

# CUS400M

# IMMUNITY DATA

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### Terminology used

FG	...	Frame GND
L	...	Live Line
N	...	Neutral line
$\perp$	...	Earth
+V	...	+ Output
-V	...	- Output

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

## 1. Summary of Immunity Test Result

**MODELS : CUS400M-12/BX5 ; CUS400M-12/FX5**

**CUS400M-24/BX5 ; CUS400M-24/FX5**

**CUS400M-24/BX6 ; CUS400M-24/FX6**

Item	Standard	Test level	Criteria	Result	Page	Notes & Conditions
Electrostatic Discharge Immunity Test	IEC61000-4-2	4	A	PASS	4	
Radiated Radio-Frequency Electromagnetic Field Immunity Test	IEC61000-4-3	3	A	PASS	5	
	IEC60601-1-2	Proximity Field to Table 9	A	PASS	5	
Electrical Fast Transient / Burst Immunity Test	IEC61000-4-4	4	A	PASS	6	
Surge Immunity	IEC61000-4-5	3	A	PASS	7	
Conducted Disturbances Induced by Radio-Frequency Field Immunity Test	IEC61000-4-6	3	A	PASS	8	
Power Frequency Magnetic Field Immunity Test	IEC61000-4-8	4	A	PASS	9	
Voltage Dips, Short Interruptions Immunity Test	IEC61000-4-11	70%, 25 cycles	A	PASS	10	70% Criteria A at 270W Criteria B above 270W  40% Criteria A at 100W Criteria B above 100W
		40%, 10 cycles	A			
		0%, 1 cycle	A			
		0%, 250 cycles	B			
		0%, 0.5 cycles	A			
		80%, 250 cycles	A			

### Criteria A

1. The regulation of output voltage must not exceed 5% of initial value during test with a blanking time of 3 ms.
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 test.
3. Smoke and fire are not allowed.

## 2. Electrostatic Discharge Immunity Test (IEC61000-4-2)

**MODEL: CUS400M-12/FX5; CUS400M-24/FX6**

### (1) Equipment Used

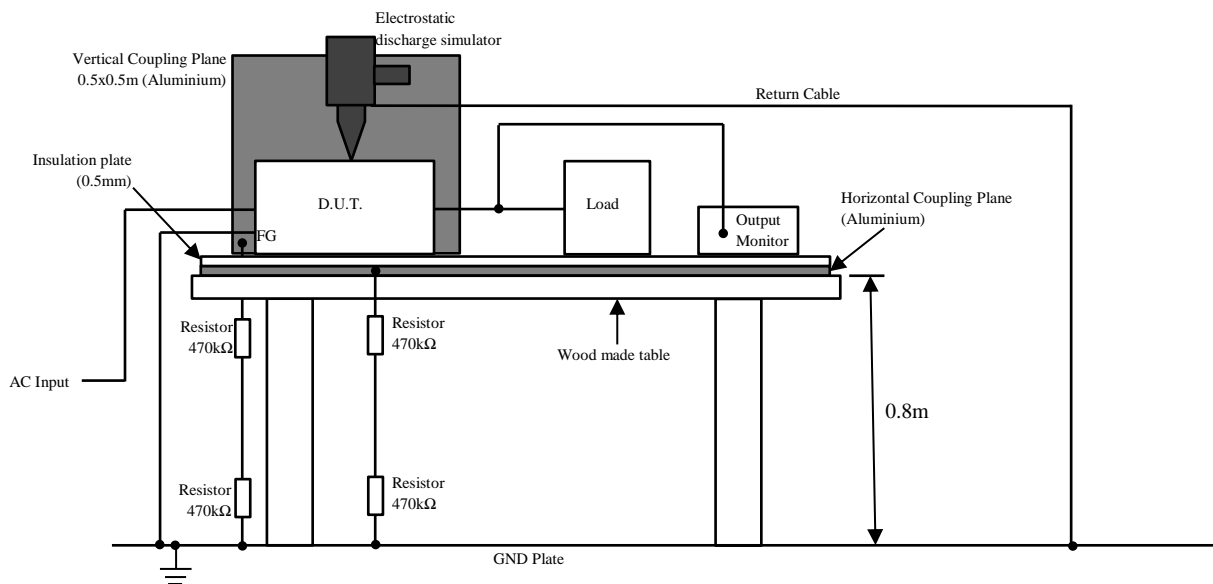
Electro Static Discharge Simulator :NSG435 (Schaffner)  
 Discharge Resistance: 330Ω Capacity: 150pF

### (2) Test Conditions

Input Voltage :230VAC Output Voltage :Rated  
 Output Current :100% Polarity +,-  
 Number of Tests :10 times Discharge Interval :>1 second  
 Ambient Temperature :21°C

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

Contact Discharge :FG, Case, AC Input [unit off], HCP, VCP  
 Air Discharge : None Applicable



### (4) Acceptable Conditions

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

### (5)

### (6) Test Result, CUS400M-12/FX5 Class I

Contact Discharge (kV)	[Unit]	Air Discharge (kV)	Unit
8	CUS400M-12/FX5	None Applicable	CUS400M-12/FX5
8	CUS400M-24/FX6	None Applicable	CUS400M-24/FX6

### 3. Radiated Radio-Frequency Electromagnetic Field Immunity Test (IEC61000-4-3)

**MODEL: CUS400M-12/BX5; CUS400M-24/BX6**

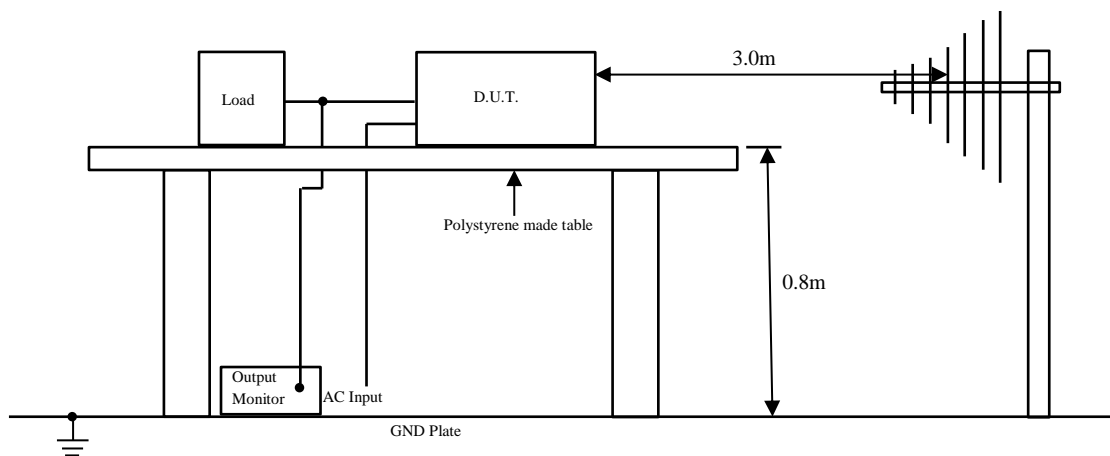
#### (1) Equipment Used

Signal Generator	:Rohde & Schwarz SMB 100A
Power Amplifier	:Prâna MT200
Power Amplifier	:Prâna SX40-15
Electric Field Sensor	:AR FL7006 Kit
Bilog Antenna	:Schwarzbeck VULP 9118E
Horn Antenna	:AR ATH800M6G

#### (2) Test Conditions

Input Voltage	:230VAC	Output Voltage	:Rated
Output Current	:100%	Amplitude Modulated	:80% 1kHz
Wave Angle	:Horizontal and Vertical	Ambient Temperature	21°C
Test Angle	:Top, Side, Front	Electromagnetic Frequency	:80~1000MHz, 1.4~2.0GHz, 2.0~2.7GHz, 1.4~6.0GHz

#### (3) Test Method



#### (4) Acceptable Conditions

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

#### (5) Test Result

Radiation Field Strength (V/m)	Electromagnetic Frequency	Unit
10	80~6000MHz	CUS400M-12/BX5
10	80~6000MHz	CUS400M-24/BX6
IEC60601-1-2 Proximity Field, Table 9	380~5800MHz	CUS400M-12/BX5
IEC60601-1-2 Proximity Field, Table 9	380~5800MHz	CUS400M-24/BX6

#### 4. Electrical Fast Transient/Burst Immunity Test (IEC61000-4-4)

**MODEL: CUS400M-12/FX5; CUS400M-24/FX5**

##### (1) Equipment Used

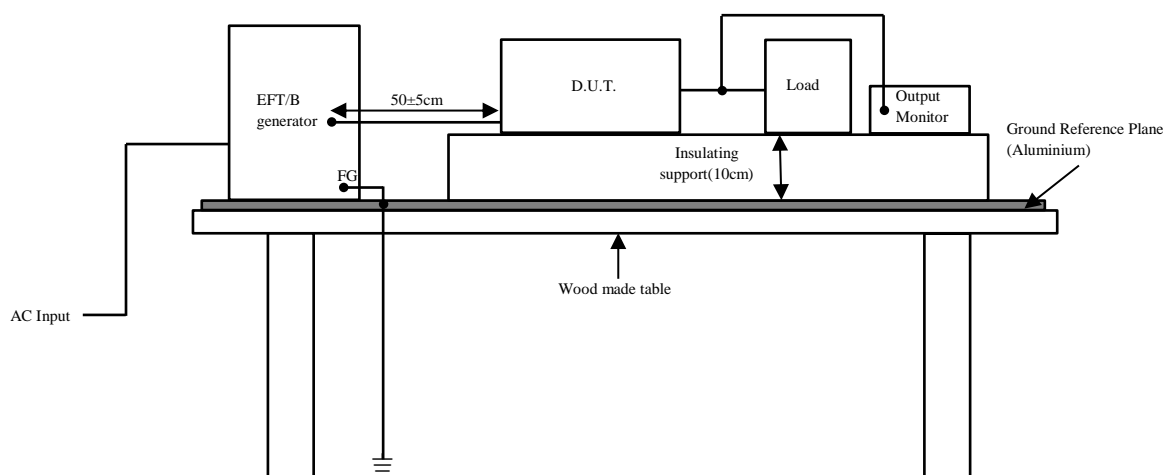
EFT/B Generator	:EMC Partner TRA2000IN6
Capacitive Coupling Clamp	:EMC Partner CN-EFT1000
Capacitive Coupling Clamp	:Schaffner CDN125

##### (2) Test Conditions

Input Voltage	:100, 230VAC	Output Voltage	:Rated
Output Current	:0, 100%	Test Time	:1 minute
Polarity	:+,-	Ambient Temperature	20°C
Number of Tests	:3 times	Pulse Frequency	:5kHz & 100kHz
Burst Time	:15ms, 0.75ms	Number of Pulse	:75
Burst Cycle	:300ms		

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

Apply to (N,L,FG), (+V, -V).



##### (4) Acceptable Conditions

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

##### (5) Test Result

Test Voltage (kV)	Port	Unit
2	Signals and control ports	CUS400M-12/FX5
2	Signals and control ports	CUS400M-24/FX5
4	AC input and DC power ports	CUS400M-12/FX5
4	AC input and DC power ports	CUS400M-24/FX5

## 5. Surge Immunity Test (IEC61000-4-5)

**MODEL: CUS400M-12/FX5; CUS400M-24/FX5**

### (6) Equipment Used

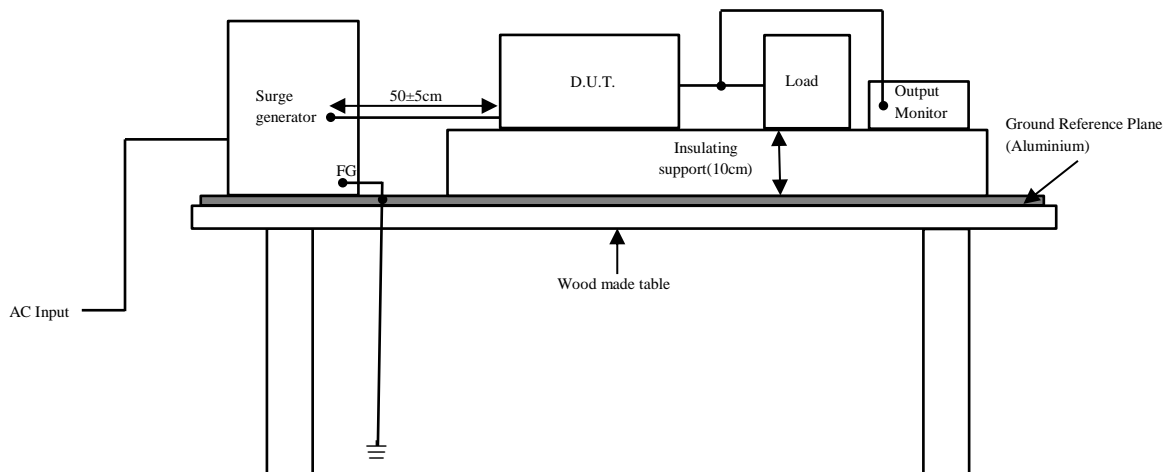
Surge Generator	:EMC Partner TRA2000IN6
Coupling Impedance	:Common – 12Ω, Normal – 2Ω
Coupling Capacitance	:Common – 9μF, Normal – 18μF

### (7) Test Conditions

Input Voltage	:100, 230VAC	Output Voltage	:Rated
Output Current	:0, 100%	Number of Tests	:5
Polarity	:+,-	Mode	:Common, Normal
Phase	:0°,90°,180°,270°	Ambient Temp	:21°C

### (8) Test Method and Device Test Point

Apply to Common mode (N-FG, L-FG) and Normal mode (N-L).



### (9) Acceptable Conditions

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

### (10) Test Result

Common		Normal	
Test Voltage (kV)	Unit	Test Voltage (kV)	Unit
2	CUS400M-12/FX5	1	CUS400M-12/FX5
2	CUS400M-24/FX5	1	CUS400M-24/FX5

## 6. Conducted Disturbances Induced by Radio-Frequency Field Immunity Test (IEC61000-4-6)

**MODEL: CUS400M-12/FX5; CUS400M-24/BX5**

### (1) Equipment Used

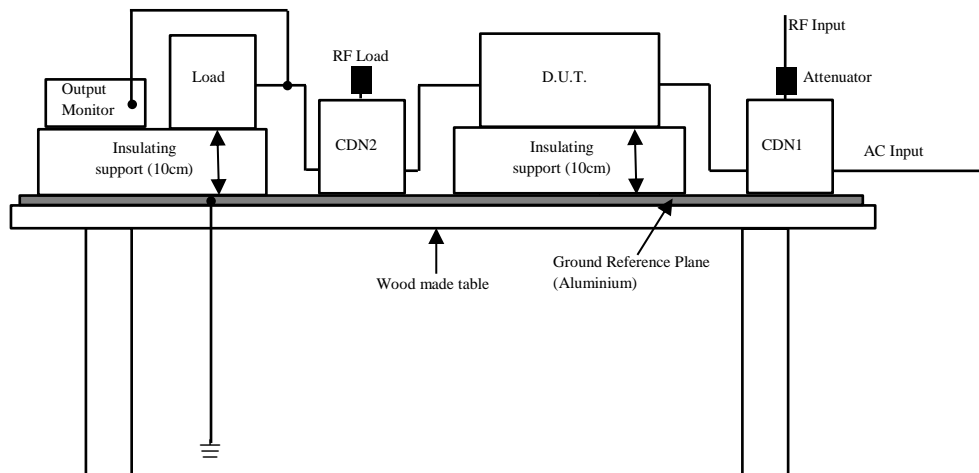
Signal Generator	:Rohde & Schwarz SMB 100A
Power Amplifier	:Ophir RF 5084
CDN1	:Com-Power CDN M350E
CDN2	:Schwarzbeck CDN M2 32A
CDN3	:Schwarzbeck CDN AF2
Attenuator	:Fairview Microwave SA3N10W-10
Attenuator	:Fairview Microwave SA4N251-06
RF Load	:Fairview Microwave ST3N252

### (2) Test Conditions

Input Voltage	:100, 230VAC	Output Voltage	:Rated
Output Current	:100%	Electromagnetic Frequency	:150kHz~80MHz
Ambient Temp	: 21°C	Sweep Condition	:1.0% step up, 0.5 seconds hold

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

Apply to (N, L, FG) and (+V, -V).



### (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 test.
3. Smoke and fire are not allowed.

### (5) Test Result

Voltage Level (V)	Unit
10	CUS400M-12/FX5
10	CUS400M-24/BX5



## 7. Power Frequency Magnetic Field Immunity Test (IEC61000-4-8)

**MODEL: CUS400M-12/BX5**

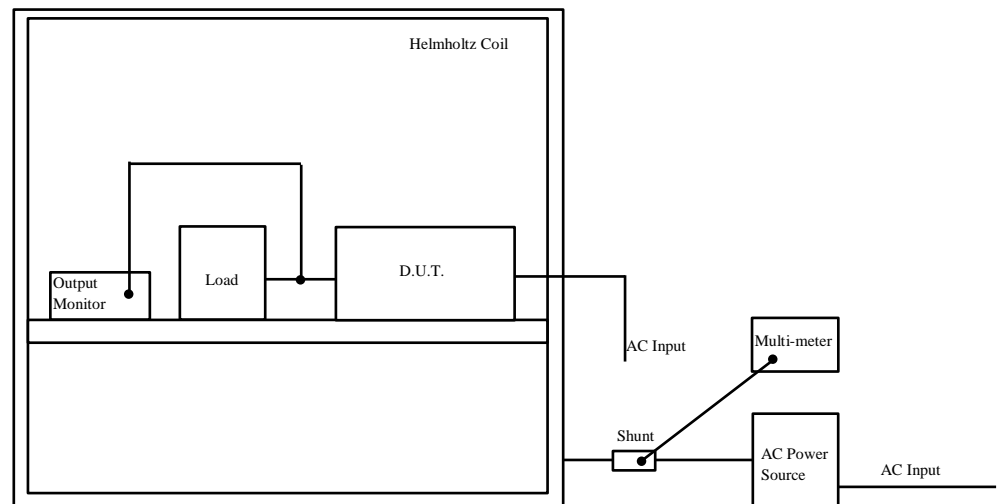
### (1) Equipment Used

AC Power Source	:California Instruments 2750L-PT
Helmholtz Coil	:TLU HHC02
Current Shunt	:P74 Calibrated Shunt
Multimeter	:Fluke 287 DMM

### (2) Test Conditions

Input Voltage	:100, 230VAC	Output Voltage	:Rated
Output Current	:0, 100%	Magnetic Frequency	:50Hz, 60Hz
Ambient Temp	: 21°C	Direction	:X,Y,Z
Test Time (continuous)	: >30 seconds	Test Time (short duration)	:3 seconds

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



### (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 test.
3. Smoke and fire are not allowed.

### (5) Test Result

Continuous Magnetic Field Strength (A/m)	Short Term Magnetic Field Strength (A/m)	Unit
30	300	CUS400M-12/BX5

## 8. Voltage Dips, Short Interruptions Immunity Test (IEC61000-4-11)

**MODEL: CUS400M-12/FX5; CUS400M-24/FX6**

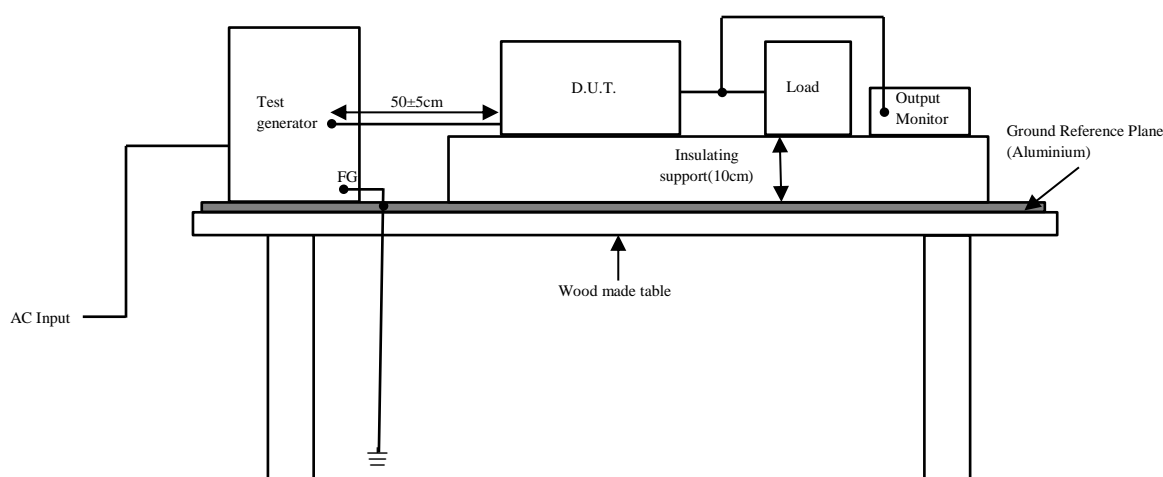
### (1) Equipment Used

Test Generator :EMC Partner TRA2000IN6

### (2) Test Conditions

Input Voltage	:100, 230VAC	Output Voltage	:Rated
Output Current	:100%	Number of Tests	:3 times
Test Interval	:More than 10 seconds	Mains Frequency	: 50Hz
Ambient Temp	: 21°C	Phase Angle	:0°,45°,90°135°,180°,225°,270°,315° (0% for 0.5 cycle)

### (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 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 test.
3. Smoke and fire are not allowed.

### (5) Test Result

Test Level	Continue Time	Criteria	Unit
70%	25 cycles	A at 270W; B at >270W	CUS400M-12/FX5; CUS400M-24/FX6
40%	10 cycles	A at 100W; B at >100W	CUS400M-12/FX5; CUS400M-24/FX6
0%	1 cycle	A	CUS400M-12/FX5; CUS400M-24/FX6
0%	250 cycles	B	CUS400M-12/FX5; CUS400M-24/FX6
0%	0.5 cycles	A	CUS400M-12/FX5; CUS400M-24/FX6
80%	250 cycles	A	CUS400M-12/FX5; CUS400M-24/FX6