

# **GENESYS™**

## **GH1.5kW**

### *EN61000*

### *DATA*

DWG: IA762-58-01		
APPD	CHK	DWG
<i>Cramer</i> <i>19/08/19</i>	<i>Urcin</i> <i>19/8/19</i>	<i>MICHAEL G.</i> <i>18.08.2019</i>

**TDK-LAMBDA**

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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	Digital multimeter	HP	34401A
4	Digital power meter	Yokogawa	WT130
5	Digital power meter	Yokogawa	WT230
6	Digital power meter	Yokogawa	WT330
7	Autotransformer	Metrel	HSN 260/30
8	Autotransformer	Metrel	HTN 450/20
9	Resistive load	NLI	10V
10	Resistive load	NLI	600V
11	AC source	Chroma	6590
12	ESD simulator system	NOISEKEN	ESS2000
13	EFT/B Generator	TESEQ	NSG3060
14	Surge Generator	TESEQ	NSG3060 CDN3063
15	RF Signal Generator 150kHz-230MHz	SCHLODER	CDG-6000
16	Coupling/Decoupling Network	COMPPOWER	ATTN-6-100W
17	Coupling/Decoupling Network	SCHLODER	CDN-RJ45-S
18	Coupling/Decoupling Network	SCHLODER	CDN-M4-32A
19	Current Injection Probe	FISCHER	F-120-9A
20	Anechoic test chamber	Hermon Labs	AC-2
21	Antenna, biconical, 20-300MHz, 1kW	A.H.Systems inc.	SAS-200/543
22	Antenna, 1-18GHz, 300W	EMC Test Systems	3115
23	RF signal generator, 10kHz-1.05GHz	Fluke	6061A
24	Monitor, field, 10kHz-1GHz, 1-300V/m	Amplifier Research	FM1000
25	Coupling-decoupling network according	Hermon Labs	50141S1
26	RF amplifier, 500MHz -1000MHz, 120W	Hermon Labs	A-120
27	RF amplifier, 1 to 4 GHz, 55W	Milmega	AS 0104-55/55
28	RF power meter	Boonton	4200

# 1. Electrostatic discharge (ESD) (IEC 61000-4-2)

**(1) Equipment used:**

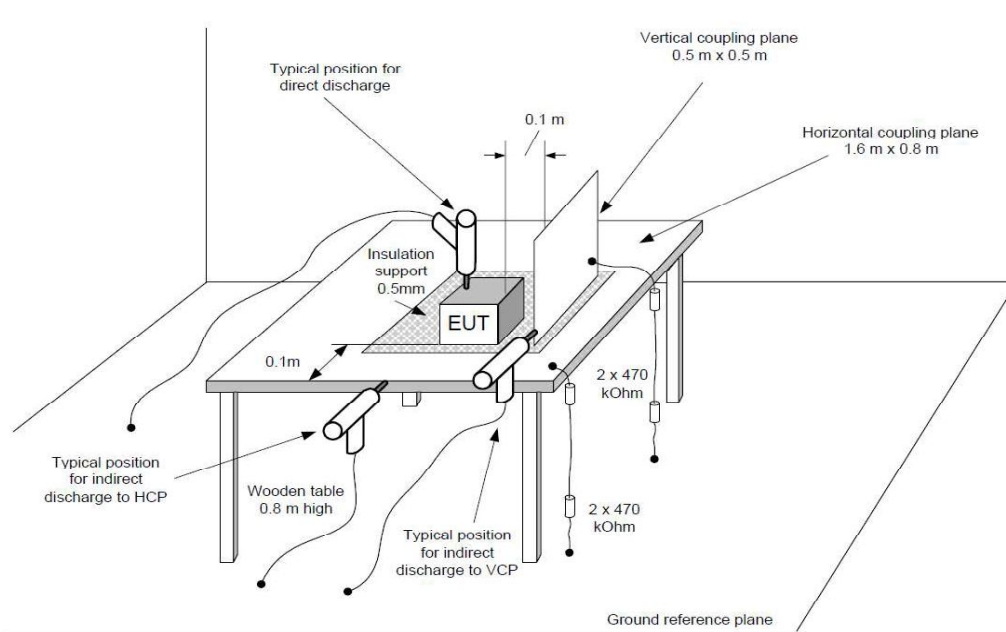
ESD simulator system: NOISEKEN ESS2000  
 Discharge resistance: 330Ω Capacitor: 150pF

**(2) Test conditions:**

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

**(3) Test setup:**

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



**(4) 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.

**(5) Test result:**

Contact discharge		Air discharge	
Discharge (kV)	GH40-38	Discharge (kV)	GH40-38
2	PASS	2	PASS
4	PASS	4	PASS
		8	PASS

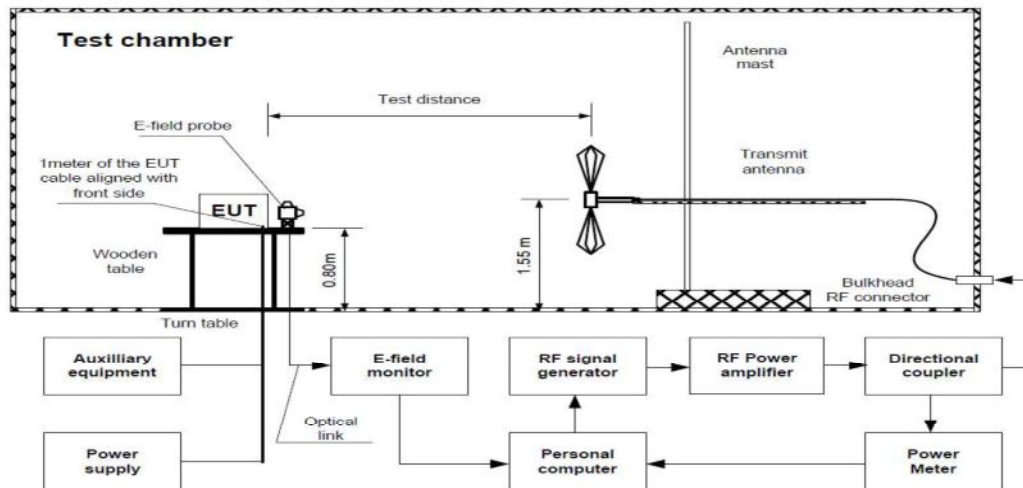
## 2. Radiated immunity to radio frequency electromagnetic field (IEC 61000-4-3)

### (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, 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 and test setup:

Input voltage:	Rated	Output voltage:	Rated
Output current:	100%	Amplitude Modulated:	80%, 1kHz
Electromagnetic Frequency:	80~2700MHz	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:

Frequency (GHz)	Radiated Field Strength (Vrms/m)	GH100-15
0.08-1	10	PASS
1.4-2	3	PASS
2-2.7	1	PASS

### 3. Electrical fast transient/ burst (EFT/ B) (IEC 61000-4-4)

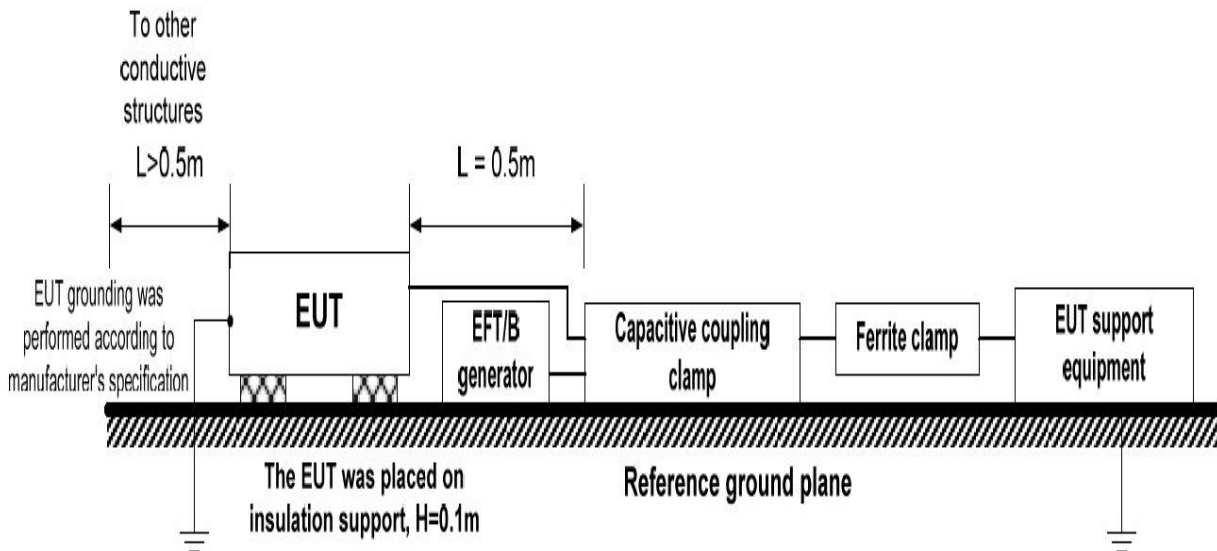
**(1) Equipment used:**

EFT/B Generator: TESEQ NSG3060

**(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 setup**



**(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)	GH100-15
2	5	PASS
2	100	PASS

## 4. Conducted immunity to voltage surges (IEC 61000-4-5)

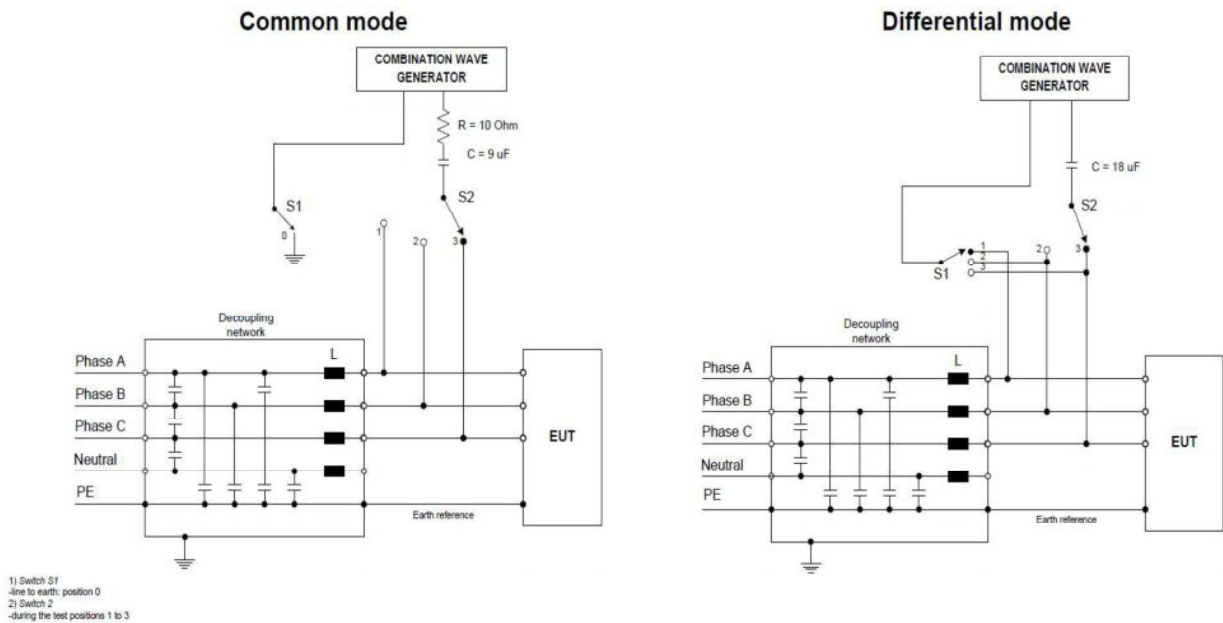
### (1) Equipment used:

Surge Generator: TESEQ - NSG3060 CDN3063  
 Coupling impedance: Common - 12 OHm  
 Normal - 2 OHm  
 Coupling capacitance: Common - 9uF  
 Normal - 18uF  
 Coupling network: SCHLODER - CDN-M4-32A

### (2) Test conditions and test setup:

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 failure.

### (4) Test Result:

Test Voltage (kV)	GH100-15
Common	
2.0	PASS

Test Voltage (kV)	GH100-15
Normal	
1.0	PASS

## 5. Conducted immunity to disturbances by radio frequency field (IEC 61000-4-6)

### (1) Equipment used:

RF Signal Generator 150kHz-230MHz  
Coupling/Decoupling Network  
Coupling/Decoupling Network

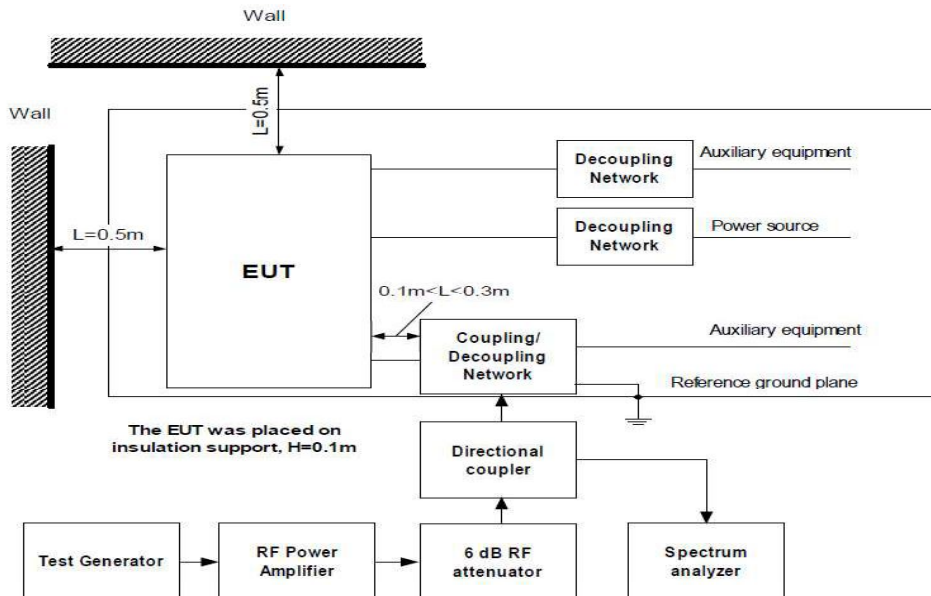
SCHLODER CDG-6000  
SCHLODER CDN-RJ45-S  
SCHLODER CDN-M4-32A

### (2) Test condition:

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

Freq. range: 0.15 ~ 80MHz  
Type of modulation: AM 80% @ 1kHz  
DWELL Time: 2.8s  
Freq. step: 1% of current freq.

### (3) Test setup:



### (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 (Vrms)	GH40-38
10	PASS



## 6. Radiated immunity to power frequency magnetic field (IEC 61000-4-8)

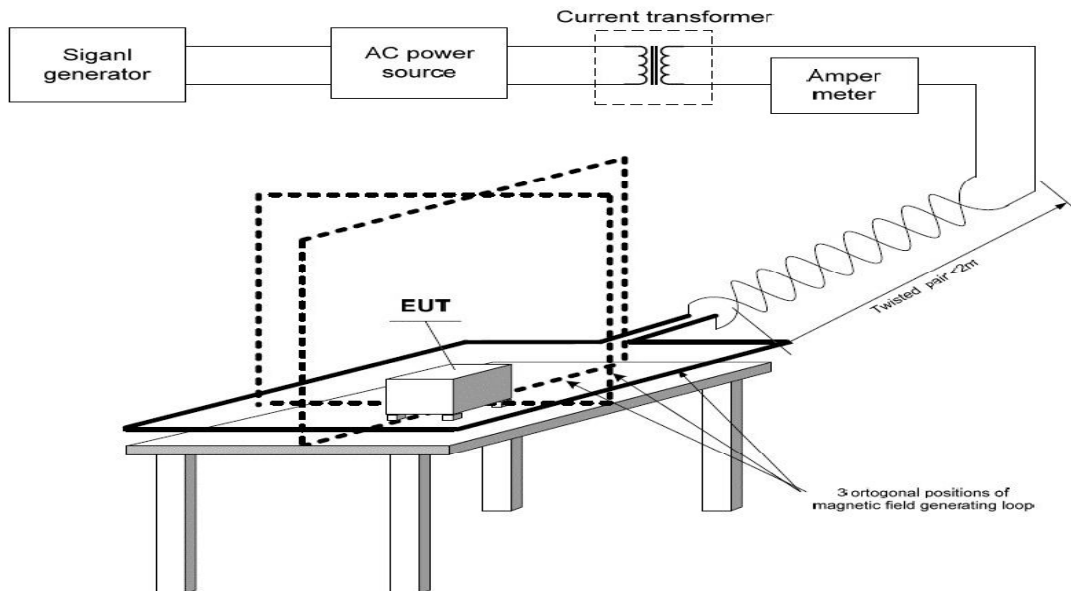
### (1) Equipment used:

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	Duration: 10 min
Output current:	100%	Freq.: 50Hz & 60 Hz
Output voltage:	Rated	
Ambient temperature:	25°C	

### (3) Test setup:



### (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:

Position	Strength of magnetic field (A/m)	GH100-15
Vertical	30	PASS
Vertical at 90°	30	PASS
Horizontal	30	PASS

## 7. Voltage dips and short interruptions (IEC 61000-4-11)

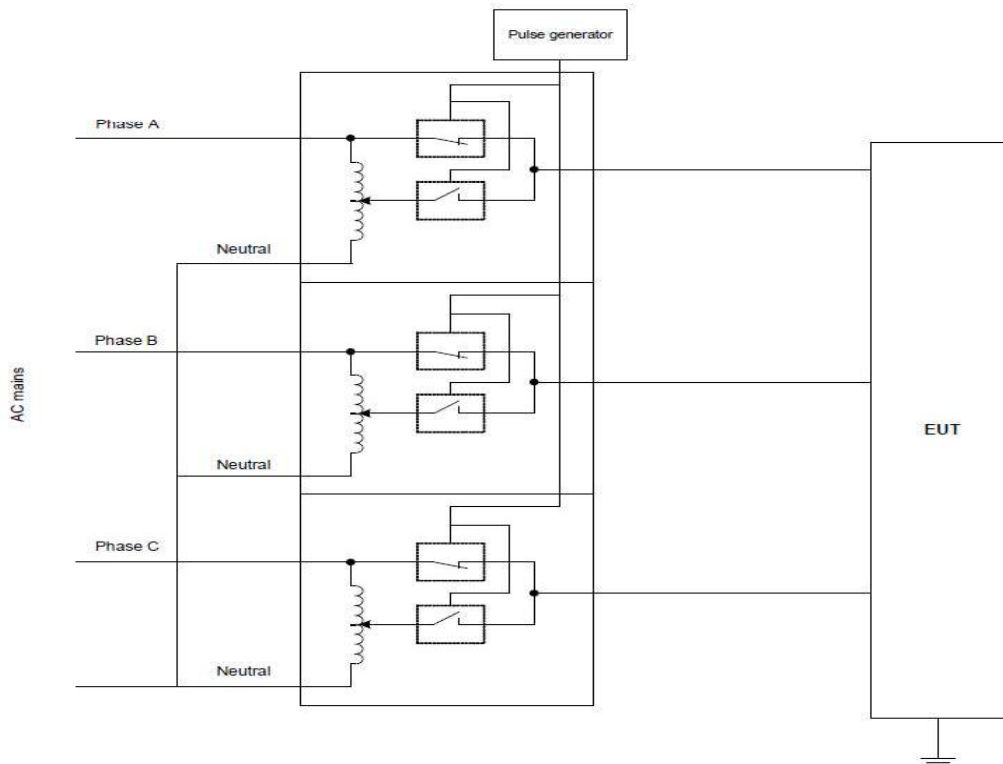
**(1) Equipment used:**

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

**(2) Test Condition:**

Input voltage:	Rated	Number of dips:	3
Output current:	100%	Repetition rate:	0.1 Hz
Output voltage:	Rated		
Ambient temperature:	25°C		

**(3) Test setup:**



**(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:**

For Phase A, B, C				
Test level	DIP rate	Duration	GH100-15	
0%	100%	10ms	PASS	(criteria B)
0%	100%	20ms	PASS	(criteria B)
70%	30%	10ms	PASS	(criteria B)
70%	30%	500ms	PASS	(criteria C)
40%	60%	100ms	PASS	(criteria C)
40%	60%	200ms	PASS	(criteria C)
80%	20%	5000ms	PASS	(criteria C)
0%	100%	5000ms	PASS	(criteria C)