GERAC
ELECTROMAGNETISME

GERAC's PRODUCTS CATALOG

High Power, RF and microwave Amplifiers

2016





Subsidiary of

THALES
Thales Communications & Security

Approvals & Accreditations

✓ CE

GERAC is a notified body for the EMC european directive (2004/108/CE).

✓ ISO 9001 BUREAU VERITAS Certification

GERAC possesses ISO 9001 V 2015 Certification.

✓ cofrac ESSAIS

Accreditation COFRAC Tests of Gerac Toulouse and Trappes EMC Laboratories.

✓ Ministère de la Défense – DGA

Aptitude to carry out tests in the electromagnetic field : recognition of Direction Générale de l'Armement n° 20-307 of 29/07/92.

✓ Crédit Impôt Recherche CIR

GERAC is an approved body for the French Research Tax Credit (Crédit Impôt Recherche). All companies are eligible and all R&D expenses can be covered (30 % up to € 100 million).

✓ Qualifoudre INERIS

Since 2015, GERAC is allowed to realize the Evaluation of Lightning Risk – Standard NF-EN-62305 (1 to 4), by refering to french government order ICPE.

✓ aerospace valley

GERAC belongs to Aerospace Valley which is the most significant innovation « pôle de compétitivité » in France in the fields of Aeronautics, Space and embedded systems.

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Bordeaux's Laboratories

Table of contents

About GERAC 4

- Our network 5
- Our partners 7

Amplifiers Index 8

Modulators Index 11

Lightning Index 11

NEMP Generators Index 12

Technical data 13

- Technical data PWS Line « PULSED WIDE BAND SOLID STATE» AMPLIFIERS 13

PULSED POWER AMPLIFIERS 1.2 GHz to 1.4 GHz Up to 140 KW output power 14

PULSED POWER AMPLIFIERS 1 GHz to 2 GHz Up to 50 KW output power 17

PULSED POWER AMPLIFIERS 0.8 GHz to 2.5 GHz Up to 10 KW output power 20

PULSED POWER AMPLIFIERS 2.2 GHz to 2.7 GHz Up to 60 KW output power 22

PULSED POWER AMPLIFIERS 2.7 GHz to 3.1 GHz Up to 50 KW output power 25

Technical data PNS Line « PULSED SOLID STATE NARROW BAND » 31

Technical data CNS Line « CW SOLID STATE NARROW BAND » 32

Technical data HV solid state Modulators 33

Direct Lightning 35

Generator Civil Tests - IEC standard 35

Direct Lightning Generators 37

Aeronautical & Military Tests 37

BZ 200 44

Ultra Broadband Radio Frequency Metamaterial Absorber 44

Description: 44

Features: 44

Applications: 44

Properties: 44

Typical range detection reduction for a MBT, X-band ground radar: 44

IR properties: 44

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About GERAC

GERAC is a 100 % THALES subsidiary, created in 1985 by Thales Communication & Security, as an expertise centre specialized in radio-frequency and microwave high power amplifiers.

For 30 years, GERAC offers its expertise to its customers' requirements for a better control of electromagnetic environments. GERAC has become an international industrial actor in various areas thanks to wide ranges of products, services, skills and experience in radio-frequency and microwave electronic. Our company is engaged in a wide range of activities :

Products

- RF and microwave solid state amplifiers
- RF and microwave tube amplifiers
- High voltage modulators (Klystron, TWT, magnetron) for industrial, medical and scientific application
- Indirect and direct lightning generators (LEMP)
- EMI, NEMP generators

Expertise and services

- EMC testing
- Electromagnetic simulation and survey
- On-site measurements
- Electromagnetic Compatibility (EMC)
- Lightning Electromagnetic Pulse (LEMP)
- High Intensive Radiated Fields (HIRF)
- High Power Microwaves (HPM)
- Nuclear Electromagnetic Pulse (NEMP)
- Electrostatic Discharges (ESD)
- Transient Radiation Effects on Electronics (TREE)

Application areas

- Medical and Scientific Research
- Defence and Aerospace
- Aeronautic
- EMC tests for industries

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Our network

Share older : 100 % THALES Thales Communications & Security

Average Turn over 2010/2015 : 11 M €

102 employees (64 engineers)

Located in France in 4 places :
Paris, Bordeaux, Toulouse, Gramat

2 offices in E.U. : Bristol and Madrid

Le Barp / Bordeaux

- Design and manufacture of radio frequency and microwave high power sources amplifiers and systems

Trappes / Paris

- EMC normative tests (military, civil and aeronautic)
- Normative tests (lightning, climatic and vibrational)
- Specific tests and survey in electromagnetism
- EMC, EMP and lightning engineering.

Toulouse

- Tests on equipments (EMC, direct and indirect lightning …)
- Tests on aircrafts
- EMC expertise and studies
- EMC training.

Gramat

- Antenna calibration
- Composite materials shielding efficiency measurements
- On-site electromagnetic measurements (GAMT20, GAMT21…)
- Conception of electromagnetism calculation codes 1D, 2D and 3D
- Numerical survey for coupling of electromagnetic waves

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FRANCE

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www.gerac.com

GERAC's headquarter is located 40 km south west of Bordeaux, in the area « Zone Industrielle Laseris in Le Barp ».

By the motorway A63 from the airport :
Take exit 23 (Le Barp/Marcheprime) then follow on D5 direction Le BARP (3 km),
Before Le Barp, take on your left « Route des Lasers » in Z.I Laseris .

Our partners

➢ DIS

DIS sector from **Thales Communications & Security** deals with Devices hardening, Instrumentation and Systems safety. It provides a comprehensive range of expertise encompassing particle accelerators, high pulsed power generators, electromagnetic sensors, modeling and characterization tools. Capabilities cover design, development, manufacture, commissioning and maintenance of either equipments or complete turnkey systems.

THALES
ELECTRON DEVICES

Thales Microwave & Imaging Sub-System , includes GERAC solid state modulators in their klystron systems

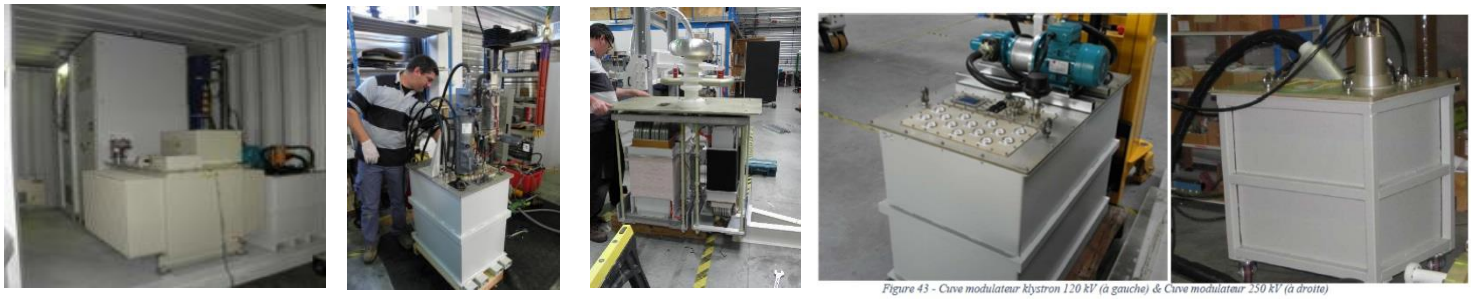

Figure 43 - Cuve modulateur klystron 120 kV (à gauche) & Cuve modulateur 250 kV (à droite)

Examples of pulsed amplifiers designed by GERAC for Amplifier Research on a worldwide distribution :

For more 45 years, Amplifier Research supplies power amplifiers, antennas, and solutions for EMC testing, wireless, medical and industrial applications. With the collaboration of AR Europe and AR USA, GERAC offers a wide EMC & HIRF line of products and solutions.

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Amplifiers Index

→ PULSED WIDE BAND SOLID STATE : PWS Line			Model number
1.2 - 1.4 GHz			
1 kW	0,1-30 µs	1 %	PWS1-1.2G1.4A
1 kW	0,1-300 µs	12 %	PWS1-1.2G1.4B
2 kW	0,1-30 µs	1 %	PWS2-1.2G1.4A
4 kW	40 µs	1 %	PWS4-1.2G1.4A
5 kW	0, 1-30 µs	1 %	PWS5-1.2G1.4A
5 kW	0,1-300 µs	12 %	PWS5-1.2G1.4B
8 kW	0,1-40 µs	1 %	PWS8 1.2G1.4A
10 kW	0,1-30 µs	1 %	PWS10-1.2G1.4A
10 kW	0,1-300 µs	12 %	PWS10-1.2G1.4B
20 kW	0,1-30 µs	1 %	PWS20-1.2G1.4A
kW	0,1-30 µs	1 %	PWS50-1.2G1.4A
80 kW	0,1-30 µs	1 %	PWS80-1.2G1.4A
140 kW	0,1-30 µs	1 %	PWS140-1.2G1.4A
1 - 2 GHz			
1 kW	0,1-50 µs	6 %	PWS1-1G2B
2 kW	0,1-50 µs	6 %	PWS2-1G2B
2 kW	0,1-100 µs	10 %	PWS2-1G2C
4kW	0,1-50 µs	6 %	PWS4-1G2B
4 kW	0,1-100 µs	10 %	PWS4-1G2C
8 kW	10 µs	1 %	PWS8-1G2A
8kW	0,1-50 µs	6 %	PWS8-1G2B
8kW	0,1-100 µs	10 %	PWS8-1G2C
10 kW	0,1-50 µs	6 %	PWS10-1G2B
20 kW	10 µs	1 %	PWS20-1G2A
20 kW	0,1-50 µs	6 %	PWS20-1G2B
50 kW	0,1-50 µs	6 %	PWS50-1G2B
0.8 - 2.5 GHz			
1 kW	0,1-100 µs	5 %	PWS1-0.8G2.5A
2 kW	0,1-100 µs	5 %	PWS2-0.8G2.5A
5 kW	0,1-100 µs	5 %	PWS5-0.8G2.5A
10 kW	0,1-100 µs	5 %	PWS10-0.8G2.5A
2.2 - 2.7 GHz			
2 kW	1-20 µs	1 %	PWS2-2.2G2.7A
4 kW	1-20 µs	1 %	PWS4-2.2G2.7A
8 kW	1-20 µs	1 %	PWS8-2.2G2.7A
10 kW	1-20 µs	1 %	PWS10-2.2G2.7A
20 kW	1-20 µs	1 %	PWS20-2.2G2.7A
60 kW	1-20 µs	1 %	PWS60-2.2G2.7A
2.7 - 3.1 GHz			
2 kW	1-200 µs	10 %	PWS2-2.7G3.1A
4 kW	1-200 µs	10 %	PWS4-2.7G3.1A
8 kW	1-200 µs	10 %	PWS8-2.7G3.1A
10 kW	1-200 µs	10 %	PWS10-2.7G3.1A
20 kW	1-200 µs	10 %	PWS20-2.7G3.1A
50 kW	1-200 µs	10 %	PWS50-2.7G3.1A

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→ PULSED NARROW BAND SOLID STATE : PNS Line	Model number
100 MHz factory adjustable ➔ 95 MHz to 105 MHz	
10 kW	PNS10-100M
20 kW	PNS20-100M
50 kW	PNS50-100M
100 kW	PNS100-100M
200 MHz factory adjustable ➔ 176 MHz to 200 MHz	
50 kW	PNS50-200M
100 kW	PNS100-200M
150 kW	PNS150-200M
352 MHz factory adjustable ➔ 340 MHz to 360 MHz	
50 kW	PNS50-352M
100 kW	PNS100-352M
150 kW	PNS150-352M
500 MHz factory adjustable ➔ 480 MHz to 520 MHz	
50 kW	PNS50-500M
100 kW	PNS100-500M
150 kW	PNS150-500M

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→ CW NARROW BAND SOLID STATE : CNS Line	Model number
90 MHz factory ajustable ➔ 88 MHz to 95 MHz	
120 kW	CNS120-90M
100 MHz factory adjustable ➔ 95MHz to 105 MHz	
10 kW	CNS10-100M
20 kW	CNS20-100M
50 kW	CNS50-100M
100 kW	CNS100-100M
200 MHz factory adjustable ➔ 176 MHz to 200 MHz	
50 kW	CNS50-200M
100 kW	CNS100-200M
150 kW	CNS150-200M
352 MHz factory adjustable ➔ 340 MHz to 360 MHz	
50 kW	CNS50-352M
100 kW	CNS100-352M
150 kW	CNS150-352M
404 MHz factory adjustable ➔ 380 MHz to 410 MHz	
50 kW	CNS50-404M
100 kW	CNS100-404M
150 kW	CNS150-404M
500 MHz factory adjustable➔ 480 MHz to 520 MHz	
50 kW	CNS50-500M
100 kW	CNS100-500M
150 kW	CNS150-500M
704 MHz factory adjustable ➔ 680 MHz to 720 MHz	
50 kW	CNS50-700M
100 kW	CNS100-700M
150 kW	CNS150-700M
750 MHz	
50 kW	CNS50-750M
100 kW	CNS100-750M
120 kW	CNS150-750M
1300 MHz	
30 kW	CNS30-1.3G
50 kW	CNS50-1.3G
90 kW	CNS90-1.3G
3900 MHz	
900 W	CNS1-3.9G

Modulators Index

→ HV MODULATOR Line		Model number
20 kV		
10 A	1 -100 µs	M20-10-4D
10 A	1 -100 µs	M20-10-20D
40 kV		
20 A	1 -100 µs	M40-20-16D
20 A	1 -100 µs	M40-20-80D
80 kV		
20 A	1 -100 µs	M80-20-32T
20 A	1 -100 µs	M80-20-80T
140 kV		
10 A	1 – 150 µs	M140-10-14T
20 A	1 – 100 µs	M140-20-56T
50 A	1 – 100 µs	M140-50-140T
20 A	1 – 20 µs	M140-20-56T1
20 A	1 – 20 µs	M140-20-112T
25 A	0,01 – 3,8 ms	M140-25-200DRF
100 A	0,01 – 3,8 ms	M140-100-600DRF
240 kV		
20 A	1 – 10 µs	M240-20-96T
50 A	1 – 10 µs	M240-50-96T1
20 A	1 – 20 µs	M240-20-200T
50 A	1 – 20 µs	M240-50-200T1

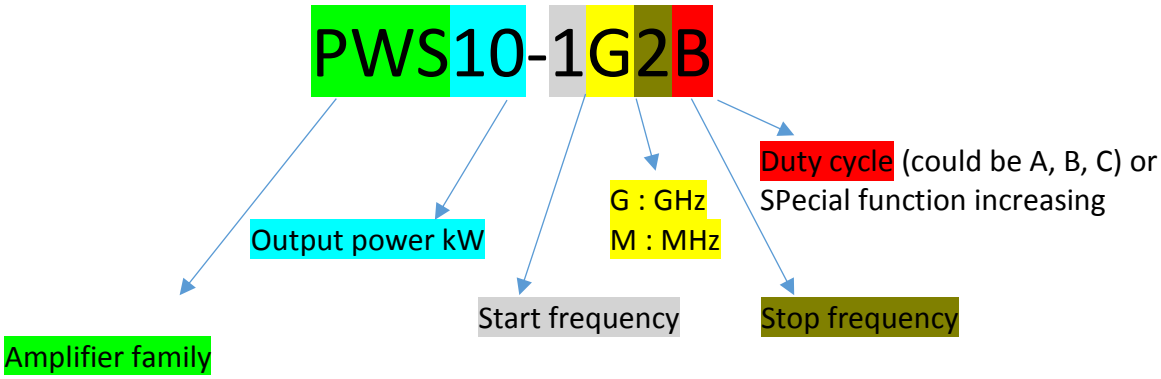
Lightning Index

→ DIRECT LIGHTNING GENERATOR : DLG Line			Model number
25 kA		Civil	DLG25K-C
50 kA		Civil	DLG50K-C
100 kA		Civil	DLG100K-C
200 kA	1.5 µH	Avionic	DLG200K-L
200 kA	3 µH	Avionic	DLG200K-M
200 kA	6 µH	Avionic	DLG200K-H

NEMP Generators Index

→ NEMP Nuclear electromagnetic pulse generators : NP Line				
Output voltage	Rise time	Fall time	**Model number**	**Page**
100 kV	1 ns	20 ns	NP 100-1-20	On request
100 kV	2 ns	50 ns	NP 100-2-50	
100 kV	5 ns	50 ns	NP 100-5-50	
100 kV	10 ns	200 ns	NP 100-10-200	
200 kV	1 ns	20 ns	NP 200-1-20	
200 kV	2 ns	50 ns	NP 200-2-50	
200 kV	5 ns	50 ns	NP 200-5-50	
200 kV	10 ns	200 ns	NP 200-10-200	
300 kV	1 ns	20 ns	NP 300-1-20	
300 kV	2 ns	50 ns	NP 300-2-50	
300 kV	5 ns	50 ns	NP 300-5-50	
300 kV	10 ns	200 ns	NP 300-10-200	
400 kV	1 ns	20 ns	NP 400-1-20	
400 kV	2 ns	50 ns	NP 400-2-50	
400 kV	5 ns	50 ns	NP 400-5-50	
400 kV	10 ns	200 ns	NP 400-10-200	

Meaning of amplifier model number :



8 amplifiers' families :

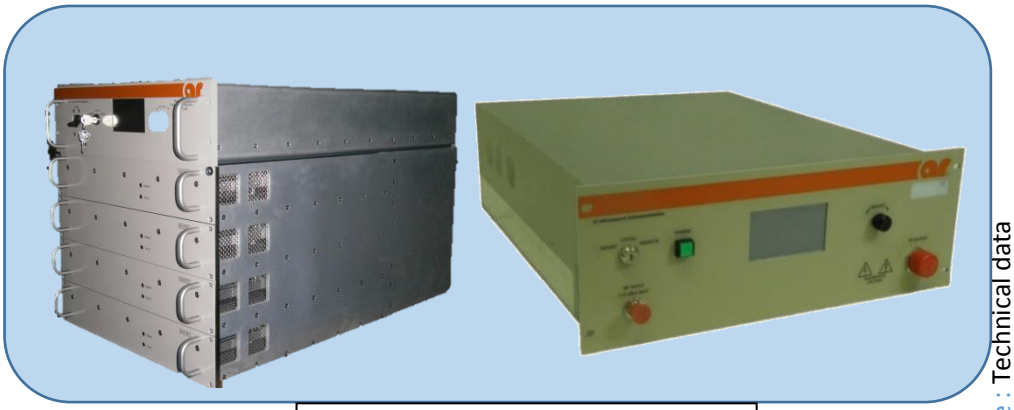
PULSED
→ PWS : Pulsed Wide band Solid state
→ PNS : Pulsed Narrow band Solid state
→ PWT : Pulsed Wide band Tube
→ PNT : Pulsed Narrow band Tube
CW
→ CWS : CW Wide band Solid state
→ CNS : CW Narrow band Solid state
→ CWT : CW Wide band Tube
→ CNT : CW Narrow band Tube

Technical data

Technical data PWS Line « PULSED WIDE BAND SOLID STATE» AMPLIFIERS

- 1.2 to 1.4 GHz
- 1 to 2 GHz
- 0.8 to 2.5 GHz
- 2.2 to 2.7 GHz
- 2.7 to 3.1 GHz



GERAC Design for AR

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PULSED POWER AMPLIFIERS

1.2 GHz to 1.4 GHz

Up to 140 KW output power

USER BENEFITS

- ✓ Solid state amplifiers
- ✓ High power, high and flat gain
- ✓ High VSWR operation
- ✓ Low harmonic distorsions
- ✓ High reliability
- ✓ Wide RF bandwidth
- ✓ Worldwide AR services

APPLICATION AREAS

- ✓ EMC tests
- ✓ Radar systems
- ✓ Communications (CDMA,W-CDMA,GSM…)
- ✓ TWT replacement
- ✓ Particles accelerators
- ✓ Medical and Scientific Research
- ✓ Defence and Aerospace

MAIN CHARACTERISTICS

- ✓ PWSX-1.2G1.4-x models are self-contained, forced air cooled (self-contained Water cooling on W option)
- ✓ Protect against short and open circuit on RF output
- ✓ Forward / reflected power and system status information displayed on front panel digital touchscreen
- ✓ Adjustable gain on manual and remote control
- ✓ Standard features built-in IEEE-488 and Ethernet interface
- ✓ CE compliance.

OVERVIEW			
Model	Rated Power (*)	Pulse width	Duty cycle
PWS1-1.2G1.4A	1kW	0.1-30µs	1%
PWS1-1.2G1.4B	1kW	0.1-300µs	12%
PWS2-1.2G1.4A	2kW	0.1-30µs	1%
PWS5-1.2G1.4A	5kW	0.1-30µs	1%
PWS5-1.2G1.4B	5kW	0.1-300µs	12%
PWS8-1.2G1.4A	8kW	0.1-30 µs	1%
PWS10-1.2G1.4A	10kW	0.1-30µs	1%
PWS10-1.2G1.4B	10kW	0.1-300µs	12%
PWS20-1.2G1.4A	20kW	0.1-30µs	1%
PWS50-1.2G1.4A	50kW	0.1-30µs	1%
PWS80-1.2G1.4A	80kW	0.1-30µs	1%
PWS140-1.2G1.4A	140kW	0.1-30µs	1%

(*): Minimum mean power in the pulse, measured on 50 Ohms load, VSWR < 1.3:1

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SPECIFICATIONS

	PWS1-1.2G1.4-A / B	PWS2-1.2G1.4A	PWS5-1.2G1.4-A / B	PWS8-1.2G1.4B	PWS10-1.2G1.4-A / B	PWS20-1.2G1.4A	PWS50-1.2G1.4A	PWS80-1.2G1.4A	PWS140-1.2G1.4A
Pulsed saturated output power									
Minimum (Watts)	1 000	2 000	5 000	8000	10 000	20 000	50 000	80 000	140 000
Typical (Watts)	1 200	2 300	5 400	8500	12 500	23 000	52 000	83 000	146 000
Mini.@3dB compression (Watts)	930	1 820	4 550	7000	9 400	18 000	45 000	72 000	126 000
Mini.@1dB compression (Watts)	700	1 400	3 600	5500	7 000	14 000	36 000	58 000	100 000
Input for rated output (dBm)	0			0	10				
Instantaneous frequency response	1.2 – 1.4 GHz								
Gain (dB)	60 min	63 min	63 min / 67 min	60 min	60 min	63 min	67 min	69 min	71,5 min
Flatness (dB)	Small signal +/-2 dB max. compressed +/- 1 dB max								
Gain adjustment	20 dB								
Harmonic distortion @1 dB compression	<-30 dBc								
Noise figure	12 dB	15 dB							
Spurious	<-60 dBc								
Typical phase linearity (°/100MHz)	+/- 4								
Input impedance	50 Ω								
Output impedance	50 Ω								
Mismatch VSWR tolerance	Infinite for any phase, with adjustable foldback protection								
Output RF sample ports (forward & reverse) (dB)	50		60	60	60	70			

	PWS1-1.2G1.4-A / B	PWS2-1.2G1.4-A	PWS5-1.2G1.4-A / B	PWS8-1.2G1.4-B	PWS10-1.2G1.4-A / B	PWS20-1.2G1.4-A	PWS50-1.2G1.4-A	PWS80-1.2G1.4-A	PWS140-1.2G1.4-A
Pulse width (µs)	0.1 to 30 / 0.1 to 300	0.1 to 30	0.1 to 30 / 0.1 to 300	0.1 to 30	0.1 to 30 / 0.1 to 300	0.1 to 30	0.1 to 30	0.1 to 30	0.1 to 30
Pulse Rate	0 to 50 kHz								
Duty cycle (%)	1 max. / 12 max.	1 max.	1 max. / 12 max.	1 max.	1 max. / 12 max.	1 max.			
RF rise and fall	30 ns max.								
Pulse off isolation	80 dB minimum								
Pulse input	TTL								
Primary power voltage (Vac)	Single phase 100-264							three phases 200-440	
Primary power frequency	47 to 63 Hz								
Power consumption (W max.)	700 / 1 200	800	1 000 / 6 000	1400	1 600 / 1 900	2 000	5 000	8 000	14 000
Cooling (Water cooling on W option)	Air								water
Operating temperature	0 to 35 °C (-10 °C to 50°C on T option)								
Storage temperature	-10 to 50 °c (-20 °C to 70°C on T option)								
Humidity	until 95% (non-condensing)								
RF input connector (Front)	N fem								
RF output connector (Rear)	7/16 fem					EIA flange			
RF output sample ports (Rear)	N fem								
Pulse input connector (Rear)	N fem								
Interface connector (Rear)	IEEE488 & Ethernet								
Primary power connectors (Rear)	CEI320							DS3 / DS3	
Number of unities (U)	3	4	6 / 13	6	16 / 20	26	2 x 30	2 X 42	2 x 46
Size (WxHxD) (cm)	50.3x13x68	50.3x18x68	50.3x26x58 / 50.3x57x58	50.3x26x58	50.3x71x72 / 50.3x89x72	50.3x115x90	100x133x90	100x205x90	100x205x90
Weight (Kg)	16 / 21	25	50 / 150	60 kg	100 / 280	200	500	720	800

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PULSED POWER AMPLIFIERS

1 GHz to 2 GHz

Up to 50 KW output power

USER BENEFITS

- ✓ Solid state amplifiers
- ✓ High power, high and flat gain
- ✓ High VSWR operation
- ✓ Low harmonic distorsions
- ✓ High reliability
- ✓ Wide RF bandwidth
- ✓ Worldwide AR services

APPLICATION AREAS

- ✓ EMC tests
- ✓ Radar systems
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- ✓ TWT replacement
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- ✓ Defence and Aerospace

MAIN CHARACTERISTICS

- ✓ PWSX-1G2x models are self-contained, forced air cooled (Water cooling on W option)
- ✓ Protect against short and open circuit on RF output
- ✓ Forward / reflected power and system status information displayed on front panel digital touchscreen
- ✓ Adjustable gain on manual and remote control
- ✓ Standard features built-in IEEE-488 and Ethernet interface
- ✓ CE compliance.

OVERVIEW			
Model	Rated Power (*)	Pulse width	Duty cycle
PWS1-1G2B	1kW	0.1-50µs	6%
PWS2-1G2B	2kW	0.1-50µs	6%
PWS2-1G2C	2kW	0.1-100µs	10%
PWS4-1G2B	4kW	0.1-50µs	6%
PWS4-1G2C	4kW	0.1-100µs	10%
PWS8-1G2A	8kW	0.1-10µs	1%
PWS8-1G2B	8kW	0.1-50µs	6%
PWS8-1G2C	8kW	0.1-100µs	10%
PWS10-1G2B	10kW	0.1-50µs	6%
PWS20-1G2A	20kW	0.1-10µs	1%
PWS20-1G2B	20kW	0.1-50µs	6%
PWS50-1G2B	50kW	0.1-50µs	6%

(*): Minimum mean power in the pulse, measured on 50 Ohms load, VSWR < 1.3:1

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SPECIFICATIONS

	PWS1-1G2B	PWS2-1G2B / C	PWS4-1G2B / C	PWS8-1G2A / B / C	PWS10-1G2B	PWS20-1G2A / B	PWS50-1G2B
Pulsed saturated output power							
Minimum (Watts)	1000	2000	4000	8000	10 000	20 000	50 000
Typical (Watts)	1200	2300	5400	8500	12 500	23 000	52 000
Mini.@3dB compression (Watts)	930	1820	4550	6430	9 400	18 000	45 000
Mini.@1dB compression (Watts)	700	1400	3600	5 000	7 000	14 000	36 000
Input for rated output (dBm)	0			10			
Instantaneous frequency response(GHz)	0.9-2						
Gain (dB)	60 min.	63 min	67 min	68.5 min	60 min	70 min	77 min
Flatness (small signal to saturation) (dB)	+/-2 max.						
Gain adjustment (dB)	20						
Harmonic distortion at -1 dB compression (dBc)	-22 max.		-20 max				
Noise figure (dB)	12		15				
Spurious (dBc)	<-60						
Typical phase linearity (°/100MHz)	+/- 4						
Input impedance (Ω)	50						
Output impedance (Ω)	50						
Mismatch VSWR tolerance	Infinite for any phase, with adjustable foldback protection						
Output RF sample ports (forward & reverse) (dB)	50		60			70	

	PWS1-1G2B	PWS2-1G2B / C	PWS4-1G2B / C	PWS8-1G2A / B / C	PWS10-1G2B	PWS20-1G2A / B	PWS50-1G2-B
Pulse Capability							
Pulse width (µs)	0.1 to 50	0.1 to 50 / 0.1 to 100	0.1 to 50 / 0.1 to 100	0.1 to 10 / 0.1 to 50 / 0.1 to 100	0.1 to 50	0.1 to 10 / 0.1 to 50	0.1 to 50
Pulse Rate (KHz)	0 to 50						
Duty cycle (%)	6 max.	6 max. / 10 max.	6 max. / 10 max.	1 max. / 6 max. / 10 max.	6 max.	1 max. / 6 max.	6 max.
RF rise and fall (ns)	30 max.						
Pulse off isolation (dB)	80 minimum						
Pulse input	TTL						
Primary power voltage (Vac)	Single phase 100-264					three phases 100-264	
Primary power frequency (Hz)	47 to 63						
Power consumption (W max.)	500	1000 / 1800	2200	1000	4500	2600 / 10 000	22 000
Cooling	Air						water
Working temperature (°C)	0 to 35						
Storage temperature (°C)	-10 to 50						
RF input connector (Front)	N fem						
RF output connector (Rear)	7/16 fem				TBD		
RF output sample ports (Rear)	N fem						
Pulse input connector (Rear)	N fem						
Interface connectors (Rear)	IEEE488						
Primary power connector (Rear)	CEI320					DS3	
Number of unities (U)	4	5	12	10	24	15 / 42	2 x 42
Size (W x H x D) (cm)	50.3x18x58	50.3x22x58	50.3x53x72	50.3x55x72	50.3x120x72	50.3x75x90 / 50.3x205x90	50.3x205x90
Weight (Kg)	26	44 / 52	160/180	150/180/200	420	650/740	2 x 650

	PWS1-0.8G2.5A	PWS2-0.8G2.5A	PWS5-0.8G2.5A	PWS10-0.8G2.5A
ulse Capability				

PULSED POWER AMPLIFIERS

0.8 GHz to 2.5 GHz

Up to 10 KW output power

USER BENEFITS

- ✓ Solid state amplifiers
- ✓ High power, high and flat gain
- ✓ High VSWR operation
- ✓ Low harmonic distorsions
- ✓ High reliability
- ✓ Wide RF bandwidth
- ✓ Worldwide AR services

APPLICATION AREAS

- ✓ EMC tests
- ✓ Radar systems
- ✓ Communications (CDMA,W-CDMA,GSM…)
- ✓ TWT replacement
- ✓ Particles accelerators
- ✓ Medical and Scientific Research
- ✓ Defence and Aerospace

MAIN CHARACTERISTICS

- ✓ PWSX-0.8G2.5-x models are self-contained, forced air cooled (self-contained Water cooling on W option)
- ✓ Protect against short and open circuit on RF output
- ✓ Forward / reflected power and system status information displayed on front panel digital touchscreen
- ✓ Adjustable gain on manual and remote control
- ✓ Standard features built-in IEEE-488 and Ethernet interface
- ✓ CE compliance.

OVERVIEW			
Model	Rated Power (*)	Pulse width	Duty cycle
PWS1-0.8G2.5A	1 kW	0.1-100 µs	5 %
PWS2-0.8G2.5A	2 kW	0.1-100 µs	5 %
PWS5-0.8G2.5A	5 kW	0.1-100 µs	5 %
PWS10-0.8G2.5A	10 kW	0.1-100 µs	5 %

(*): Minimum mean power in the pulse, measured on 50 Ohms load, VSWR < 1.3:1

SPECIFICATIONS

	PWS1-0.8G2.5A	PWS2-0.8G2.5A	PWS5-0.8G2.5A	PWS10-0.8G2.5A
Pulsed saturated output power				
Minimum (Watts)	1 000	2 000	5 000	10 000
Typical (Watts)	1 200	2 400	5 600	11 500
Mini.@3dB compression (Watts)	900	1 800	4 500	9 000
Mini.@1dB compression (Watts)	700	1 400	3 500	7 000
Input for rated output (dBm)	0			
Instantaneous frequency response(GHz)	0.8 -2.5			
Gain (dB)	60 min	63 min	67 min	60 min
Flatness (small signal to saturation) (dB)	+/- 2 max			
Gain adjustment (dB)	20			
Harmonic distortion at -1 dB compression (dBc)	< -20 dBc			
Noise figure (dB)	12		15	
Spurious (dBc)	< -60 dBc			
Typical phase linearity (°/100MHz)	+/- 4 °			
Input impedance (Ω)	50			
Output impedance (Ω)	50			
Mismatch VSWR tolerance	Infinite for any phase, with adjustable foldback protection			
Output RF sample ports (forward & reverse) (dB)	50			60

PULSED POWER AMPLIFIERS

2.2 GHz to 2.7 GHz

Up to 60 KW output power

USER BENEFITS

- ✓ Solid state amplifiers
- ✓ High power, high and flat gain
- ✓ High VSWR operation
- ✓ Low harmonic distorsions
- ✓ High reliability
- ✓ Wide RF bandwidth
- ✓ AR worldwide services

APPLICATION AREAS

- ✓ EMC tests
- ✓ Radar systems
- ✓ Communications (CDMA,W-CDMA,GSM…)
- ✓ TWT replacement
- ✓ Particles accelerators
- ✓ Medical and Scientific Research
- ✓ Defence and Aerospace

MAIN CHARACTERISTICS

- ✓ PWSX-2.2G2.7-x models are self-contained, forced air cooled (water cooling on W option)
- ✓ Protect against short and open circuit on RF output
- ✓ Forward / reflected power and system status information displayed on front panel digital touchscreen
- ✓ Adjustable gain on manual and remote control
- ✓ Standard features built-in IEEE-488 and Ethernet interface
- ✓ CE compliance.

OVERVIEW			
Model	Rated Power (*)	Pulse width	Duty cycle
PWS2-2.2G2.7A	2 kW	1-20 µs	1%
PWS4-2.2G2.7A	4 kW	1-20 µs	1%
PWS8-2.2G2.7A	8 kW	1-20 µs	1%
PWS10-2.2G2.7A	10 kW	1-20 µs	1%
PWS20-2.2G2.7A	20 kW	1-20 µs	1%
PWS60-2.2G2.7A	60 kW	1-20 µs	1%

(*): Minimum mean power in the pulse, measured on 50 Ohms load, VSWR < 1.3:1

SPECIFICATIONS

	PWS2-2.2G2.7A	PWS4-2.2G2.7A	PWS8-2.2G2.7A	PWS10-2.2G2.7A	PWS20-2.2G2.7A	PWS60-2.2G2.7A
Pulsed saturated output power						
Minimum (Watts)	2 000	4 000	8 000	10 000	20 000	60000
Typical (Watts)	X	3 500	7 500	12 500	23 000	65000
Mini.@3dB compression (Watts)	930	2 600	6 430	9 400	18 000	55 000
Mini.@1dB compression (Watts)	700	2 000	5 000	7 000	14 000	42 000
Input for rated output (dBm)	0			10		
Instantaneous frequency response (GHz)	2.2 – 2.7					
Gain (dB)	60 min.	65 min	68.5 min	60 min	63 min	68.2 min
Flatness (small signal to saturation) (dB)	+/-2 max.					
Gain adjustment (dB)	20					
Harmonic distortion at -1 dB compression (dBc)	22 max.			20 max		
Noise figure (dB)	12			15		
Spurious (dBc)	<-60					
Typical phase linearity (°/100MHz)	+/- 4					
Input impedance (Ω)	50					
Output impedance (Ω)	50					
Mismatch VSWR tolerance	Infinite for any phase, with adjustable foldback protection					
Output RF sample ports (forward & reverse) (dB)	50			60	70	

	PWS2-2.2G2.7A	PWS4-2.2G2.7A	PWS8-2.2G2.7A	PWS10-2.2G2.7A	PWS20-2.2G2.7A	PWS60-2.2G2.7A
Pulse Capability						
Pulse width (µs)	1 to 20					
Pulse Rate (KHz)	0 to 50					
Duty cycle (%)	1 max.					
RF rise and fall (ns)	30 max					
Pulse off isolation (dB)	80 min					
Pulse input	TTL					
Primary power voltage (Vac)	Single phase 100-264					Three phase 100-264
Primary power frequency (Hz)	47 to 63					
Power consumption (W max.)	750	870	1200	1300	2200	6000
Cooling	Air					
Working temperature (°C)	0 to 35					
Storage temperature (°C)	-10 to 50					
RF input connector (Front)	N fem					
RF output connector (Rear)	7/16 fem				EIA flange	
RF output sample ports (Rear)	N fem					
Pulse input connector (Rear)	N fem					
Interface connectors (Rear)	IEEE 488 & Ethernet					
Primary power connector (Rear)	CEI320					DS3
Number of unities (U)	3	6	9	11	24	2x42
Size (W x H x D) (cm)	50.3x13x58	50.3x26x58	50.3x40x72	50.3x44x72	50.3x145x90	100x210x90
Weight (Kg)	16	36	70	90	120	340

PULSED POWER AMPLIFIERS

2.7 GHz to 3.1 GHz

Up to 50 KW output power

USER BENEFITS

- ✓ Solid state amplifiers
- ✓ High power, flat gain
- ✓ High VSWR operation
- ✓ Low harmonic distorsions
- ✓ High reliability
- ✓ Wide RF bandwidth
- ✓ Worldwide AR services

APPLICATION AREAS

- ✓ EMC tests & HIRF
- ✓ Radar systems
- ✓ Communications (CDMA,W-CDMA,GSM…)
- ✓ TWT replacement
- ✓ Particles accelerators
- ✓ Defence and Aerospace

MAIN CHARACTERISTICS

- ✓ PWSX-2.7G3.1X models are self-contained, forced air cooled (self-contained Water cooling on W option)
- ✓ Protect against short and open circuit on RF output
- ✓ Forward / reflected power and system status information displayed on front panel digital touchscreen
- ✓ Adjustable gain on manual and remote control
- ✓ Standard features built-in IEEE-488 and Ethernet interface
- ✓ CE compliance.

POWER OVERVIEW			
Model	Rated Power (*)	Pulse width	Duty cycle
PWS2-2.7G3.1A	2 kW	1-200 µs	10 %
PWS4-2.7G3.1A	4 kW	1-200 µs	10 %
PWS6-2.7G3.1A	6 kW	1-200 µs	10 %
PWS8-2.7G3.1A	8 kW	1-200 µs	10 %
PWS10-2.7G3.1A	10 kW	1-200 µs	10 %
PWS20-2.7G3.1A	20 kW	1-200 µs	10 %
PWS50-2.7G3.1B	50 kW	1-5 µs	0,1 %
PWS50-2.7G3.1A	50 kW	1-200 µs	10 %

(*): Minimum mean power in the pulse, measured on 50 Ohms load, VSWR < 1.3:1

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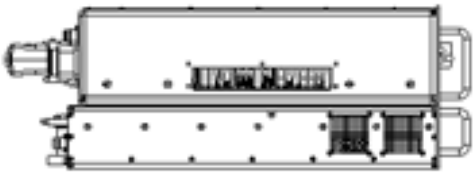
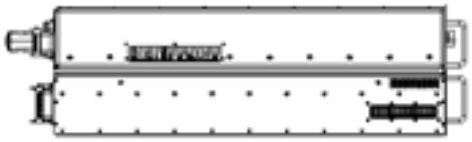
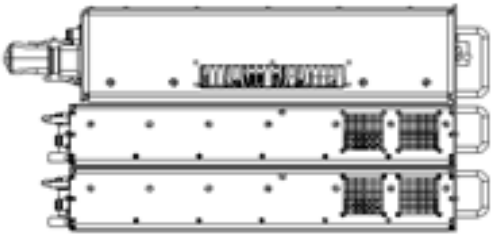
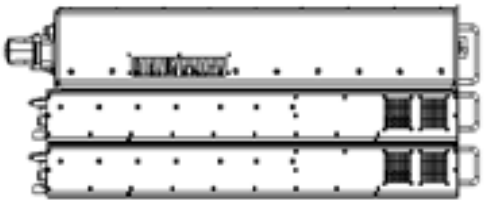
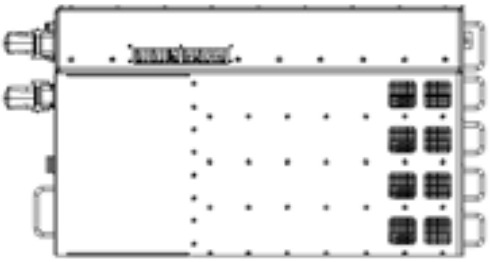
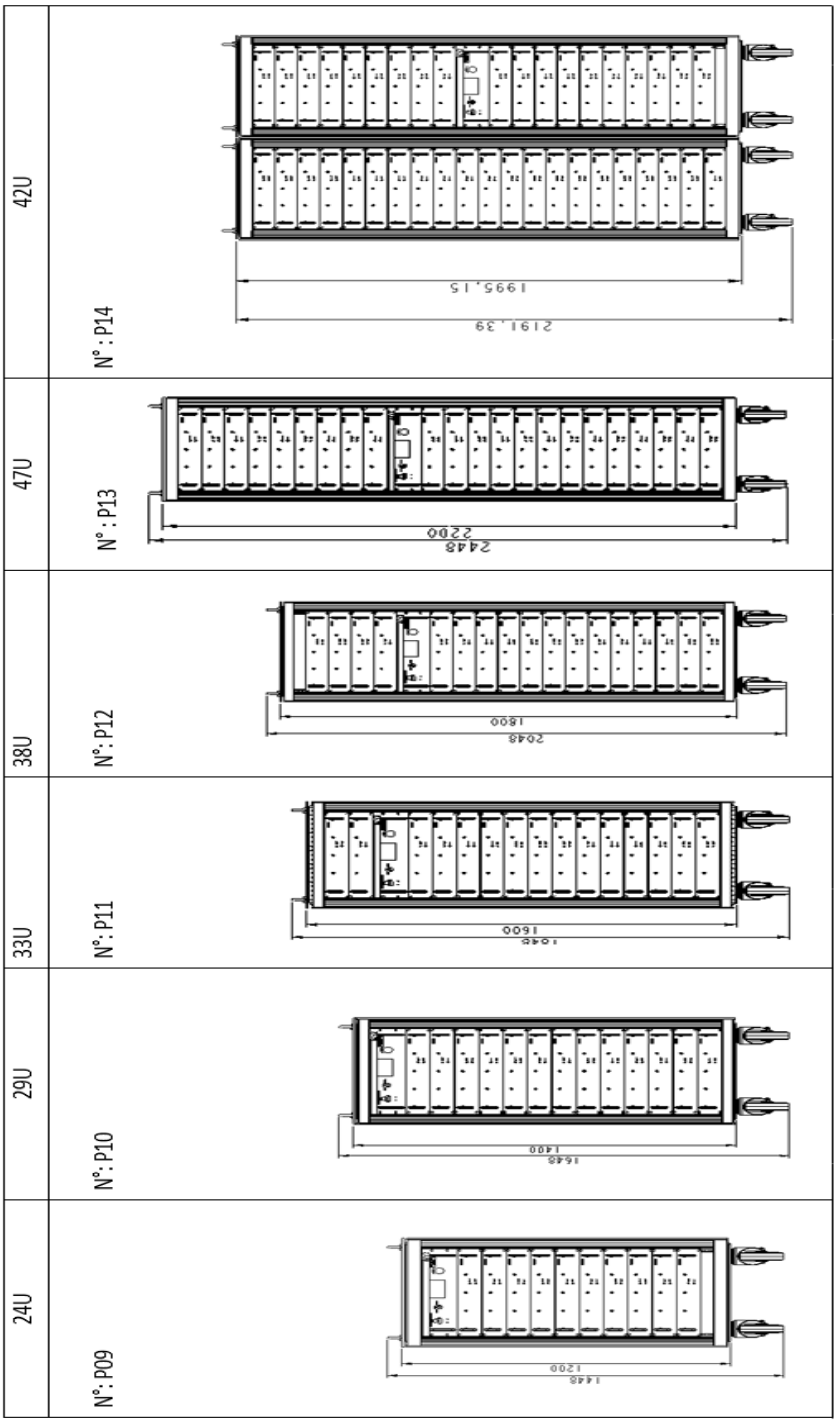
SPECIFICATIONS

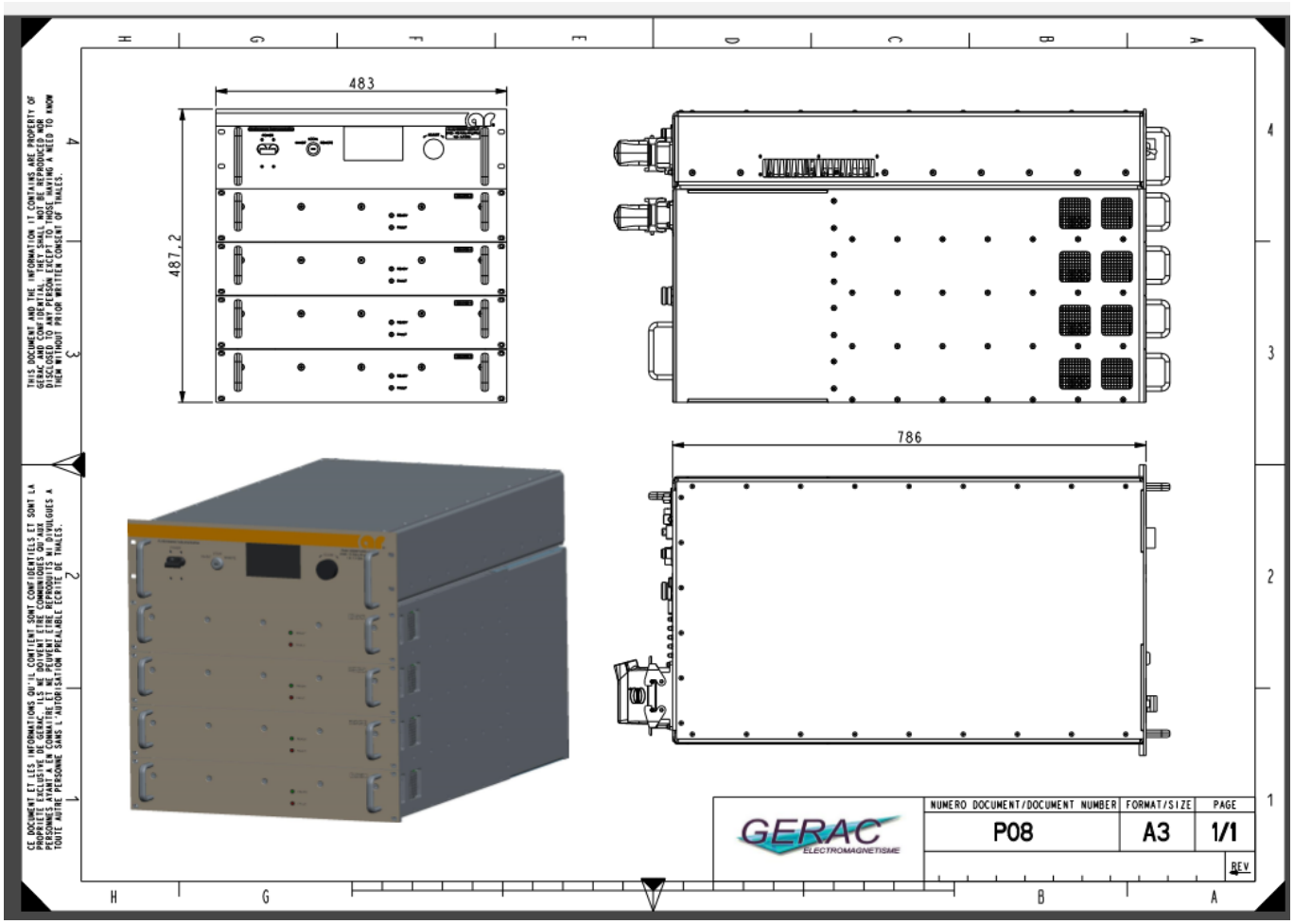
	PWS2-2.7G3.1A	PWS4-2.7G3.1A	PWS6-2.7G3.1A	PWS8-2.7G3.1A	PWS10-2.7G3.1A	PWS20-2.7G3.1A	PWS50-2.7G3.1B	PWS50-2.7G3.1A
Pulsed saturated output power								
Minimum (Watts)	2 000	4 000	6 000	8 000	10 000	20 000	50 000	50 000
Typical (Watts)	2 300	4 500	6 500	8 500	12 500	23 000	52 000	52 000
Mini.@3dB compression (Watts)	1 820	3 600	5 600	7 700	9 400	18 000	45 000	45 000
Mini.@1dB compression (Watts)	1 400	3 000	4 0000	5 200	7 000	14 000	36 000	36 000
Input for rated output (dBm)	0				10			
Instantaneous frequency response (GHz)	2.7 – 3.1						2.7-2.9	2.7 – 3.1
Gain (dB)	63 min.	66 min	67 min	69 min	60 min	63 min	67 min	67 min
Flatness (dB)	Small signal +/-2 dB max. compressed +/- 1 dB max							
Gain adjustment	20 dB							
Harmonic distortion @1 dB compression	<-30 dBc							
Noise figure (dB)	12				15			
Spurious	<-60 dBc							
Typical phase linearity (°/100MHz)	+/- 4							
Input impedance	50 Ω							
Output impedance	50 Ω							
Mismatch VSWR tolerance	Infinite for any phase, with adjustable foldback protection							
Output RF sample ports (forward & reverse) (dB)	50				60		70	

	PWS2-2.7G3.1A	PWS4-2.7G3.1A	PWS6-2.7G3.1A	PWS8-2.7G3.1A	PWS10-2.7G3.1A	PWS20-2.7G3.1A	PWS50-2.7G3.1B	PWS50-2.7G3.1A
Pulse width	1 to 200 µs						1 to 5 µs	1 to 200 µs
Pulse Rate	0 to 10 kHz							
Duty cycle	10 % max.						0,1 % max	10 % max.
RF rise and all	30 ns max							
Pulse off isolation	80 dB min							
Pulse input	TTL							
Primary power voltage (Vac)	Single phase 100-264							three phase 200-440
Primary power frequency	47 to 63 Hz							
Power consumption (W max.)	700	1 200	1 900	2 300	2 800	5600	1300	14 000
Cooling	Air (Water cooling on W option)							
Operating temperature	0 to 35 °C (-10 °C to 50°C on T option)							
Storage temperature	-10 to 50 °c (-20 °C to 70°C on T option)							
Humidity	until 95% (non-condensing)							
RF input connector (Front)	N fem							
RF output connector (Rear)	7/16 fem					EIA flange		
RF output sample ports (Rear)	N fem							
Pulse input connector (Rear)	N fem							
Interface connectors (Rear)	IEEE488 & Ethernet							
Primary power connector (Rear)	CEI320							DS3
Number of 19" unities (U)	3	6	11	11	16	26	2 x 26	2x43
Size (W x H x D) (cm)	50.3x13x68	50.3x26x68	50.3x50x68	50.3x50x68	50.3x71x72	50.3x115x90	100x115x90	100x190x90
Weight (Kg)	24	36	70	90	180	320	550	870

Outline configuration

3U		 N°: P01
5U	 N°: P02	 N°: P03
6U		 N°: P04
7U	 N°: P05	 N°: P06
9U		 N°: P07
11U		 N°: P08
13U		


42U
N°:P14
47U
N°:P13
38U
N°:P12
33U
N°:P11
29U
N°:P10
24U
N°:P09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Technical data PNS Line « PULSED SOLID STATE NARROW BAND »

→ PULSED SOLID STATE NARROW BAND : PNS Line	Model number	Pulse width Duty cycle	Primary power	Cavity combiner	Output conector
100 MHz					
10 kW	PNS10-100M	100 µs / 5%	2kVA	Yes	7-16 mm
20 kW	PNS20-100M	100 µs / 5%	3 kVA	Yes	EIA 7/8''
50 kW	PNS50-100M	100 µs / 5%	4 kVA	Yes	EIA 1-5/8''
120 kW	PNS120-100M	100 µs / 5%	7 kVA	Yes	EIA 3-1/8''
200 MHz					
50 kW	PNS50-200M	4 ms / 5%	3 kVA	Yes	EIA 1-5/8''
100 kW	PNS100-200M	4 ms / 5%	6 kVA	Yes	EIA 3-1/8''
150 kW	PNS150-200M	4 ms / 5%	9 kVA	Yes	EIA 3-1/8''
352 MHz					
50 kW	PNS50-352M	350 µs / 2%	3 kVA	Yes	EIA 1-5/8''
100 kW	PNS100-352M	350 µs / 2%	6 kVA	Yes	EIA 3-1/8''
150 kW	PNS150-352M	350 µs / 2%	9 kVA	Yes	EIA 3-1/8''
500 MHz					
50 kW	PNS50-500M	100 µs / 5%	4 kVA	Yes	EIA 1-5/8''
100 kW	PNS100-500M	100 µs / 5%	7 kVA	Yes	EIA 3-1/8''
150 kW	PNS150-500M	100 µs / 5%	10 kVA	Yes	EIA 3-1/8''

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Technical data CNS Line « CW SOLID STATE NARROW BAND »

→ CW SOLID STATE NARROW BAND : CNS Line	Model number	Duty cycle	Primary power	Cavity combiner	Output connector
90 MHz					
120 kW	CNS120-90M	CW	210 kVA	Yes	EIA 6-1/8''
100 MHz					
20 kW	CNS20-100M	CW	44 kVA	Yes	EIA 3-1/8''
50 kW	CNS50-100M	CW	55 kVA	Yes	EIA 6-1/8''
100 kW	CNS100-100M	CW	210 kVA	Yes	EIA 6-1/8''
150 kW	CNS150-100M	CW	370 kVA	Yes	EIA 9 - 1/8''
162,5 MHz					
7 kW	CNS7-162M	CW	18 kVA	Yes	EIA 1-5/8''
187,5 MHz					
60 kW	CNS60-187M	CW	136 kVA	Yes	EIA 6-1/8''
200 MHz					
50 kW	CNS50-200M	CW	115 kVA	Yes	EIA 6-1/8''
100 kW	CNS100-200M	CW	230 kVA	Yes	EIA 6-1/8''
150 kW	CNS150-200M	CW	340 kVA	Yes	EIA 9 - 1/8''
352 MHz					
50 kW	CNS50-352M	CW	120 kVA	Yes	EIA 6-1/8''
100 kW	CNS100-352M	CW	240 kVA	Yes	EIA 9 - 1/8''
150 kW	CNS150-352M	CW	360 kVA	Yes	Customised
500 MHz					
50 kW	CNS50-500M	CW	125 kVA	Yes	EIA 6-1/8''
100 kW	CNS100-500M	CW	250 kVA	Yes	Customised
150 kW	CNS150-500M	CW	370 kVA	Yes	Customised
650 MHz					
150 kW	CNS150-650M	CW	380 kVA	Yes	Customised

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Technical data HV solid state Modulators

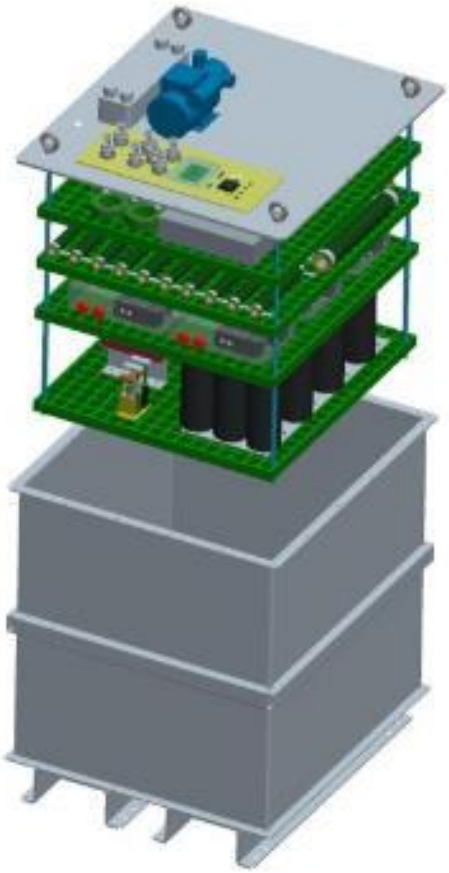
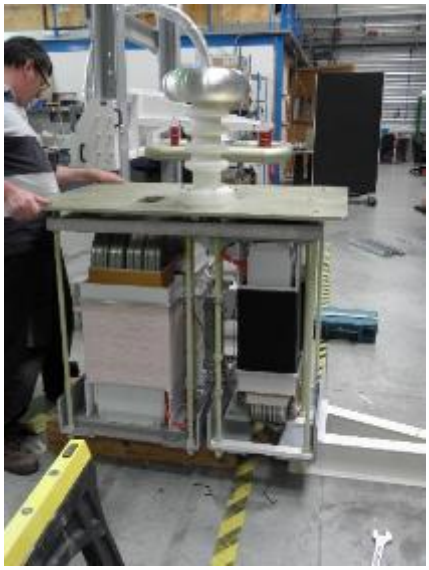
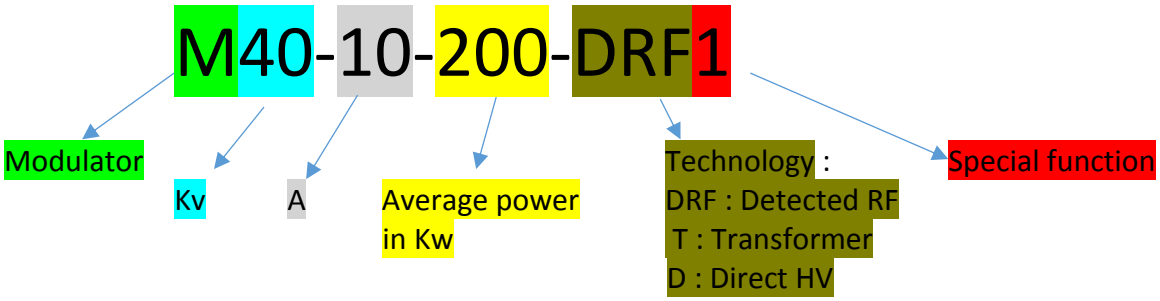


Figure 43 - Cuve modulateur klystron 120 kV (à gauche) & Cuve modulateur 250 kV (à droite)



Meaning of modulator model number



GERAC HV SOLID STATE MODULATORS

Part number	Output Voltage	Output current	Pulse width	Duty cycle	Average power	Outline	Weight
M20-10-4-D1	20 kV	10 A	1-100 µs	2%	4 kW	19'' Rack 6U	45 kg
M20-10-20-D1	20 kV	10 A	1-100 µs	10%	20 kW	19'' Rack 15U	105 kg
M40-20-16-D1	40 kV	20 A	1-100 µs	2%	16 kW	19'' Rack 15U	96 kg
M40-20-80-D1	40 kV	20 A	1-100 µs	10%	80 kW	19'' cabinet 38U	450 kg
M80-20-32-T1	80 kV	20 A	1-100 µs	2%	32 kW	19'' cabinet 24U	270 kg
M80-20-80-T1	80 kV	20 A	1-100 µs	5%	80 kW	19'' cabinet 38U	470 kg
M140-10-14-T1	140 kV	10 A	1-150 µs	1%	14 kW	19'' Rack 15U	102 kg
M140-20-56-T1	140 kV	20 A	1-100 µs	2%	56 kW	19'' cabinet 24U	330 kg
M140-50-140-T1	140 kV	50 A	1-100 µs	2%	140 kW	2 x cabinets 38U	800 kg
M140-20-56-T2	140 kV	20 A	1-20 µs	2%	56 kW	19'' cabinet 24U	310 kg
M140-20-112-T1	140 kV	20 A	1-20 µs	4%	112 kW	2 x cabinets 33U	720 kg
M140-25-200-DRF1	140 kV	25 A	0,01-3,8 ms	6%	200 kW	3 x cabinets 42U	1 400 kg
M140-100-600-DRF1	140 kV	100 A	0,01-3,8 ms	6%	600 kW	9 x cabinets 42U	4 200 kg
M240-20-96-T1	240 kV	20 A	1-10 µs	2%	96 kW	19'' cabinet 42U	530 kg
M240-20-96-T1	240 kV	50 A	1-20 µs	2%	96 kW	19'' cabinet 42U	550 kg
M240-20-200-T1	240 kV	20 A	1-10 µs	4%	200 kW	2 x cabinets 42U	910 kg
M240-50-200-T1	240 kV	50 A	1-20 µs	4%	200 kW	2 x cabinets 42U	960 kg

Direct Lightning

Generator Civil Tests - IEC standard

Available models:

DLG 25K-C / DLG 50K-C / DLG 100K-C

Up to 100 kA output current

10/350 µs surge test current wave

KEY DIFFERENTIATORS & INNOVATION

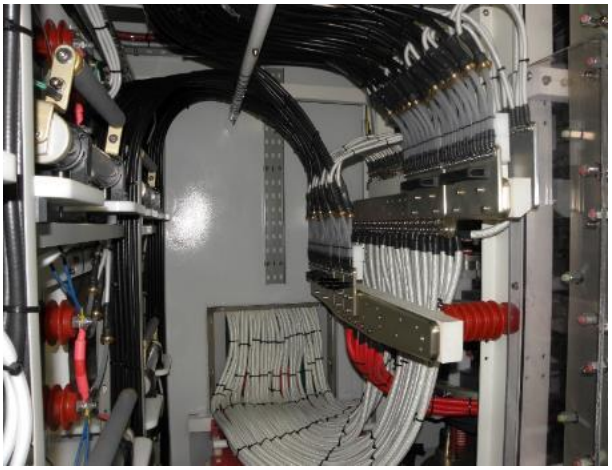
- ✓ Compact & Industrial design
- ✓ Autonomous & transportable Laboratory
- ✓ Extensible architecture
- ✓ Full security solution
- ✓ Low electromagnetic interference (EMI)
- ✓ RGB & IR cameras embedded
- ✓ Full instrumentations : current, voltage probes + oscilloscope,...
- ✓ Soundproof test chamber

APPLICATION AREAS

- ✓ Spark gap
- ✓ Lightning Arrestors
- ✓ Lightning Rods
- ✓ Varistors
- ✓ Circuit Breaker

USER BENEFITS

- ✓ High reliability
- ✓ Easy to use
- ✓ CE compliance
- ✓ Low noise level



STANDARDS COVERED

Tests on equipment and systems according to the standards:

- EN 61 643-11
- IEC 61 321-1

GENERAL & ENVIRONMENTAL CHARACTERISTICS

These generators are integrated in a marine shelter composed of a high pulse power generator and a soundproof test chamber.

They are fully autonomous, transportable and easy to set up on customer site within only 1 day.

A full security solution is embedded such as fiber optic and pneumatic links, fire detection and smoke control system, high voltage self-powered detector, open doors detectors and HV shutdown.

- Main Voltage :……..3 × 400 V ±10% 50-60 Hz + Earth
- Control command Software :……LabVIEW
- Communication Interfaces :……Gigabit Multimode Fiber Optic duplex SC/SC
- Control Unit :……Laptop or Computer + keyboard + mouse + LCD display
- Operating System :……Microsoft Windows 7
- Noise Level :……< 85 dBa
- Operating Temperature :……0°C to 40°C
- Storage Temperature :……-10°C to 50°C
- Operating Relative Humidity :……20% to 85%

GENERATOR CHARACTERISTICS

	DLG 25K-C	DLG 50K-C	DLG 100K-C
TOTAL ENERGY STORED	85 kJ	320 kJ	850 kJ
RANGE $R_{DUT(*)}$	0.01 to 0.1 Ω	0.01 to 0.1 Ω	0.01 to 0.1 Ω
RANGE $L_{DUT(*)}$	0.1 to 1.5 µH	0.1 to 1.5 µH	0.1 to 1.5 µH
TESTING TYPE	Conducting / Arcing	Conducting / Arcing	Conducting / Arcing
WAVEFORMS POLARITY	Unidirectional	Unidirectional	Unidirectional
CHARGING VOLTAGE	0 to 13 kV	0 to 25 kV	0 to 35 kV
DURATION	< 5 ms	< 5 ms	< 5 ms
OUTPUT CURRENT	0 to 25 kA	0 to 50 kA	0 to 100 kA
MAX. CHARGE TRANSFERT	12.5 A.s	25 A.s	50 A.s
SHOT CYCLE	1 shot / 10 min	1 shot / 10 min	1 shot / 10 min
WAVEFORM	Bi-exponential	Bi-exponential	Bi-exponential
CONFIGURATION	1 Marine Shelter	1 Marine Shelter	1 Marine Shelter
WEIGHT	4 T	5 T	6.5 T
SIZE (W × H × D)	2.5 × 2.5 × 3 m	2.5 × 2.5 × 3 m	2.5 × 2.5 × 6 m

(*) DUT: Device Under Test

Direct Lightning Generators
Aeronautical & Military Tests

Available models:

DLG 200K-L / DLG 200K-M / DLG 200K-H

Only 3 days for Commissioning & Training on site

Designed on an advanced concept of combined Lightning Generator with a large dynamic

Up to 200 kA output current and 3.5 MA².s

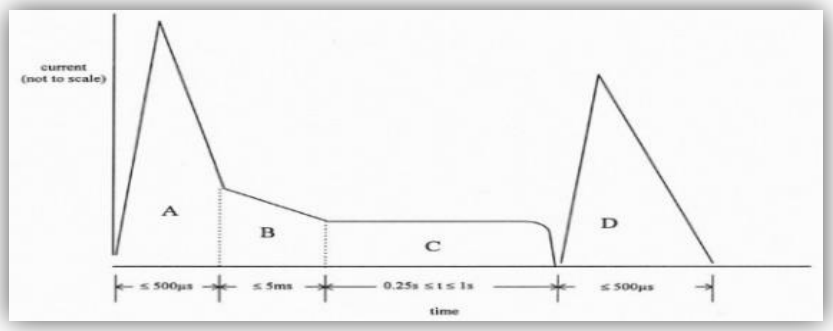
Designed on an advanced concept of large dynamic combined Lightning Generators

Up to 0.3 Ω - 6 µH Load impedance

Up to 200 kA output current and 3.5 MA²s

Up to 400 kA output current on short-circuit

Ability to operate in individual or combined waveforms:



"A" waveform Generator for DLG 200K-H model

KEY DIFFERENTIATORS & INNOVATION

- ✓ Compact & Industrial design
- ✓ Autonomous & transportable Laboratory
- ✓ Full instrumentations: I and U probes + oscilloscopes
- ✓ Control Computer and software
- ✓ Soundproof test chamber
- ✓ Color & IR cameras

APPLICATION AREAS

Damage and sparking test for:

- ✓ Metal structures
- ✓ Composite structures
- ✓ Fuel Tanks
- ✓ Antennas
- ✓ Probes
- ✓ Lightning Protections
- ✓ Components

USER BENEFITS

- ✓ High reliability
- ✓ Low exploitation price : <0.5% of the acquisition price based on 1 000 shots / year
- ✓ Easy to use and to maintain
- ✓ CE compliance
- ✓ Low acoustic noise level

COVERED STANDARDS

Tests on equipment and systems according to standards:

- Military : MIL STD 464 C/ MIL STD 1757A
- Aeronautical : EUROCAE ED84 / SAE ARP 5412 / RTCA/DO-160 (section 23)

WAVEFORMS APPLICATIONS

Components A (or Ah), B, C and D can be applied independently or applied during the same strike following a trigger defined by the operator. The different possible configurations are as follows:

A only	B only	C only	D only
A+B+C	D+B+C	B+C+D	A+B
D+B	A+C	D+C	

Current continue resolution for each waveform:

- A component: 0 to I_{max}
- B component: 0 to I_{max}
- C component: 0 to I_{max}

GENERAL & ENVIRONMENTAL CHARACTERISTICS

These systems are integrated in a marine shelter comprised of a high pulse power generator and a soundproof test chamber. They are fully autonomous, transportable and easy to set up on customer site within only 1 day.
A full security solution is embedded such as fiber optic and pneumatic links, fire detection and smoke control system, high voltage self-powered detector, open door detectors and HV shutdown.

- Main Voltage :……..3 × 400 V ±10% 50-60 Hz + Earth
- Control command Software :……LabVIEW
- Communication Interfaces :……..Gigabit Multimode Fiber Optic duplex SC/SC
- Communication protocol:……...Ethernet
- Control Unit :……Laptop or Computer + keyboard + mouse + LCD display
- Operating System :……Microsoft Windows 10
- Acoustic Noise Level :……< 85 dBa
- Operating Temperature :……0°C to 40°C
- Storage Temperature :……-10°C to 50°C
- Operating Relative Humidity :……20% to 85%

GENERATOR CHARACTERISTICS

(*) DUT: Device Under Test

	DLG 200K-L	DLG 200K-M	DLG 200K-H
TOTAL ENERGY STORED	6.64 MJ	8.85 MJ	11.35 MJ
RANGE $R_{DUT(*)}$	0.01 to 0.1 Ω	0.01 to 0.1 Ω	0.01 to 0.3 Ω
RANGE $L_{DUT(*)}$	0.1 to 1.5 µH	0.1 to 3 µH	0.1 to 6 µH
TESTING TYPE	Conducting / Arcing	Conducting / Arcing	Conducting / Arcing
WAVEFORMS POLARITY	Unidirectional	Unidirectional	Unidirectional
A WAVEFORM CHARACTERISTICS			
CHARGING VOLTAGE	0 to 55 kV	0 to 70 kV	0 to 85 kV
MAX. ENERGY STORED	0.4 MJ	0.55 MJ	1 MJ
RISE TIME	< 45 µs	< 45 µs	< 45 µs
DURATION	< 500 µs	< 500 µs	< 500 µs
OUTPUT CURRENT	0 to 200 kA	0 to 200 kA	0 to 200 kA
MAX. ACTION INTEGRAL	0 to 2 MA^2s	0 to 2 MA^2s	0 to 3.5 MA^2s
SHOT CYCLE	1 shot / 5 min	1 shot / 5 min	1 shot / 5 min
WAVEFORM	Bi-exponential	Bi-exponential	Bi-exponential
B WAVEFORM CHARACTERISTICS			
CHARGING VOLTAGE	0 to 25 kV	0 to 50 kV	0 to 77 kV
MAX. ENERGY STORED	0.24 MJ	0.3 MJ	0.35 MJ
RISE TIME	< 150 µs	< 150 µs	< 150 µs
DURATION	5 ms	5 ms	5 ms
OUTPUT AVERAGE CURRENT	0 to 2 kA	0 to 2 kA	0 to 2 kA
MAX. CHARGE TRANSFER	0 to 10 C	0 to 10 C	0 to 10 C
SHOT CYCLE	1 shot / 5 min	1 shot / 5 min	1 shot / 5 min
WAVEFORM	Bi-exponential	Bi-exponential	Bi-exponential
C WAVEFORM CHARACTERISTICS			
CHARGING VOLTAGE	1.4 kV	1.6 kV	3 kV
MAX. ENERGY STORED	5.5 MJ	6 MJ	10 MJ
RISE TIME	1 to 10 ms	1 to 10 ms	1 to 10 ms
DURATION	10 ms to 1 s	10 ms to 1 s	10 ms to 1 s
OUTPUT CURRENT	1 to 600 A	1 to 600 A	1 to 800 A
MAX. CHARGE TRANSFER	10 to 200 C	10 to 200 C	10 to 300 C
SHOT CYCLE	1 shot / 15 min	1 shot / 15 min	1 shot / 15 min
WAVEFORM	Rectangular	Rectangular	Rectangular
D WAVEFORM CHARACTERISTICS (**)			
CHARGING VOLTAGE	0 to 55 kV	0 to 70 kV	0 to 80 kV
MAX. ENERGY STORED	0.062 MJ	0.062 MJ	0.062 MJ
RISE TIME	< 25 µs	< 25 µs	< 25 µs
DURATION	< 500 µs	< 500 µs	< 500 µs
OUTPUT CURRENT	0 to 100 kA	0 to 100 kA	0 to 100 kA
MAX. ACTION INTEGRAL	0 to 0.25 MA^2s	0 to 0.25 MA^2s	0 to 0.25 MA^2s
SHOT CYCLE	1 shot / 5 min	1 shot / 5 min	1 shot / 5 min
WAVEFORM	Bi-exponential	Bi-exponential	Bi-exponential

(**) "D" waveform is generated by the "A" waveform generator

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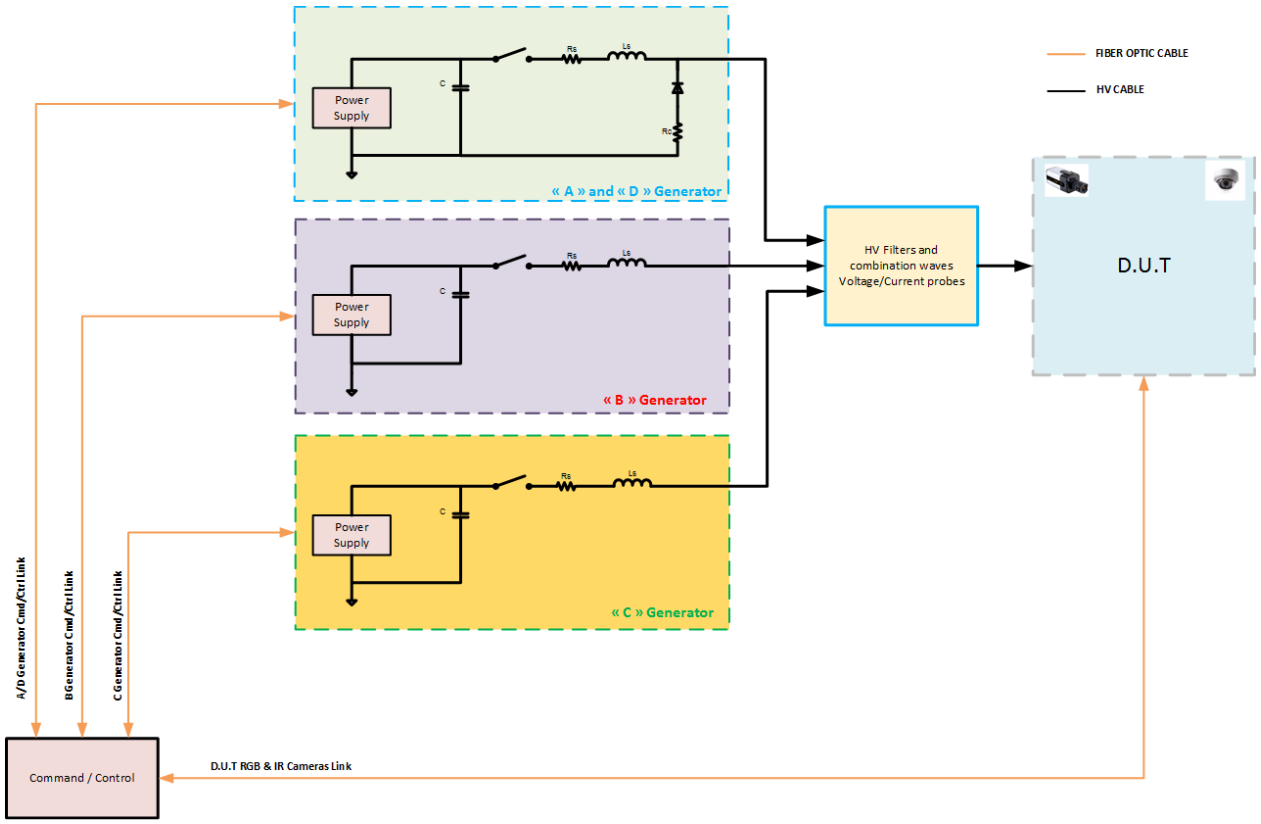
DLG SET UP

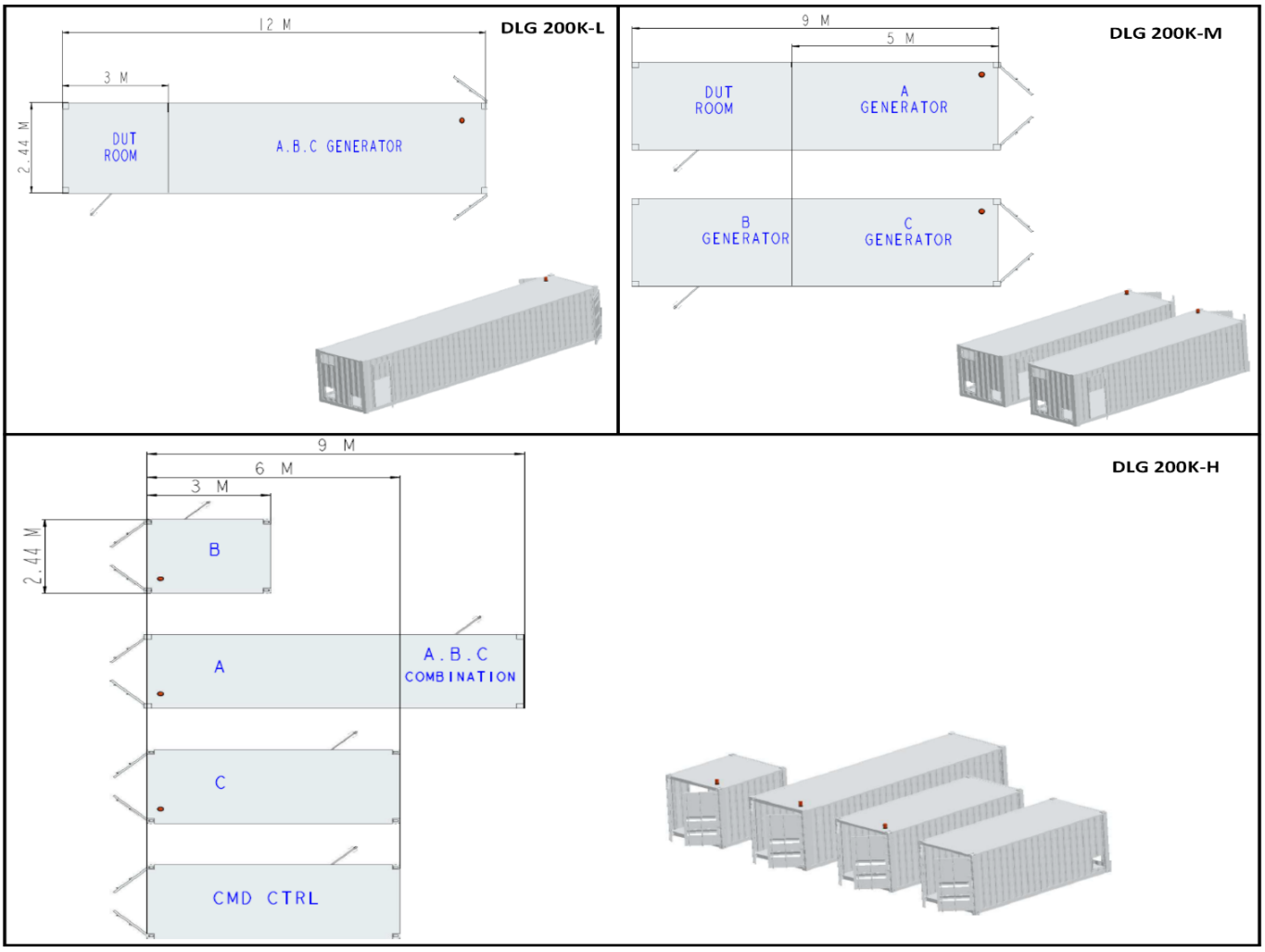


External D.U.T example

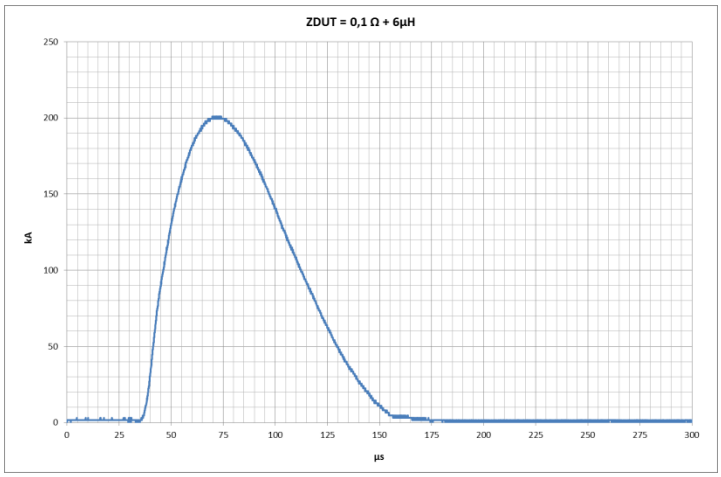
D.U.T Soundproof Chamber

PHYSICAL CHARACTERISTICS

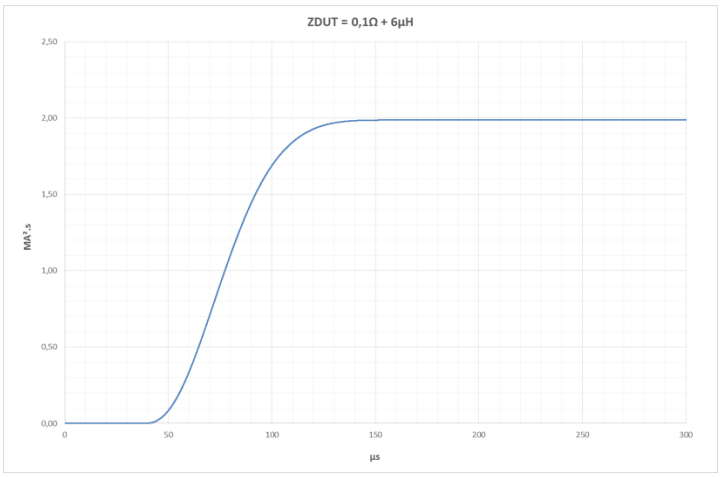
	DLG 200K-L	DLG 200K-M	DLG 200K-H
PHYSICAL CHARACTERISTICS			
SYSTEM CONFIGURATION	1 Marine Shelter	2 Marine Shelters	4 Marine Shelters
SHELTER 1	A+B+C waves+DUT room	A wave + DUT room	A waves
SHELTER 2	-	B+C waves	B waves
SHELTER 3	-	-	C waves
CMD/CTRLE SHELTER FOR OPERATOR	No	No	Yes
SYSTEM SIZE (W × D × H)			
SHELTER 1	2.44 × 12 × 2.5 m	2.44 × 9 × 2.5 m	2.44 × 9 × 2.5 m
SHELTER 2	-	2.44 × 9 × 2.5 m	2.44 × 3 × 2.5 m
SHELTER 3	-	-	2.44 × 6 × 2.5 m
DUT ROOM	2.44 × 3 × 2.5 m	2.44 × 4 × 2.5 m	External
CMD/CTRLE SHELTER	-	-	2.44 × 6 × 2.5 m
WEIGHT PER SHELTER			
SHELTER 1	11 T	10 T	11.5 T
SHELTER 2	-	9 T	5 T
SHELTER 3	-	-	7.5 T
CMD/CTRLE SHLETER	-	-	5.5 T
TOTAL WEIGHT	11 T	19 T	29.5 T



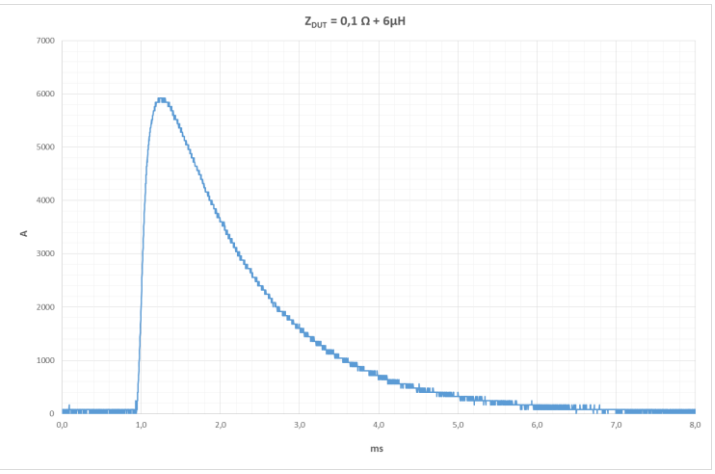
MEASURED WAVEFORMS



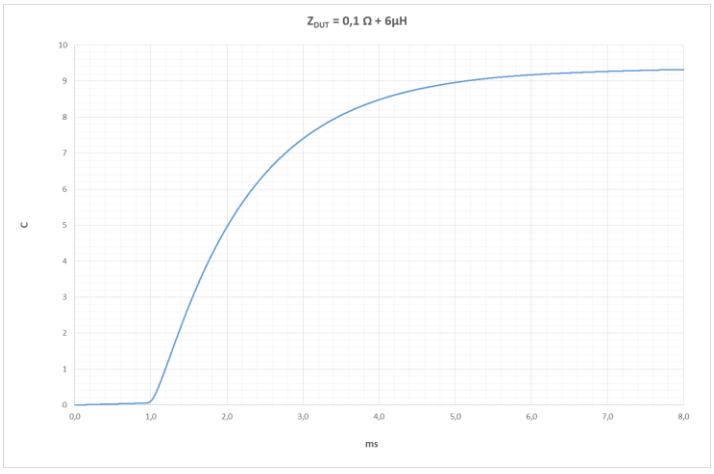
A Waveform – I(t)



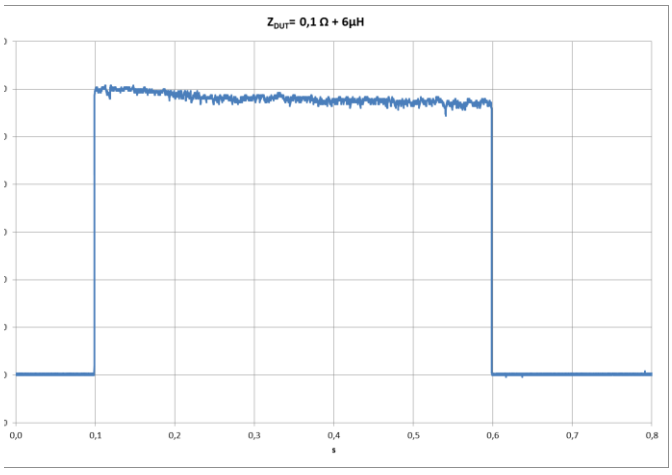
A Waveform - Action Integral



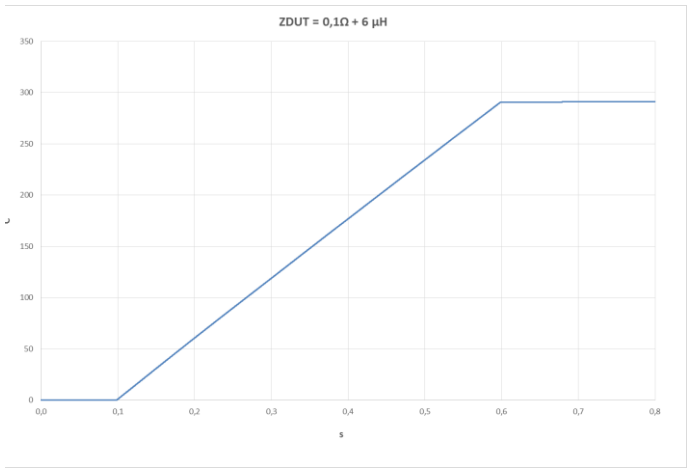
B Waveform – I(t)



B Waveform - Charge Transfer

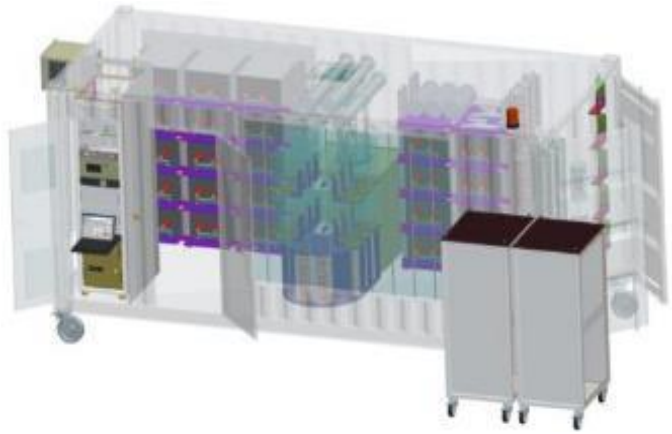


C Waveform on arcing – I(t)
(In conducting mode the wave shape is perfectly smoothed)



C Waveform - Charge Transfer

DIRECT LIGHTNING GENERATORS VIEWS



GERAC conception with 3D-Tool CAD

Integration and FAT on GERAC factory

A waveform Generator

C waveform Generator

Fast integration on customer site

Commissioning and SAT on customer test room

BZ 200

Ultra Broadband Radio Frequency Metamaterial Absorber

- Signature management system for increased survivability
- Reduces Radar Cross Section of mobile and stationary assets
- Very significantly decreases detection range
- Improves system interoperability by shielding RF interferences
- Protects personnel conducting tests or installations on antennas from RF radiation
- Equipment and personnel covering and concealment

Description:

BZ 200 is a novel patented high-performance thin lightweight polarization-insensitive and wide-angle metamaterial RF absorber. It absorbs up to 99% of the electromagnetic waves from S to Ku band and 35 and 94 GHz.

Features:

- Highly flexible
- Corrosion resistant
- Durable outer surfaces
- High wear and tear resistance
- High tensile strength
- Fire resistant

Applications:

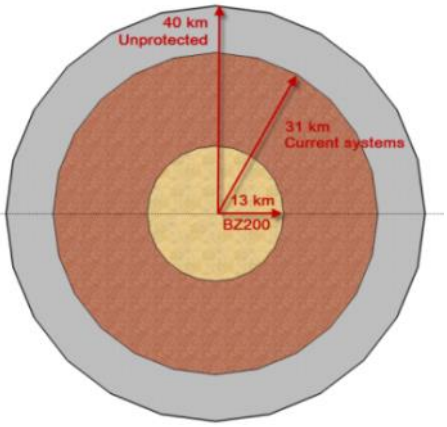
The BZ 200 highly conformable composite cover will lower and modify the radar and the IR signatures of any system, such as; naval vessels, land combat vehicles, shelters, personnel, etc…
Each kit is custom designed to individual customers' exact specifications.

Custom sizes are available upon request. The panel may be sealed (waterproofed) upon request.

Properties:

- Weight < 1,0 kg/m2
- Thickness < 6mm
- Color: any other color are available upon request

Typical range detection reduction for a MBT, X-band ground radar:



IR properties:

Due to its multi-layered construction, BZ 200 will inherently reduce the IR signature of the covered object

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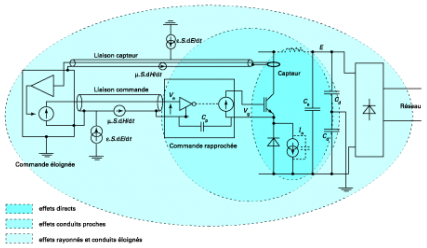
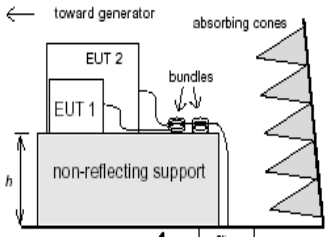
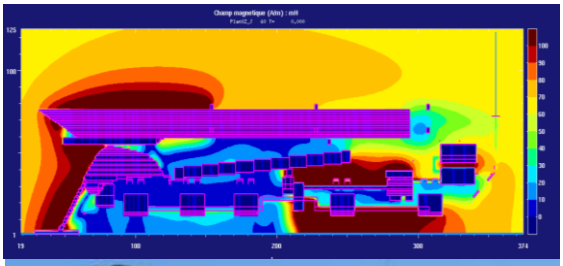
COMPLEMENTARY GERAC SKILLS

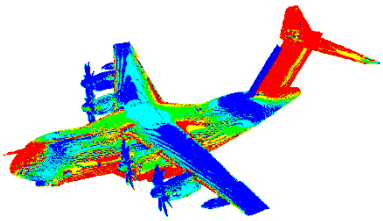
EMC Engineering

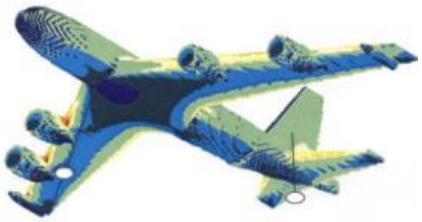




Numerical Simulation



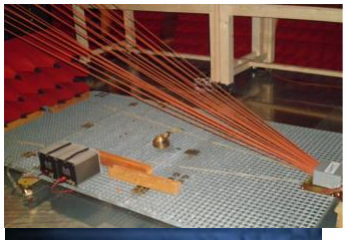




EMC Tests

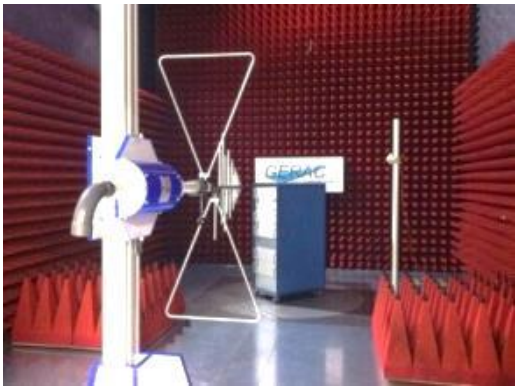
HIRF up to 7 kV/m up to 40 GHz

Lightning indirect / direct effects until 200 KA
NEMP test until 50 kV/m



Paris

Toulouse



Trappes

64 supers condensateurs S3
Total = 12 MJ – 2,3 F

9 résistances de décharge
Ptotal = 180 kW