

# **G+GENESYS™ 2.7/3.4kW**

## **EN61000**

## **DATA**

APPD	CHK	DWG
Uranii 22/08/19	ASAF. A 22/08/19	PAVEL G. 22/08/19

**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	ESD generator	Schloder	SESD 30000
2	Resistors for ESD test 470kΩ x 2	Hermon Labs	R470 x 2
3	Coupling Plane Vertical	Hermon Labs	CPV-2
4	Antenna, Log Periodic	Electro-Metric	LPA 25/30
5	Antenna, Biconical	A.H. Systems Inc.	SAS-200/543
6	Generator Swept Signal	HP	83640B
7	Attenuator	Midwest Microwave	0793-20-NN-07
8	Coupler coaxial bi-directional	Narda	3022
9	HygroThermometer	Delta TRAK	13301
10	Horn Antenna	GTE Sylvania	AN-10E
11	Directional Coupler High Power	WERLATONE	C 3910
12	Cable 40GHz, K/K-type	UtiFLEX	MICROCOAX
13	RF cable, 18 GHz, N-N	Huber-Suhner	SF118A/11N
14	Laser Probe Interface	Amplifier Research	FI7000
15	Load Termination	Amphenol	R404051
16	Broadband Amplifier, 80MHz to 1.0GHz, 500W	Rohde&Schwarz	BBA150-BC500
17	Broadband Amplifier, 0.69GHz to 3.2GHz, 200W	Rohde&Schwarz	BBA150-D200
18	Power Meter	Boonton Electronics	4220
19	Coupling Clamp, 100pF	Schaffner Electronic AG	CDN 125
20	EFT Decoupling Network	Hermon Labs	DN-3
21	Surge Impulse Module	Haefely Hipotronics	TW 8
22	EMC Compact Tester	Haefely Hipotronics	AXOS 8
23	Surge Generator	Hermon Labs	CDN-3PH
24	Generator Signal	Marconi Instruments	2023
25	Coupler Directional	WERLATONE	C3653
26	Attenuator 6dB	Hermon Labs	6-150
27	Bulk Current Injection Probe	Fisher Custom Comm.	F-120-9A
28	Multimeter	Fluke	115C
29	Cable, N/N-type, 0.3m	Belden	RG-213/U
30	Cable RF, 3.5m, N type-N type, DC-6.5GHz	Alpha Wire	RG 214/U
31	Coupling-decoupling network, STD 61000-4-6	Hermon Labs	S-T
32	Coupling-decoupling network	Hermon Labs	230-M3
33	Power amplifier	COM-POWER CORP.	ACS-250-100W
34	Generator Audio	HP	200CDR
35	Power Source AC	Elgar	751A
36	SmartWave Switching Amplifier	Elgar	SW5250AE-4
37	Compliance Test System	California Instruments	PACS-3
38	Induction coil according to EN 61000-4-8	Hermon Labs	IC-2
39	Dips Voltage tapped Transformer	EM Test	V4070
40	Commutation Panel for dips generator	Hermon Labs	CPD-1
41	Compact Simulator	EM Test	UCS 500-M4

# 1. Electrostatic discharge (ESD) (IEC 61000-4-2; EN 61204-3/ IEC 61204-3)

## (1) Equipment used:

ESD generator  
Resistors for ESD tests 470kΩ x 4

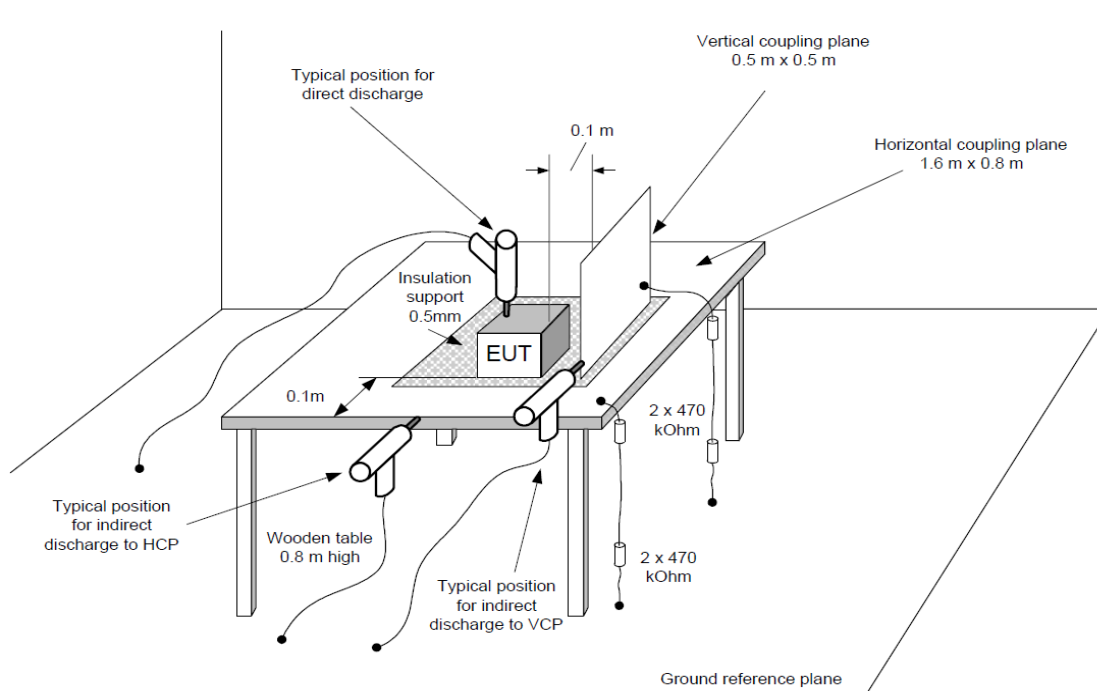
Coupling Plane Vertical

## (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:

Performance Criteria: B

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:

Contact discharge		Air discharge	
Discharge (kV)	G80-42	Discharge (kV)	G80-42
2	PASS	2	PASS
4	PASS	4	PASS
		8	PASS

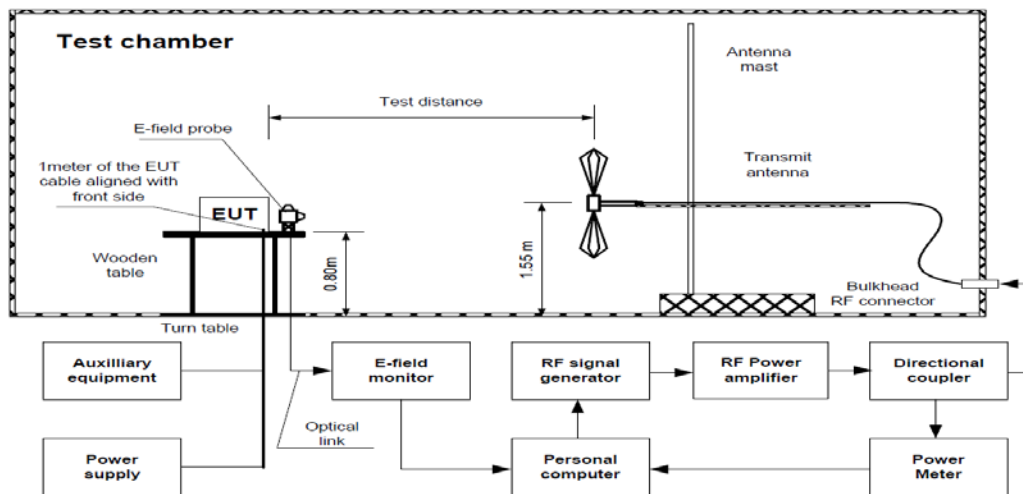
## 2. Radiated immunity to radio frequency electromagnetic field (IEC 61000-4-3; EN 61204-3/ IEC 61204-3)

### (1) Equipment used:

Antenna, Log Periodic	RF cable, 18 GHz, N-N x 2
Antenna, Biconical	Laser Probe Interface
Generator Swept Signal	Load Termination
Attenuator	Broadband Amplifier, 80MHz to 1.0GHz, 500W
Coupler coaxial bi-directional	Broadband Amplifier, 0.69GHz to 3.2GHz, 200W
HygroThermometer	Power Meter
Horn Antenna	Cable 40GHz, K/K-type
Directional Coupler High Power	

### (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, 3.0 Second Hold		



### (3) Acceptable conditions:

Performance Criteria: A

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:

Frequency (GHz)	Radiated Field Strength (Vrms/m)	G80-42
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; EN 61204-3/ IEC 61204-3)

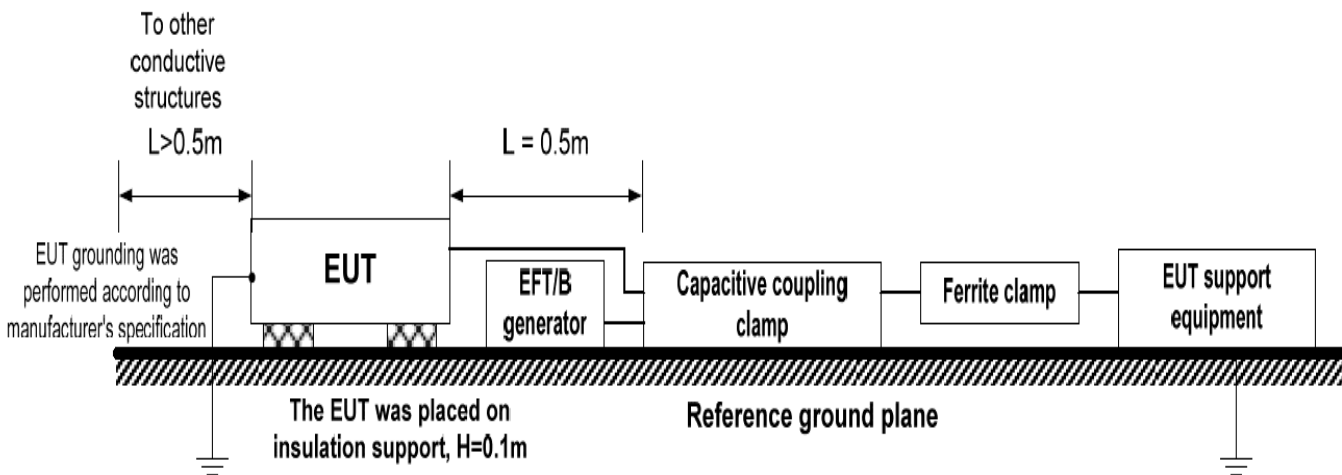
#### (1) Equipment used:

Coupling Clamp, 100pF	HygroThermometer
EFT Decoupling Network	EMC Compact Tester
Surge Impulse Module	

#### (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:

Performance Criteria: B

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)	G10-340	G80-42	G600-5.6
2	5	PASS	PASS	PASS
2	100	PASS	PASS	PASS

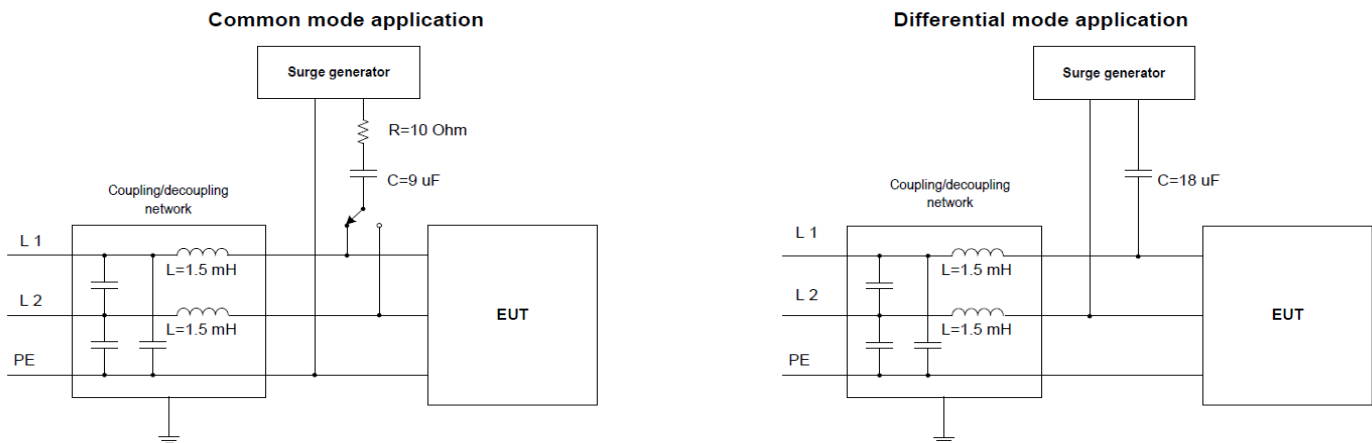
## 4. Conducted immunity to voltage surges (IEC 61000-4-5; EN 61204-3/ IEC 61204-3)

### (1) Equipment used:

Surge Generator	Coupling impedance: Common - 10 Ohm
EMC Compact Tester	
HygroThermometer	
Coupling impedance:	Common - 10Ω
Coupling capacitance:	Common - 9uF
	Differential - 18uF

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

Input voltage:	Rated	Output voltage:	Rated
Output current:	100%	Number of tests:	5 times
Polarity:	-,+	Mode:	Common, Differential
Phase:	0°, 90°, 180°, 270°	Ambient temperature:	25°C



### (3) Acceptable conditions:

Performance Criteria: B

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) Common	G80-42	Test Voltage (kV) Differential	G80-42
2.0	PASS	1.0	PASS

## 5. Conducted immunity to disturbances by radio frequency field (IEC 61000-4-6; EN 61204-3/ IEC 61204-3)

### (1) Equipment used:

Generator Signal  
 Coupler Directional  
 Attenuator 6dB  
 Bulk Current Injection Probe  
 Multimeter  
 Coupling-decoupling network, STD 61000-4-6

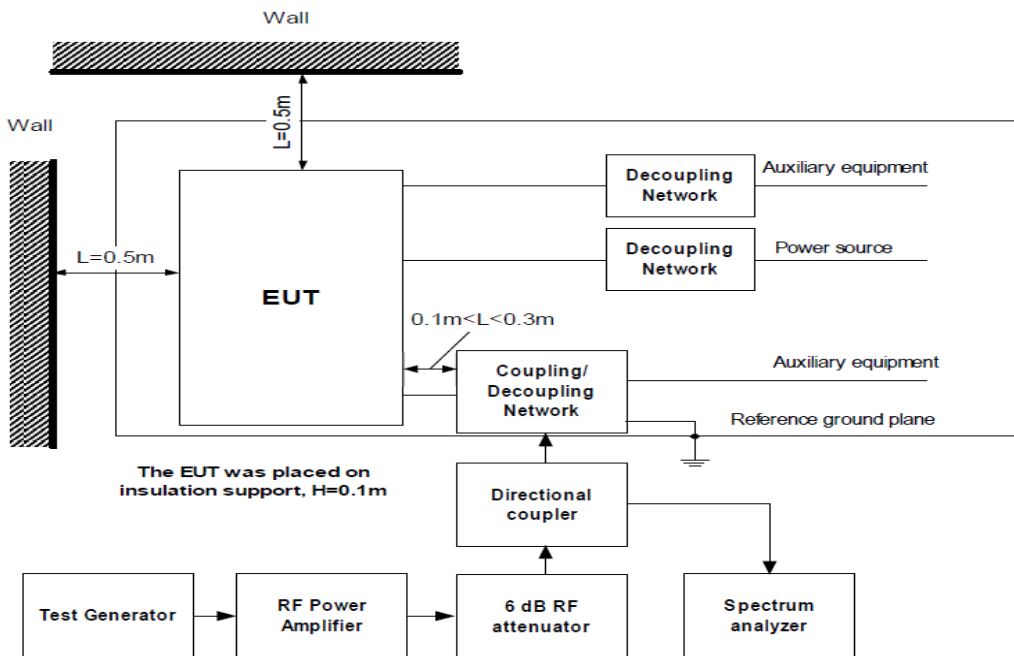
Cable, N/N-type, 0.3m  
 Cable RF, 3.5m, N type-N type  
 Coupling-decoupling network  
 Power amplifier  
 Load Termination

### (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:

Performance Criteria: A

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)	G10-340	G80-42	G600-5.6
10	PASS	PASS	PASS



## 6. Radiated immunity to power frequency magnetic field (IEC 61000-4-8; IEC 61204-3)

### (1) Equipment used:

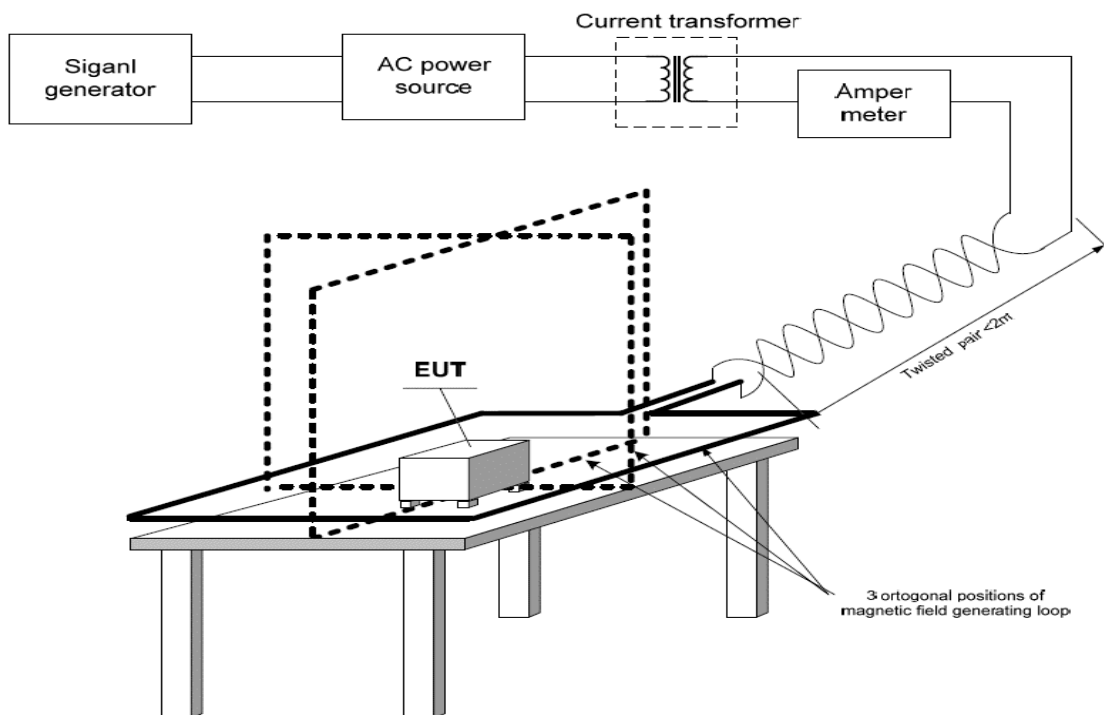
Generator Audio  
 Power Source AC  
 SmartWave Switching Amplifier

Compliance Test System  
 Multimeter  
 Induction coil according to EN 61000-4-8

### (2) Test Condition:

Input voltage:	Rated	Duration: 10 min
Output current:	100%	Frequency: 50Hz & 60 Hz
Output voltage:	Rated	Magnetic field strength: 30 A/m
Ambient temperature:	25°C	

### (3) Test setup:



### (4) Acceptable conditions:

Performance Criteria: A

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	Strenght of magnetic field (A/m)	G80-42
Vertical	30	PASS
Vertical at $90^0$	30	PASS
Horizontal	30	PASS

# 7. Voltage dips and short interruptions (IEC 61000-4-11; EN 61204-3/ IEC 61204-3)

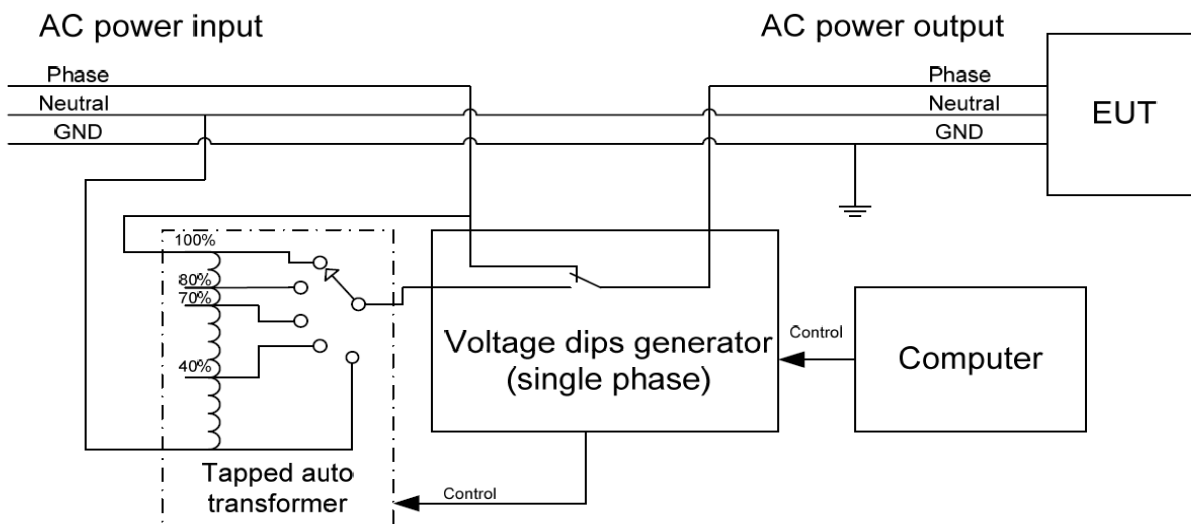
## (1) Equipment used:

HygroThermometer	Commutation Panel for dips generator
Multimeter	Compact Simulator
Dips Voltagetapped Transformer	

## (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:

Performance Criteria: B, C

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 [ms]	G80-42	
<5	>95	10	PASS	(criteria B)
<5	>95	20	PASS	(criteria B)
70	30	10	PASS	(criteria B)
70	30	500	PASS	(criteria C)
40	60	100	PASS	(criteria C)
40	60	200	PASS	(criteria C)
80	20	5000	PASS	(criteria C)
<5	>95	5000	PASS	(criteria C)