

**CUS150M1**

**IMMUNITY DATA**

**IEC60601-1-2 Series**

## I N D E X

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## Terminology Used

FG	.....	Frame GND
$\frac{\perp}{\perp}$	.....	Earth ( $\frac{\perp}{\perp}$ ) terminal
L	.....	Live line
N	.....	Neutral line
$\frac{\perp}{\perp}$	.....	Earth
+V	.....	+ Output
-V	.....	- Output

※ Test results are reference data based on our standard measurement condition.

## 1. Summary of Immunity Test Result

## MODEL: CUS150M1

Item	Standard	Test level	Criteria	Result	Page	Notes & Conditions
Electrostatic Discharge Immunity Test	IEC60601-1-2 Ed.4	1,2,3,4	A	PASS	R-2	ENCLOSURE PORT
Radiated Radio-Frequency Electromagnetic Field Immunity Test	IEC60601-1-2 Ed.4	1,2,3	A	PASS	R-3	ENCLOSURE PORT
Electrical Fast Transient / Burst Immunity Test	IEC60601-1-2 Ed.4	1,2,3	A	PASS	R-4	Input a.c. power PORT
Surge Immunity Test	IEC60601-1-2 Ed.4	1,2,3,(4)	A	PASS	R-5	Level4 : Common mode only
Conducted Disturbances Induced by Radio-Frequency Field Immunity Test	IEC60601-1-2 Ed.4	1,2,3	A	PASS	R-6	Input a.c. power PORT
Power Frequency Magnetic Field Immunity Test	IEC60601-1-2 Ed.4	1,2,3,4	A	PASS	R-7	ENCLOSURE PORT
Voltage Dips Immunity Test	IEC60601-1-2 Ed.4	Class 2	A (200VAC~240VAC and $I_o \leq 110W$ )	PASS	R-8	Input a.c. power PORT
			B (100VAC~ 120VAC or $I_o > 110W$ )	PASS		
Voltage Interruptions Immunity Test	IEC60601-1-2 Ed.4	Class 2	B	PASS	R-8	Input a.c. power PORT
				PASS		

Detail of test condition refer to each test page.

## Criteria A

1. The regulation of output voltage must not exceed 5% of initial value during test.
2. The output voltage must be within the regulation of specification after the test.
3. Smoke and fire are not allowed.

## Criteria B

1. Must not have temporary function degradation that requires input restart.
2. The output voltage must be within the regulation of specification after the test.
3. Smoke and fire are not allowed.

**2. Electrostatic Discharge Immunity Test (IEC60601-1-2 Ed.4)**

**MODEL: CUS150M1**

**(1) Equipment Used**

Electro Static Discharge Simulator : NSG435 (SCHAFFNER)

Discharge Resistance : 330Ω Capacity : 150pF

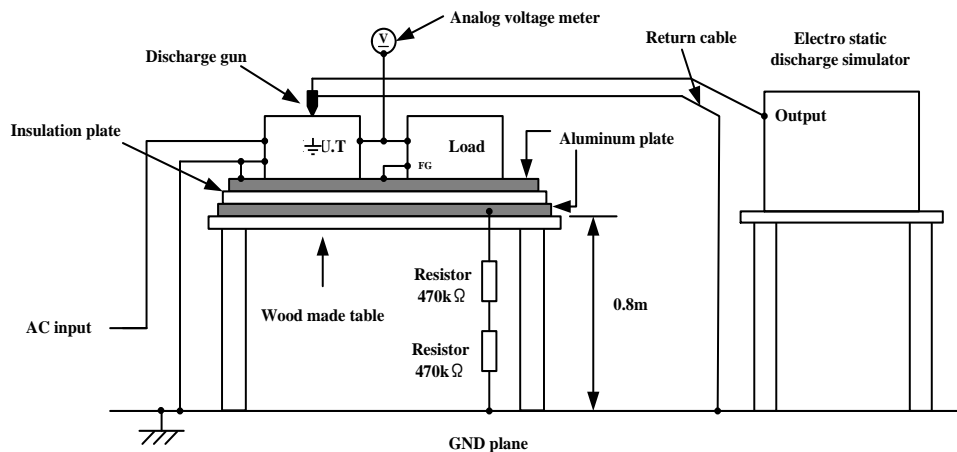
**(2) Test Conditions**

- Input Voltage : 115, 230VAC • Output Voltage : Rated
- Output Current : 0%, Full load • Polarity : +, -
- Number of Tests : 10 times • Discharge Interval : > 1 second
- Ambient Temperature : 25°C

**(3) Test Method and Device Test Point**

Contact Discharge : ⚡, Mounting screw.

Air Discharge : Input and Output terminal (L,N,+V,-V), ⚡, Mounting screw



**(4) Acceptable Conditions**

1. The regulation of output voltage must not exceed 5% of initial value during test.
2. The output voltage must be within the regulation of specification after the test.
3. Smoke and fire are not allowed.

**(5) Test Result**

Contact Discharge (kV)	CUS150M1-18
2	PASS
4	PASS
6	PASS
8	PASS

Air Discharge(kV)	CUS150M1-18
2	PASS
4	PASS
8	PASS
15	PASS

**3. Radiated Radio-Frequency Electromagnetic Field Immunity Test (IEC60601-1-2 Ed.4)**

**MODEL: CUS150M1**

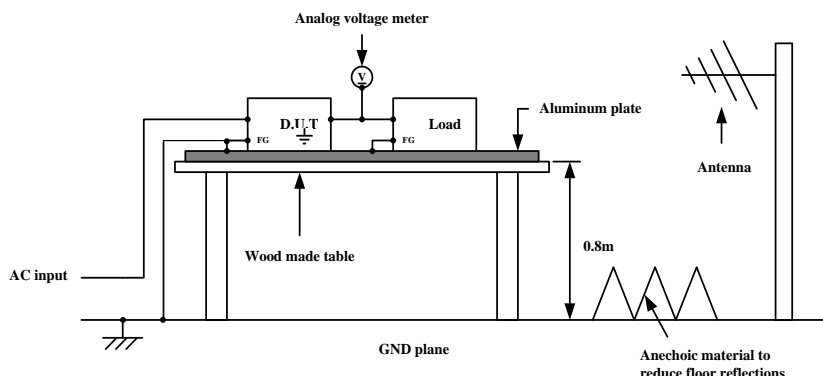
**(1) Equipment Used**

Signal Generator : N5181A (Agilent)  
 Power Amplifier System : CBA 1G-250 (Teseq)  
 : AS0104-55/55 (Milmega)  
 Antenna : 3106B (ETS Lindgren)  
 : ATH800M 5GA (ar)  
 : ATH4G8 (ar)

**(2) Test Conditions**

- Input Voltage : 115, 230VAC
- Output Voltage : Rated
- Output Current : 0%, Full load
- Distance (AM) : 3.0m
- Wave Angle : Horizontal and Vertical
- Distance (FM,PM) : 0.3m
- Test Angle : Top/Bottom, Both Sides, Front/Back
- Ambient Temperature : 25°C
- Amplitude Modulated(AM) : 80%, 1kHz, 1.0% step up, 0.5 seconds hold.
- Pulse Modulated(PM) : 18Hz, 217Hz, 0.5 seconds hold
- Frequency Modulated(FM) : 5kHz deviation, 1kHz sine, 0.5 seconds hold.

**(3) Test Method**



**(4) Acceptable Conditions**

1. The regulation of output voltage must not exceed 5% of initial value during test.
2. The output voltage must be within the regulation of specification after the test.
3. Smoke and fire are not allowed.

**(5) Test Result**

Modulation	Radiation Field Strength (V/m)	Electromagnetic Frequency	CUS150M1-24
AM	10	80 ~ 2700MHz	PASS
PM (18Hz)	27	385MHz	PASS
	28	810,870,930MHz	PASS
PM (217Hz)	9	710,745,780,5240,5500,5785MHz	PASS
	28	1720,1845,1970,2450MHz	PASS
FM	28	450MHz	PASS

**4. Electrical Fast Transient / Burst Immunity Test (IEC60601-1-2 Ed.4)**

**MODEL: CUS150M1**

**(1) Equipment Used**

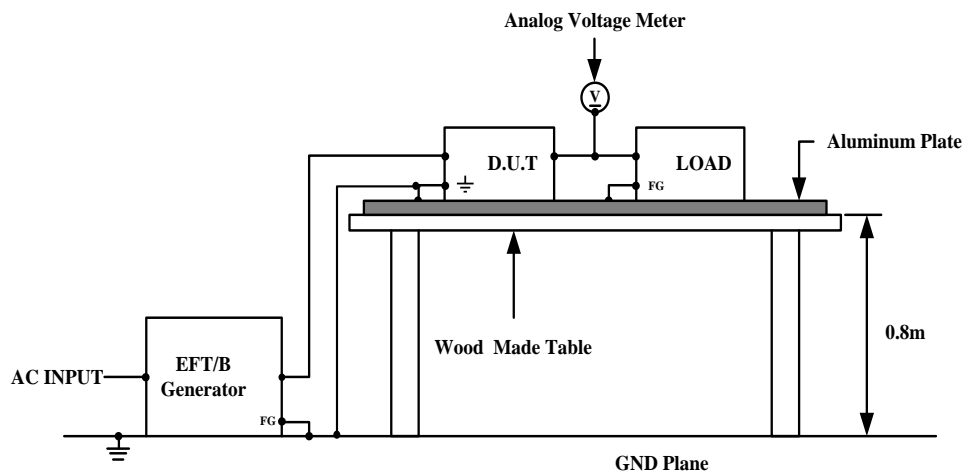
EFT/B Generator : FNS-100L (NOISEKEN)

**(2) Test Conditions**

- Input Voltage : 115, 230VAC
- Output Voltage : Rated
- Output Current : 0%, Full load
- Test Time : 1 minute
- Polarity : +, -
- Ambient Temperature : 25°C
- Number of Tests : 1 time
- Pulse Frequency : 100kHz
- Burst Time : 0.75msec
- Number of Pulse : 75pcs
- Burst Cycle : 300msec

**(3) Test Method and Device Test Point**

Apply to (N, L,  $\frac{\perp}{\perp}$ ).



**(4) Acceptable Conditions**

1. The regulation of output voltage must not exceed 5% of initial value during test.
2. The output voltage must be within the regulation of specification after the test.
3. Smoke and fire are not allowed.

**(5) Test Result**

Test Voltage (kV)	CUS150M1-18
0.5	PASS
1	PASS
2	PASS



**6. Conducted Disturbances Induced by Radio-Frequency Field Immunity Test (IEC60601-1-2 Ed.4)**

**MODEL : CUS150M1**

**(1) Equipment Used**

RF POWER AMPLIFIER : (AR U.S.A)

SIGNAL GENERATOR : IFR 2023A (IFR U.K)

**(2) Test Conditions**

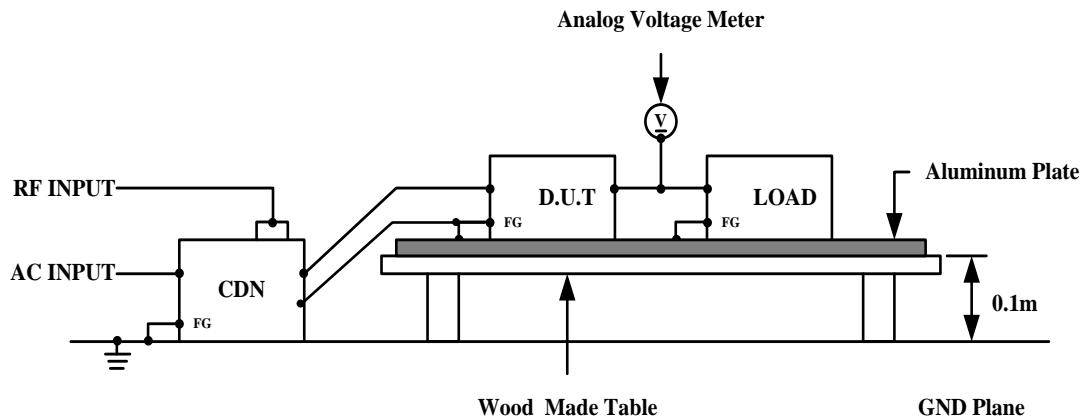
• Input Voltage : 115, 230VAC • Output Voltage : Rated

• Output Current : 100% • Electromagnetic Frequency : 150kHz~80MHz

• Ambient Temperature : 25°C

• Sweep Condition : 1.0% Step Up, 2.8 Seconds Hold

**(3) Test Method**



**(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, without the occurrence of smoke and fire, as well as no output failure.

**(5) Test Result**

Voltage Level (V)	CUS150M1-12/18/24/36/48
1	PASS
3	PASS
10	PASS



**7. Power Frequency Magnetic Field Immunity Test (IEC60601-1-2 Ed.4)**

**MODEL : CUS150M1**

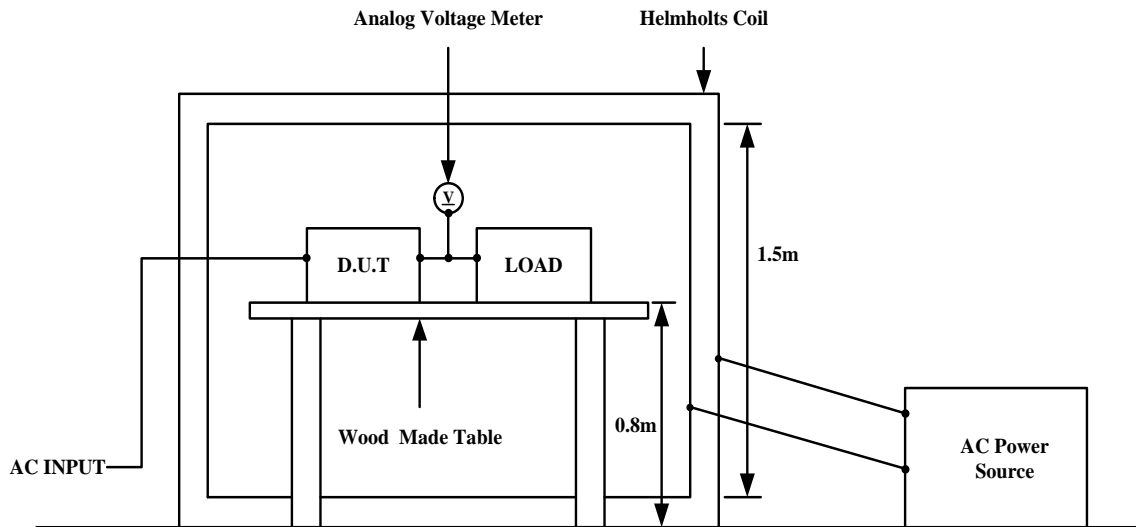
**(1) Equipment Used**

AC Power Source : 1501L (California Instrument)  
 Helmholtz Coil : HHS5215 (Spulen)

**(2) Test Conditions**

•Input Voltage : 115, 230VAC •Output Voltage : Rated  
 •Output Current : 100% •Magnetic Frequency : 50Hz  
 •Ambient Temperature : 25°C •Direction : X, Y, Z  
 •Test Time : More than 10 seconds(Each direction)

**(3) Test Method and Device Test Point**



**(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, without the occurrence of smoke and fire, as well as no output failure.

**(5) Test Result**

Magnetic Field Strength (A/m)	CUS150M1-12/18/24/36/48
1	PASS
3	PASS
10	PASS
30	PASS

**8. Voltage Dips, Short Interruptions Immunity Test (IEC60601-1-2 Ed.4)**

**MODEL: CUS150M1**

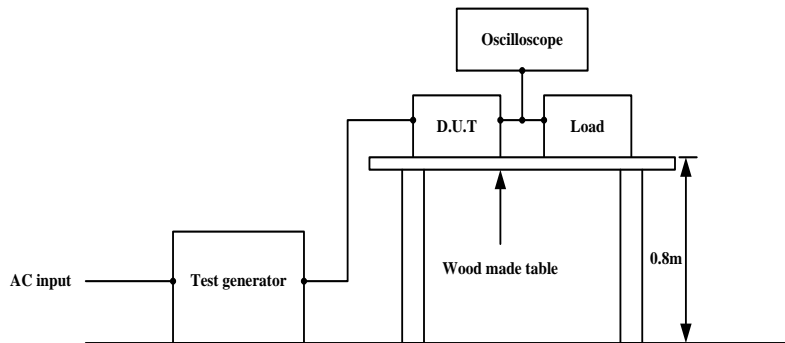
**(1) Equipment Used**

Test Generator : PCR2000LA (KIKUSUI)

**(2) Test Conditions**

- Input Voltage : 100, 240VAC
- Output Voltage : Rated
- Output Current : 100%
- Ambient Temperature : 25°C
- Number of Tests : 3 times
- Test Interval : More than 10 seconds

**(3) Test Method**



**(4) Acceptable Conditions**

Criteria A

1. The regulation of output voltage must not exceed 5% of initial value during test.
2. The output voltage must be within the regulation of specification after the test.
3. Smoke and fire are not allowed.

Criteria B

1. Must not have temporary function degradation that requires input restart.
2. The output voltage must be within the regulation of specification after the test.
3. Smoke and fire are not allowed.

**(5) Test Result**

Test Level	Dip Rate	Continue Time	Phase Angles	Criteria	CUS150M1-18
70%	30%	500ms	0 deg	B	PASS (Input Voltage at 100V)
				A	PASS (Input Voltage at 240V)
0%	100%	10ms	0,45,90,135,180, 225,270,315 deg	A	PASS
0%	100%	20ms	0 deg	B	PASS
				A	PASS (Output power Less than 110W)
0%	100%	5000ms	0 deg	B	PASS