

# ***GEN 5kW SERIES***

## ***TEST DATA***

### ***EN61000***

DWG: IA657-58-01		
APPD	CHK	DWG
<i>fu</i> <i>may -1 08</i>	<i>Ami P.</i> <i>1-May-08</i>	<i>MICHAEL G.</i> <i>25.12.2007</i>

# INDEX

# PAGE

1. Electro-Static Discharge Test EN61000-4-2 .....	R-1
2. Radiated Susceptibility Test EN61000-4-3.....	R-2
3. Electrical Fast Transient Burst Test EN61000-4-4.....	R-3
4. Surge Test EN61000-4-5.....	R-4
5. Conducted Susceptibility Test EN61000-4-6.....	R-5
6. Immunity to Magnetic Field Test EN61000-4-8.....	R-6
7. Voltage Dips and Short Interruption Test EN61000-4-11.....	R-7

The above data is typical value.

The values are considered to be actual capability data.

## 1-2 List of equipment used

EQUIPMENT USED		MANUFACTURER	MODEL No.
1	Storage oscilloscope	Yokogawa	DL7100
2	Storage oscilloscope	Yokogawa	DL1740
3	Analog oscilloscope	Hitachi	V-1565
4	Digital multimeter	HP	34401A
5	Digital power meter	Yokogawa	WT130
6	Digital power meter	Yokogawa	WT230
7	Autotransformer	Metrel	HSN 260/30
8	Autotransformer	Metrel	HTN 450/20
9	Resistive load	NLI	8V
10	Resistive load	NLI	150V
11	Resistive load	NLI	600V
12	AC source	Chroma	6590
13	AC source	Chroma	61704
14	ESD simulator system	Schaffner	ESS2000
15	EFT/B Generator	Schaffner	NSG2025
16	Surge Generator	Schaffner	NSG651
17	RF Signal Generator 9kHz-1.2GHz	Marconi Instruments	2023
18	RF Amplifier 10kHz-220MHz,150W	Amplifier Research	150L
19	Coupling/Decoupling Network	HL	230-M3
20	Coupling/Decoupling Network	HL	230-M2
21	Attenuator 6 Db,150W,DC-1000MHz	HL	6-150
22	Anechoic test chamber	Hermon Labs	AC-2
23	Antenna,biconical, 20-300MHz,1kW	A.H.Systems inc.	SAS-200/543
24	Antenna,1-18GHz,300W	EMC Test Systems	3115
25	RF signal generator,10kHz-1.05GHz	Fluke	6061A
26	Monitor,field,10kHz-1GHz,1-300V/m	Amplifier Research	FM1000
27	Coupling-decoupling network according	Hermon Labs	50141S1
28	RF amplifier,500MHz -1000MHz,120W	Hermon Labs	A-120
29	RF amplifier,1 to 4 GHz,55W	Milmega	AS 0104-55/55
30	RF power meter	Boonton	4200

**NEMIC-LAMBDA**

# 1. ELECTRO-STATIC DISCHARGE TEST (EN61000-4-2)

(1) Equipment used:

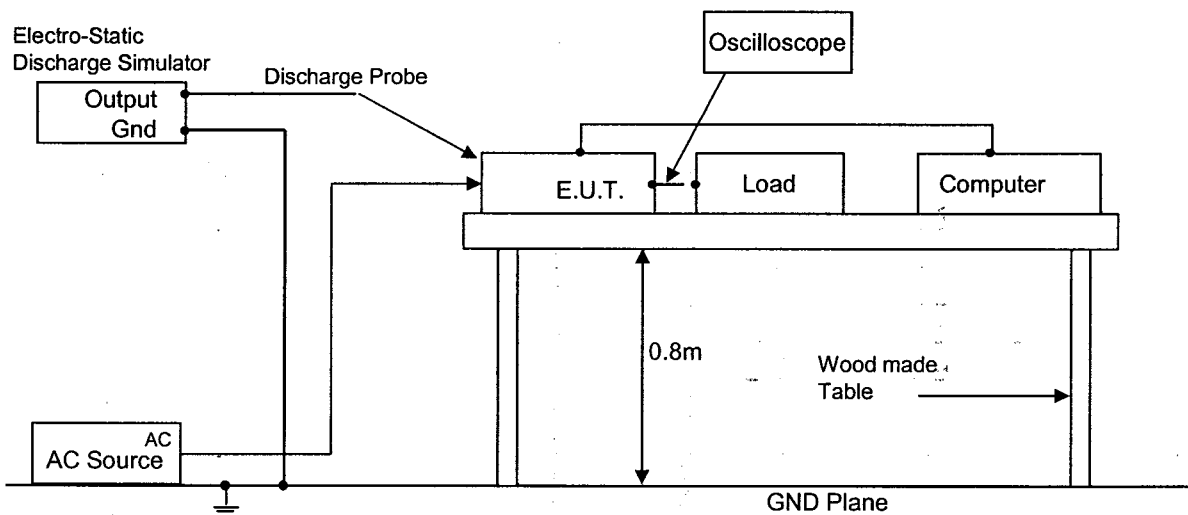
ESD simulator system:       SCHAFFNER NSG435  
Discharge resistance: 330 Ohm Capacity: 150pF

(2) Test conditions:

Input voltage:	Rated	Output voltage:	Rated
Output current:	100%	Polarity:	-,+
Number of tests:	10 times	Discharge interval:	>1 Second

(3) Test method and Device test point:

Contact discharge: FG, Case screw  
Air discharge:       Input and Output terminal



(4) Acceptable conditions:

1. Output voltage regulation not to exceed  $\pm 5\%$  of initial (before test) value during test.
2. Output voltage to be within regulation specification after the test.
3. Along with 1 and 2, no discharge of fire or smoke, as well as no output failure.

(5) Test Result:

Discharge (kV)	Contact			Discharge (kV)	Air		
	GEN8-600	GEN150-34	GEN600-8.5		GEN8-600	GEN150-34	GEN600-8.5
2	PASS	PASS	PASS	4	PASS	PASS	PASS
4	PASS	PASS	PASS	8	PASS	PASS	PASS

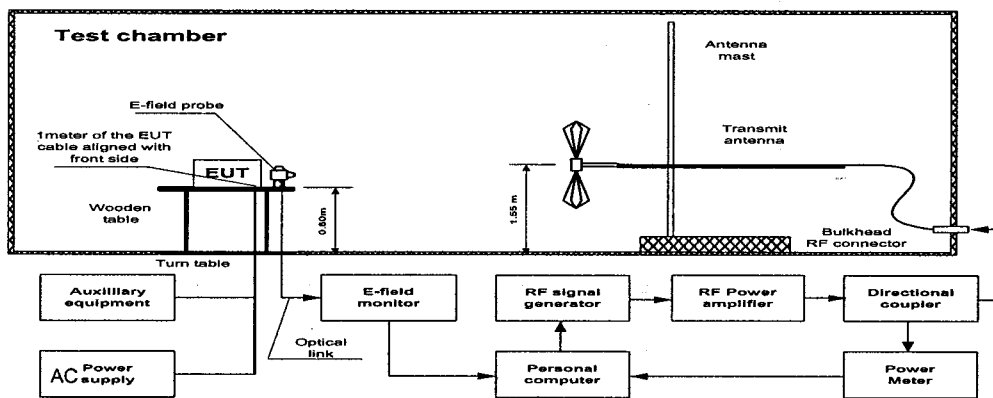
## 2. ELECTROMAGNETIC RADIATION SUSCEPTIBILITY TEST (EN61000-4-3)

(1) Equipment used:

Anechoic test chamber	Hermon Labs AC-2
Antenna, biconical, high power 20-300MHz, 1kW	A.H.Systems inc. SAS-200/543
Antenna, double-ridged waveguide horn, 1-18GHz, 300W	EMC Test Systems 3115
Synthesized RF signal generator, 10kHz-1.05GHz	Fluke 6061A
Monitor, field, 10kHz-1GHz, 1-300V/m, w/fiberoptic	Amplifier Research FM1000
Coupling-decoupling network according to ENV 50141 (S1)	Hermon Labs 50141S1
RF amplifier, 10kHz-220MHz, 150W	Amplifier Research 150L
RF amplifier, 500MHz to 1000MHz, 120W	Hermon Labs A-120
RF amplifier, 1 to 4 GHz, 55W	Milmega AS 0104-55/55B
RF power meter	Boonton 4200

(2) Test conditions:

Input voltage:	Rated	Output voltage:	Rated
Output current:	100%	Amplitude Modulated:	80%, 1kHz
Electromagnetic Frequency:	80~1000MHz	Ambient temperature:	25°C
Sweep Condition:	1.5 x 10 <sup>-3</sup> Decade/Second, 1.0 Second Hold		



(3) Acceptable conditions:

1. Output voltage regulation not to exceed ± 5% of initial (before test) value during test.
2. Output voltage to be within regulation specification after the test.
3. Along with 1 and 2, no discharge of fire or smoke, as well as no output failure.

(4) Test Result:

Radiated Field Strength (V/m)	GEN8-600	GEN150-34	GEN600-8.5
1	PASS	PASS	PASS
2	PASS	PASS	PASS
3	PASS	PASS	PASS

### 3. ELECTRICAL FAST TRANSIENT BURST TEST (EN61000-4-4)

(1) Equipment used:

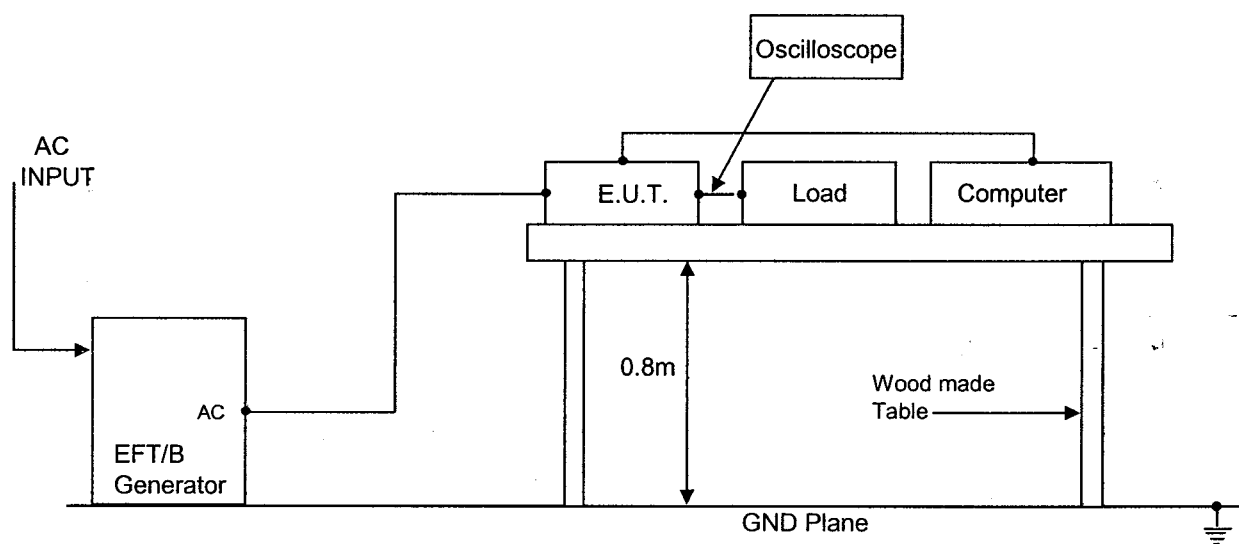
EFT/B Generator: SCHAFFNER NSG2025

(2) Test conditions:

Input voltage:	Rated	Output voltage:	Rated
Output current:	100%	Test time:	1minute
Polarity:	-,+	Ambient temperature:	25°C
Number of tests:	3 times		

(3) Test method and Device test point: N, L, FG

Apply to N, L, FG separately, as well as, all at the same time.



(4) Acceptable conditions:

1. Output voltage regulation not to exceed  $\pm 5\%$  of initial (before test) value during test.
2. Output voltage to be within regulation specification after the test.
3. Along with 1 and 2, no discharge of fire or smoke, as well as no output failure.

(5) Test Result:

Test Voltage (kV)	Repetition Rate (kHz)	GEN8-600	GEN150-34	GEN600-8.5
0.5	5	PASS	PASS	PASS
1	5	PASS	PASS	PASS

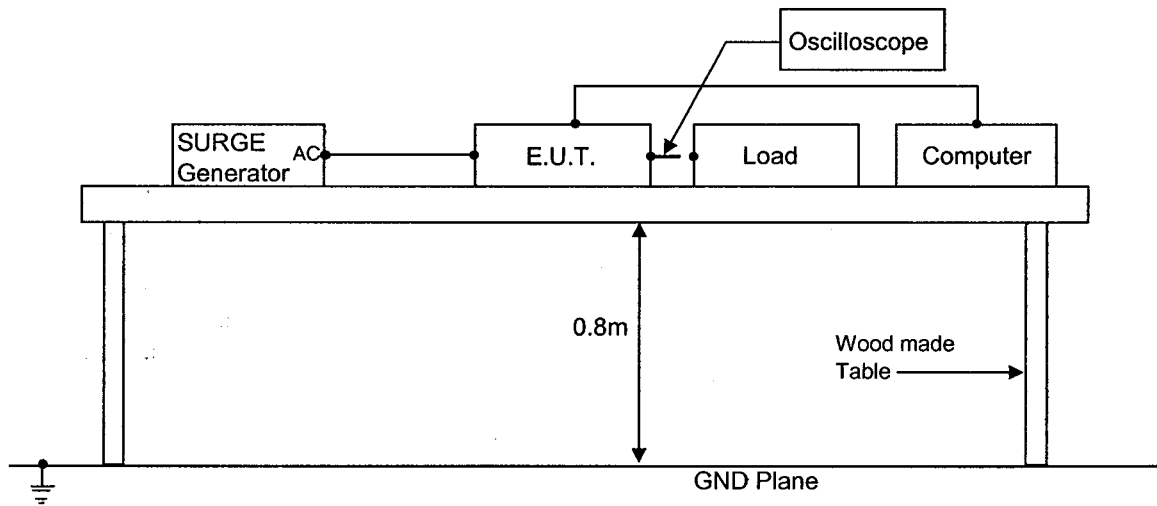
## 4. SURGE TEST (EN61000-4-5)

(1) Equipment used:

Surge Generator: SCHAFFNER- NSG651  
 Coupling impedance: Common - 12 OHm  
 Normal - 2 OHm  
 Coupling capacitance: Common - 9uF  
 Normal - 18uF  
 Coupling network: SCHAFFNER- CDN110

(2) Test method and device test point:

Input voltage: Rated  
 Output current: 100%  
 Polarity: -,+  
 Phase: 0,90 DEG.  
 Output voltage: Rated  
 Number of tests: 5 times  
 Mode: Common, Normal  
 Ambient temperature: 25°C



(3) Acceptable conditions:

1. Output voltage regulation not to exceed  $\pm 5\%$  of initial (before test) value during test.
2. Output voltage to be within regulation specification after the test.
3. Along with 1 and 2, no discharge of fire or smoke, as well as no output failre.

(4) Test Result:

Test Voltage (kV) Common	GEN8-600	GEN150-34	GEN600-8.5	Test Voltage (kV) Normal	GEN8-600	GEN150-34	GEN600-8.5
0.5	PASS	PASS	PASS	0.5	PASS	PASS	PASS
1.0	PASS	PASS	PASS	1.0	PASS	PASS	PASS
2.0	PASS	PASS	PASS				

## 5. CONDUCTED SUSCEPTIBILITY TEST (EN61000-4-6)

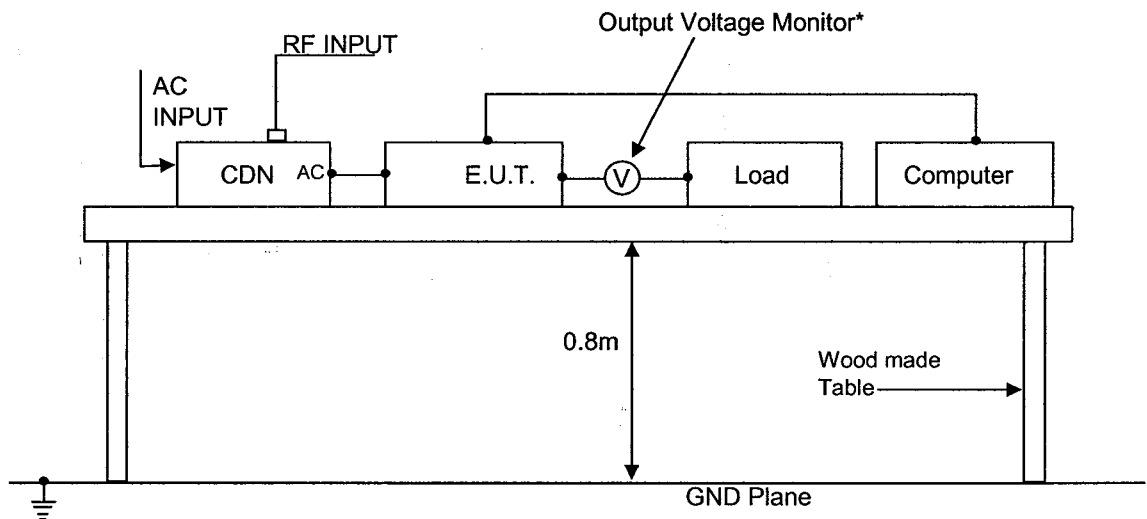
(1) Equipment used:

RF Signal Generator 9kHz-1.2GHz	Marconi Instruments 2023
RF Amplifier 10kHz-220MHz, 150W	Amplifier Research, 150L
Coupling/Decoupling Network	HL 230-M3
Coupling/Decoupling Network	HL 230-M2
Attenuator 6 dB, 150W, DC-1000MHz, with 230VAC/12VDC adapter	HL 6-150

(2) Test Condition:

Input voltage:	Rated	Output voltage:	Rated
Output current:	100%	Electromagnetic	
		Frequency:	150kHz~80MHz
Sweep Condition:	1.0% Step Up, 2.0 Seconds Hold		
Ambient temperature:	25°C		

(3) Test Method:



\*Used Oscilloscope or Analog Voltage Meter

(4) Acceptable conditions:

1. Output voltage regulation not to exceed  $\pm 5\%$  of initial (before test) value during test.
2. Output voltage to be within regulation specification after the test.
3. Along with 1 and 2, no discharge of fire or smoke, as well as no output failure.

(5) Test Result:

Voltage Level (V)	GEN8-600	GEN150-34	GEN600-8.5
1	PASS	PASS	PASS
2	PASS	PASS	PASS
3	PASS	PASS	PASS



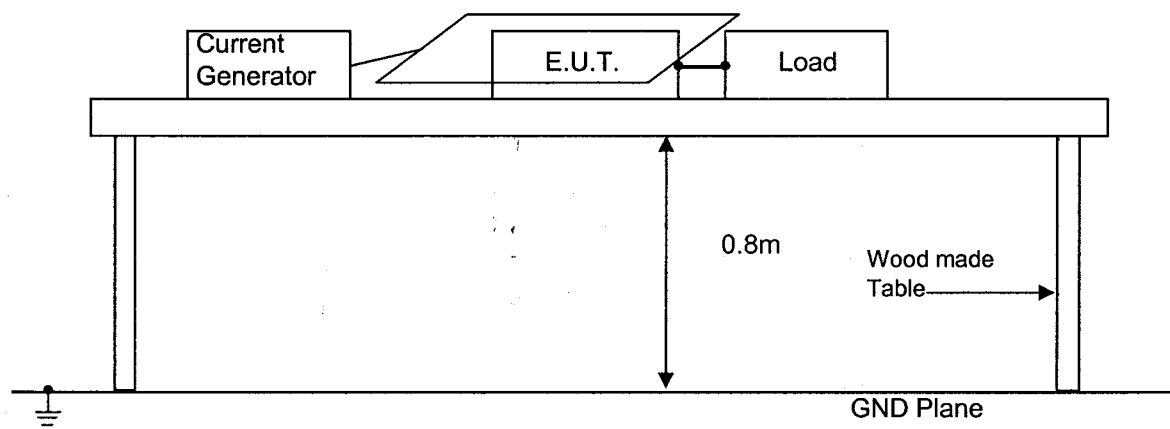
## 6. IMMUNITY TO MAGNETIC FIELD (EN61000-4-8)

(1) Equipment used:

Current Generator:	F-1000-4-8-125A	FCC
Magnetic Loop:	F-1000-4-8/9/10-L-1M	FCC

(2) Test Condition:

Input voltage: Rated  
 Output current: 100%  
 Output voltage: Rated  
 Ambient temperature: 25°C



(3) Acceptable conditions:

1. Output voltage regulation not to exceed  $\pm 5\%$  of initial (before test) value during test.
2. Output voltage to be within regulation specification after the test.
3. Along with 1 and 2, no discharge of fire or smoke, as well as no output failure.

(4) Test Result:

Position	Strenght of magnetic field (A/m)	Resoult
Vertical	1	PASS
Vertical at 90 <sup>0</sup>	1	PASS
Horizontal	1	PASS

## 7. VOLTAGE DIPS AND SHORT INTERRUPTION (EN61000-4-11)

(1) Equipment used:

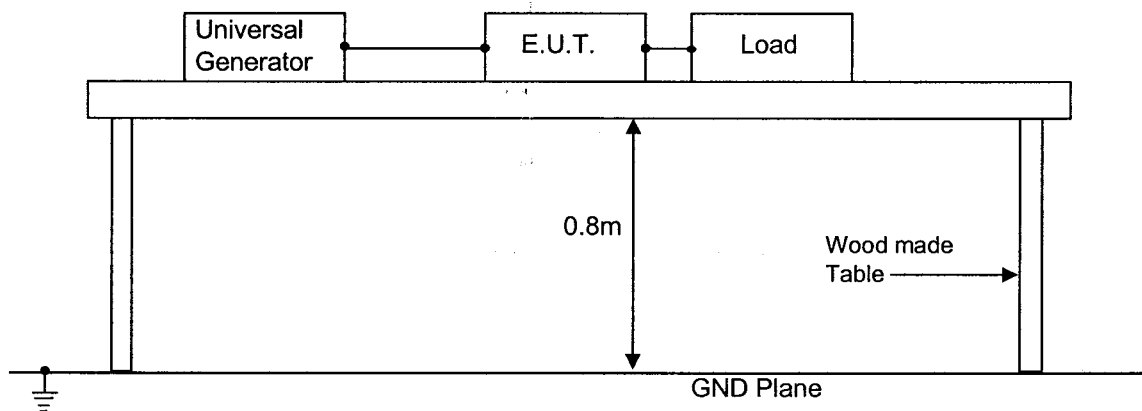
Surge Generator:	UCS500 -M4	EM TEST
AC Power Source:	UCS500 -M4	EM TEST

(2) Test Condition:

Input voltage: Rated  
 Output current: 100%  
 Output voltage: Rated  
 Ambient temperature: 25°C  
 Number of tests: 3 Times.

(3) Test method and device test point:

Voltage dip: 0.5 period, reduction of > 95% of  $U_t$   
 Voltage dip: 25 periods, reduction of 30% of  $U_t$ .  
 Voltage interruptions: 250 periods, reduction of > 95% of  $U_t$ .



(4) Acceptable conditions:

1. Output voltage to be within output voltage regulation specification after the test.
2. No discharge of fire or smoke.

(5) Test Result:

Test level	DIP rate	Continue time	GEN150-34	
5%	95%	10ms	PASS	(criteria A)
70%	30%	500ms	PASS	(criteria B)
5%	95%	5000ms	PASS	(criteria B)