
Custom AC or DC I/O filters	○	○	○	○	○
Electrical safety interlock	○	○	○	○	○
Indoor lighting 30W LED	●	●	●	●	●
9-poles signal EMI filter (DB9)	○	○	○	○	○

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● Standard

○ Costed option

N.A. Not provided

GTEM-Cells acc. to IEC/EN 61000-4-20

Technical specifications	1250	1500	1750	2000	2500
25-poles signal EMI filter (DB25)	○	○	○	○	○
XX-poles signal filter on demand	○	○	○	○	○
USB feed-thru connector	○	○	○	○	○
RJ45 (RJ11) feed-thru connector	○	○	○	○	○
Wave guide for fibre optic leads (3 couple)	●	●	●	●	●
Wave guide for fibre optic leads (6 couple)	○	○	○	○	○
Media RF feed-thru double N type	1	1	1	1	1
Media RF feed-thru double SMA type	2	2	2	2	2
Additional RF-feed-thru SMA connector	○	○	○	○	○
Additional RF feed-thru N type	○	○	○	○	○
Apex Input 7/16 or 7/8 connector	○	○	○	○	○
Technical panel pre-drilled for options	●	●	●	●	●
Video camera system	○	○	○	○	○
Manipulator X-Y-Z	○	○	○	○	○
Mechanical Equipment / Options					
Secondary door next to input	○	○	○	○	○
Additional primary door (custom size)	○	○	○	○	○
Gas / Water feed through plates	○	○	○	○	○
Honeycomb panel	○	○	○	○	○
Fans N.2 12x12cm	○	○	○	○	○
Empty Technical panels	1	1	2	2	2
Hi power termination	○	○	○	○	○
Mechanical Dimensions / Max. EUT size					
Outer (LxWxH) cm	610x320x215	710x381x250	810x430x280	910x484x314	1110x586x383
Door (WxH) cm	80x120	80x120/140x140	100x160/140x140	100x160//160x160	160x160
Wheeled undercarriage	○	○	○	○	○
Weight kg approx.	850	1000	1300	1650	2500
Max. test volume (LxWxH)cm	95x95x85	120x120x100	140x140x115	175x175x130	215x215x160
Defined test Vol. +6dB<1000MHz LxWxH)cm	42x42x42	50x50x50	58,5x58,5x58,5	67x67x67	83,5x83,5x83,5
Septum height mm	1250	1500	1750	2000	2500

** Other sizes are available on request

*6 GHz standard, 18 GHz optional

● Standard

○ Costed option

N.A. Not provided

GTEM-Cells acc. to IEC/EN 61000-4-20

Type	I/O ports	GTEM MODELS	
		250-400-500-750 1000-1250	1500-1750-2000-2500
B00	Fully Innox steel construction for tropical environment	250-400-500 ○ other ●	○
B00-FRK	Ferrite tiles om Gtem`s base + matched absorbers	○	○
B01	EIA 7/8" Flange input connector	○	○
B02	7/16" Input connector (up to 6GHz)	○	○
B03	Hi Power terminations 1KW up to 3GHz	○	●
B04	Hi Power terminations 1,6KW up to 3GHz	N.A.	○
B05	Channels for fibre optical feed-thru (additional 3 pairs)	○	○
B05-F	Channels for fibre optic leads (additional 6 pairs)	○	○
B06	Additional RF feed-thru connector N type	○	○
B07	Additional RF feed-thru connector SMA type	○	○
Electrical Equipment / Options			
B08	Additional socket for EUT (IEC or Schuko)	○	○
B09	Indoor lighting (Halogen lamp 50W)	○	○
B09-L3	Indoor lighting (LED lamp 4W)	○	N.A.
B09-L20	Indoor lighting (LED lamp 30W)+shielded mesh screen	N.A.	●
B10-30	AC filter 30A/3wire (2PH+ Ground)	○	○
B11-16	AC filter 16A/5wire (3PH+N+ Ground)	○	○
B11-25	AC filter 25A/5wire (3PH+N+Ground)	○	○
B11-30	AC filter 30A/5 wires (3PH+N+Ground)	N.A.	○
B11-64	AC filter 64A/5 wires (3PH+N+Ground)	N.A.	○
B21-300	I/O AC-DC feed-throu 300A 440V	○	○
B21	I/O AC-DC Custom filter box up to XX Channels	○	○
B13	Electrical safety inter-lock	○	○
B25	9-poles DB9 signal EMI filter (1000pF)	○	○
B14	25-poles DB25 signal EMI filter (1000pF)	○	○
B26-B32	RJ45 (RJ11) feed-thru connector	○	○
B33	USB feed-thru connector	○	○
Mechanical Equipment / Options			
B23	Vertical poitioning, turn of the door position, plastic table over pyramidal absorber	250-400-500 ○ other N.A.	○
B15-S	Secondary door next to input (Clear entry 40x40cm)	N.A.	○
B15-M	Secondary door next to input (Clear entry 60x60cm)	N.A.	○
B15-B	Secondary door next to input (Clear entry 80x80cm)	N.A.	○
B16	Window in door (Clear Diam. 200mm.)	○	●
B17	Gas / Water feed through plates	○	○
B18	Honeycomb panel	N.A.	○
B19	Fans kit for GTEM on technical panel	N.A.	○
B28	N.4 Fans kit channel for Heath sink .	○	○
B027	Empty technical panel (Diam. 200mm.)	○	●

● Standard

○ Costed option

N.A. Not provided

GTEM-Cells acc. to IEC/EN 61000-4-20

Type	Mechanical Equipment / Options	GTEM MODELS	
		250-400-500-750 1000-1250	1500-1750-2000-2500
B027C	Empty technical panel pre-cut on demand	<input type="radio"/>	<input type="radio"/>
B20	Door for SAE J1752/3 test fixture	<input type="radio"/>	<input type="radio"/>
B20/*	Option SAE 1752/3, IEC 62132-2 and IEC 61967-2	N.A.	<input type="radio"/>
B21	Undercarriage with swively wheels and brakes	<input type="radio"/>	<input type="radio"/>
B40	Video camera system	<input type="radio"/>	<input type="radio"/>
B40S	Video camera system	<input type="radio"/>	<input type="radio"/>

Standard
 Costed option
 N.A. Not provided

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