

**Subject**  
**OB2500PCP Demo Board Manual**

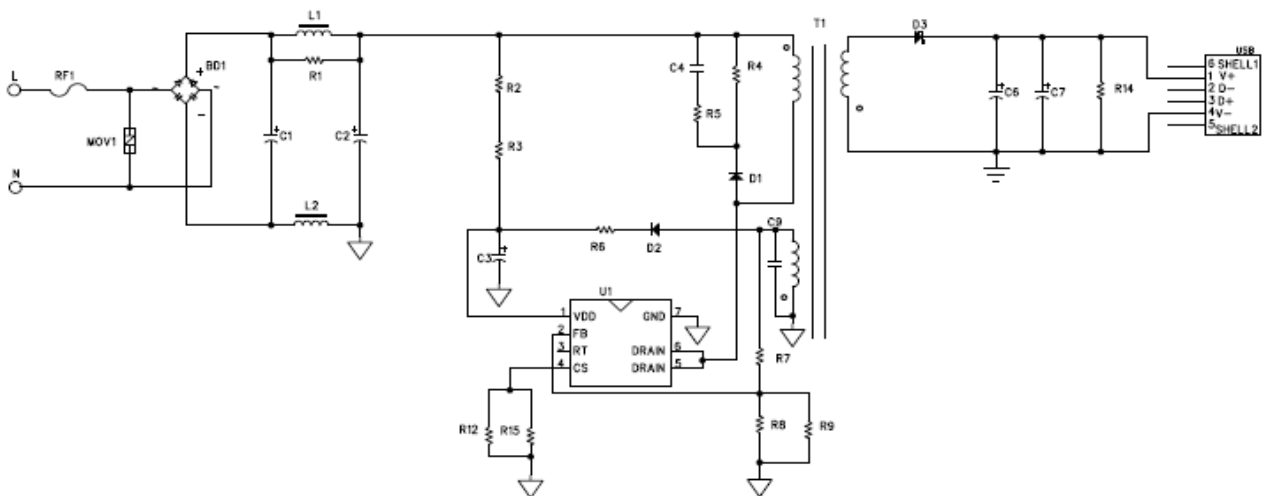
Board Model: CH5V2A2500PCP.00  
 Doc. No.: OB\_DOC\_DBM\_2500P01

**Key features:**

- Standby power less than 75mW@264Vac
- Precise CV/CC regulation
- Primary-side sensing and regulation without TL431 and opto-coupler
- Cost effective and simplified system design
- Average efficiency meet DOE Level 6
- Driver MOSFET switch
- Audio noised free operation
- Frequency shuffling technology to improve EMI performance
- Meet EN55022&FCC part 15 EMI



## Schematic



## Performance Evaluation

This session presents the test results of OB2500P module up to date. Results on inrush current and safety test are not included and will be added when they become available.

Overall, the module meets design specifications. All data was measured at the end of 1.2m, 22 AWG output cable.

### Performance Highlights

- Standby power less than 75mW@264Vac
- Precise CV/CC regulation
- The average efficiency meet DOE Level 6
- EMI passed EN55022 and FCC part 15 test with more than 6dB margin

### System Electrical Specification

Description	Symbol	Min	Typ	Max	Units	Comment
<b>Input Section</b>						
Input Voltage	$V_{IN}$	90		264	$V_{AC}$	2 Wire
Line Frequency	$f_{LINE}$	47	50/60	63	Hz	
Standby Power				75	mW	230Vac
<b>Output characteristics</b>						
CV Section	Output Voltage	$V_{OUT CV}$	4.75		5.25	V
	Output Current	$I_{OUT CV}$	0		2.0	A
CC Section	Output Voltage	$V_{OUT CC}$	3.0			V
	Output Current	$I_{OUT CC}$	2.3		2.6	A
Ripple & Noise	$V_{RIPPLE}$			80	$mV_{P P}$	
Continuous Output Power	$P_{OUT}$		10W			
Over Current Protection	$I_{OUT MAX}$			2.6	A	
Active Mode Efficiency	$\eta$	78.7			%	Measured at Line End, $V_{IN}=115V_{AC}/230V_{AC}$
<b>Time sequence</b>						
Turn on delay time				2	S	
<b>Environmental</b>						
Conducted/Radiation EMI	Meets CISPR22B/EN55022B					
Safety	Meets IEC950,UL1950,Class II					
ESD		18			kV	

### Test Equipments

Item	Vender	Module
AC Source	WEST	WEW1010
Digital Power Meter	YOKOGAWA	WT210
Electrical Load	Chroma	63030
Oscilloscope	LeCroy	WS424
Multimeter	VICTORY	VC9807A

# 1. Input Characteristics

## 1.1 Standby power

Table. 1 Standby power

Input voltage	Pin(mW)	Vo(V)	Specification	Test result
90Vac/60HZ	36	5.063	<75mW	Pass
115Vac/60HZ	38	5.064		
230Vac/50HZ	55	5.059		
264Vac/50HZ	68	5.057		

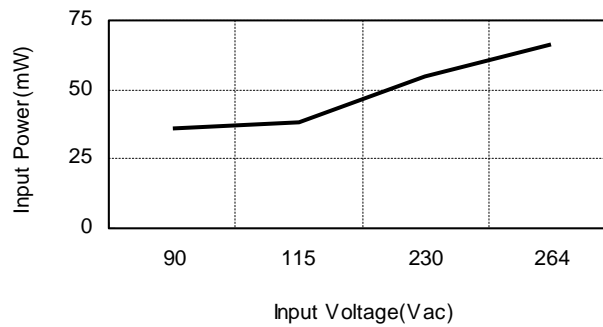


Fig. 1 No-load Input Power vs. Input Line Voltage

## 1.2 Efficiency

Table. 2 Efficiency Line end with 22AWG 1.2M(130 mΩ)

Input voltage	10%	25%	50%	75%	100%	25%~100% Load Aver. Eff.	Standards		Test Result
							DOE	COC	
115V/60Hz	79.82	81.52	80.73	79.98	79.06	80.32	78.70	69.73 (10%Load)	Pass
230V/50Hz	76.91	80.42	80.63	80.20	79.55	80.20		79.00	

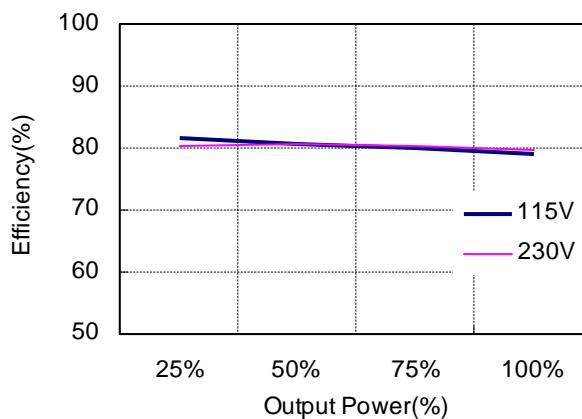


Fig. 2 Efficiency vs. Percent of Rated Output Power

### 1.3 I-V Curve

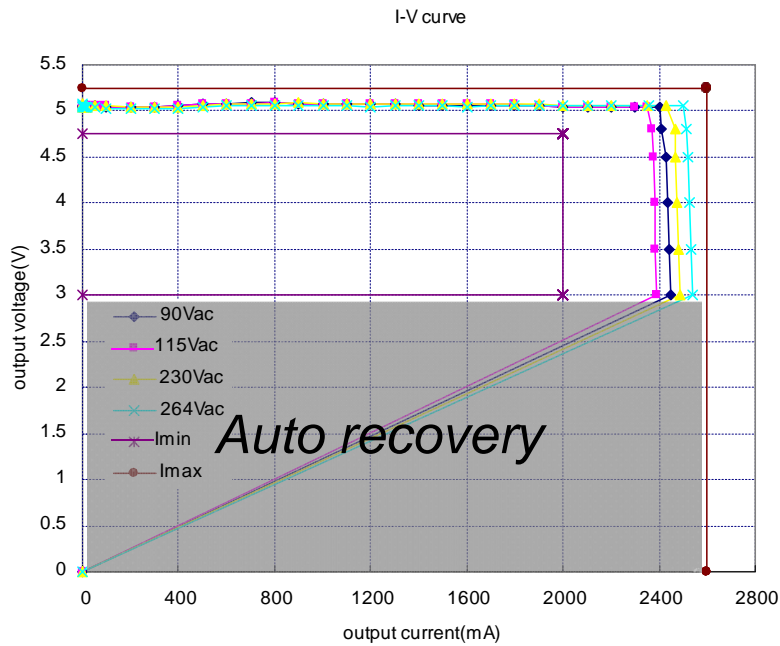


Fig. 3 I-V Curve

## 2. Output Characteristics

### 2.1 Line Regulation & Load Regulation

Table. 3 Line Regulation & Load Regulation

Input voltage	No load	Half load	Full load	Specification	Test result
90Vac/60HZ	5.063	5.070	5.043	4.75-5.25	
115Vac/60HZ	5.067	5.066	5.044	4.75-5.25	
230Vac/50HZ	5.062	5.052	5.042	4.75-5.25	
264Vac/50HZ	5.060	5.046	5.039	4.75-5.25	
Line Regulation	0.47%			<2%	Pass
Load Regulation	0.39%			<±5%	Pass

### 2.2 Ripple & Noise

Table. 4 Ripple & Noise

Input voltage	R&N (mV)		Remark
	No load	Full load	
90Vac/60HZ	18mV	76mV	Fig. 4,5
115Vac/60HZ	17mV	70mV	
230Vac/50HZ	18mV	66mV	
264Vac/50HZ	18mV	66mV	Fig. 6,7

Note: Ripple & noise was measured at line end without probe cap and ground clip. Measurement bandwidth was limited to 20MHZ.

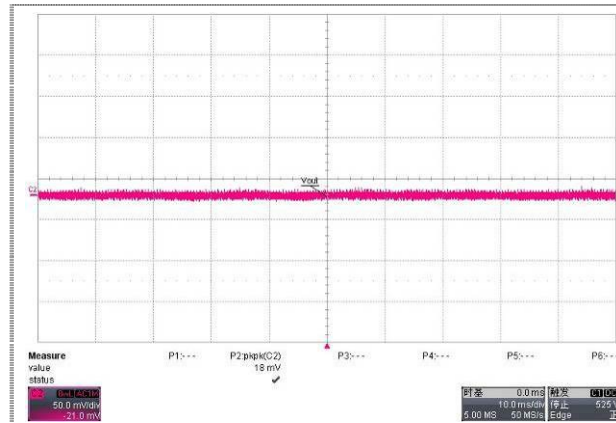


Fig. 4 Measured ripple& noise waveform @90Vac/60HZ, no load

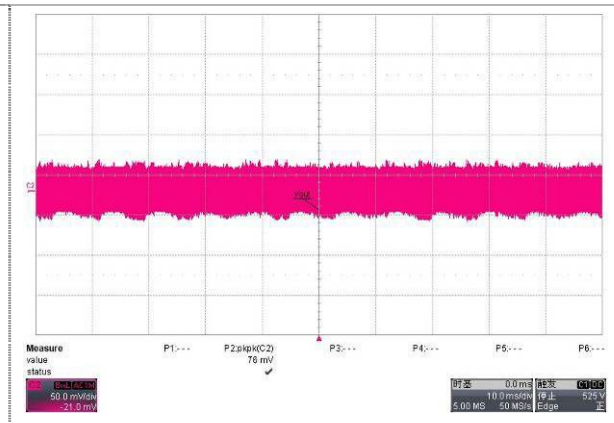


Fig. 5 Measured ripple& noise waveform @90Vac/60HZ, full load

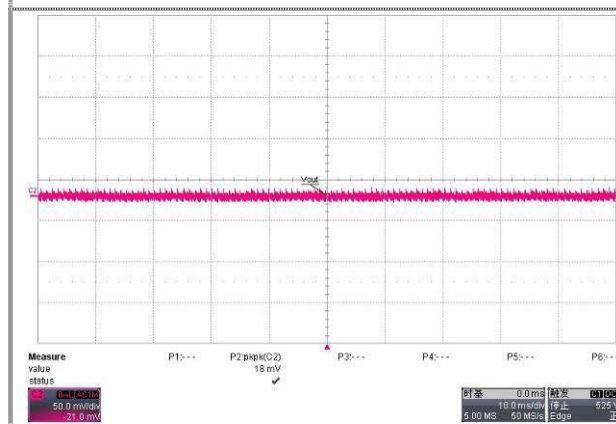


Fig. 6 Measured ripple& noise waveform @264Vac/50HZ, no load

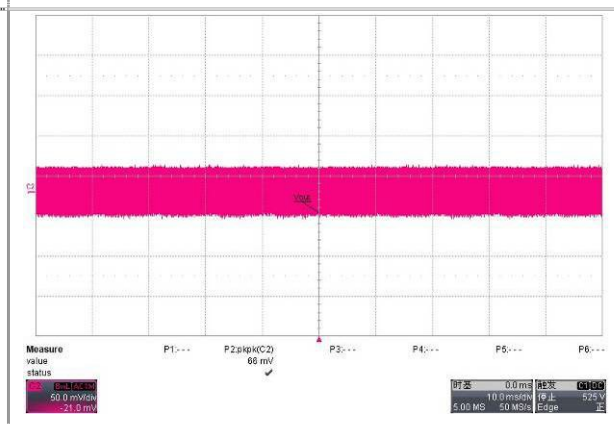


Fig. 7 Measured ripple& noise waveform @264Vac/50HZ, full load

### 2.3 Dynamic Test

A dynamic loading with low set at 0A lasting for 20mS&50mS and high set at 1A load lasting for 20mS&50mS is added to output. The ramp is set at 0.125A/us at transient. Measurement was taken at line end.

Table. 5 Output voltage under dynamic test(High load:1A Low load:0A) 20mS

Input	Vomin-Vomax(v)	Remark
90V/60HZ	4.84-5.64	
115V/50HZ	4.87-5.64	
230V/50HZ	4.81-5.67	
264V/50HZ	4.81-5.67	

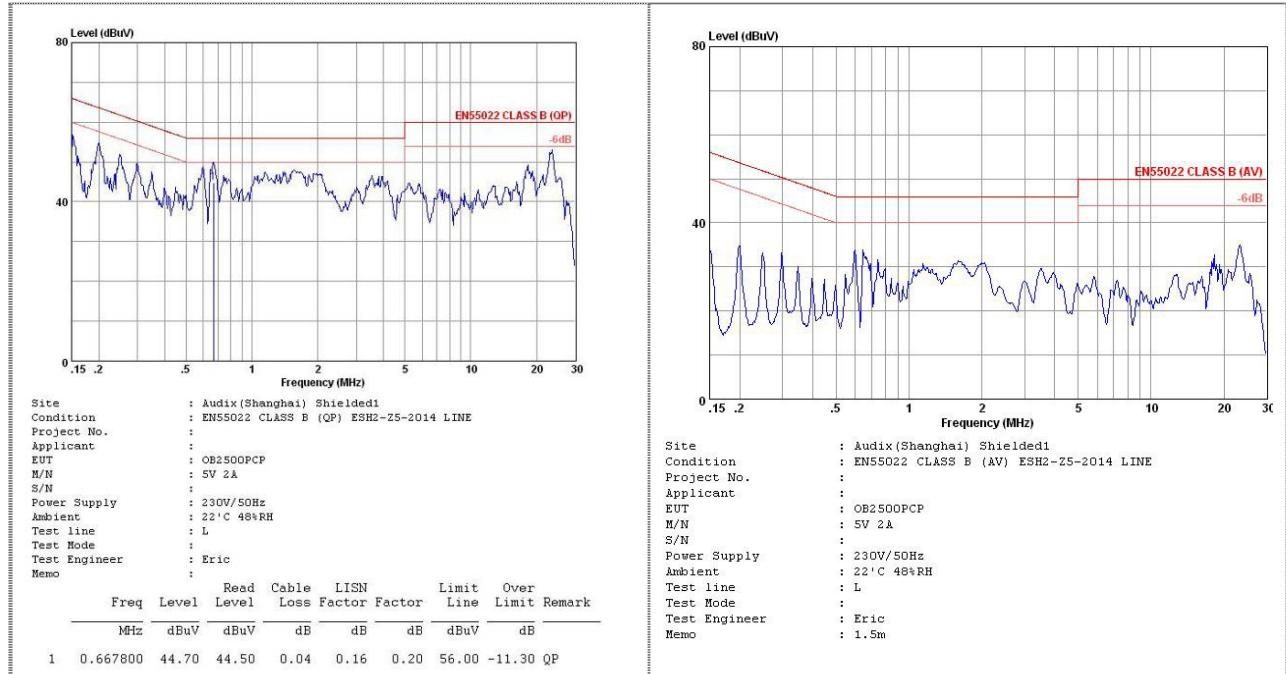
Output voltage under dynamic test(High load:1A Low load:0A) 50mS

Input	Vomin-Vomax(v)	Remark
90V/60HZ	4.04-5.64	
115V/50HZ	4.04-5.7	
230V/50HZ	4.04-5.7	
264V/50HZ	3.94-5.8	

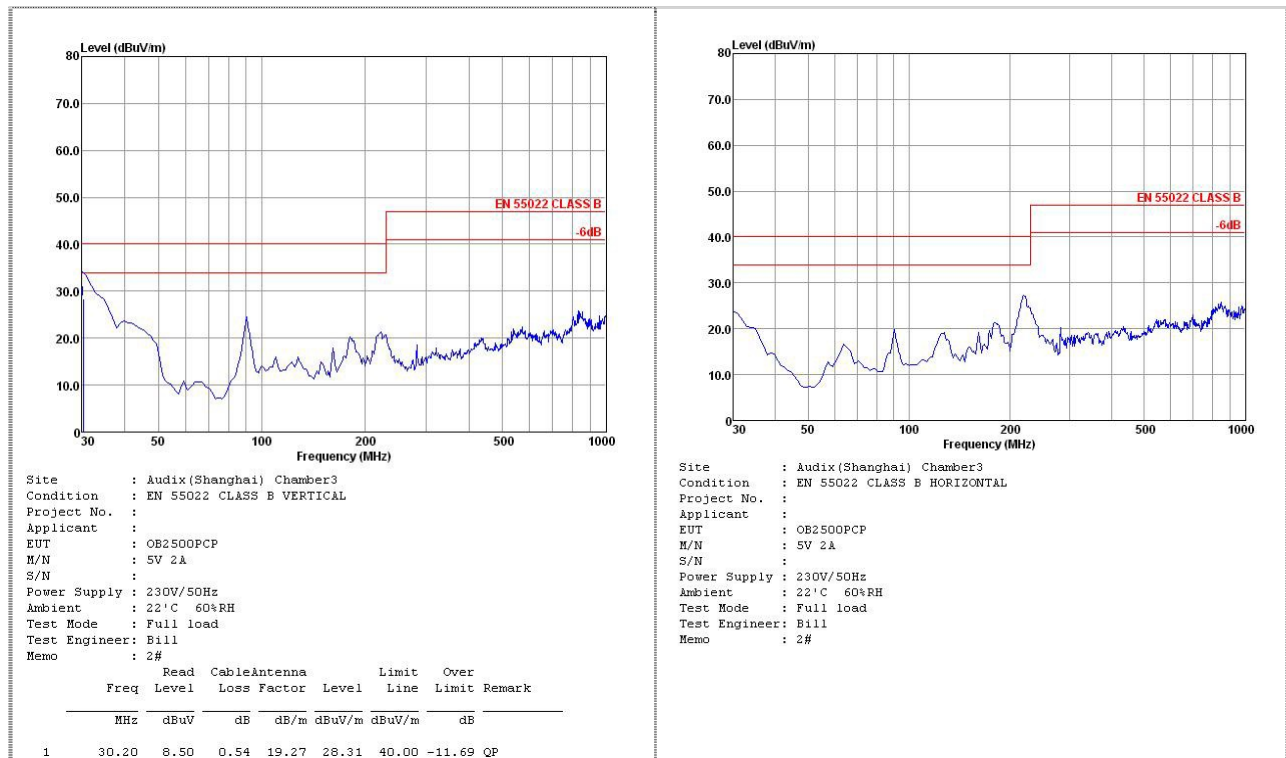
### 3. EMI Test

The Power supply passed EN55022 Class B EMI requirement with more than 6dB margin

#### 3.1 Conducted EMI Test



#### 3.2 Radiation EMI Test



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