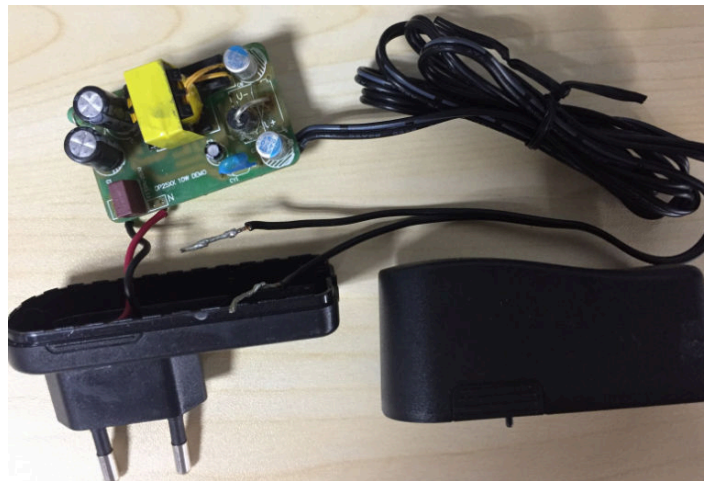




Developer Microelectronics Co.,Ltd

SPECIFICATION

DP2537B_Charger5V2A



Key Features:

- Meet “DOE-6 ” Requirement
- Meet “COC-2016 “ Requirement
- Universal Input Range 90-264 Vac
- DC Output 5V, 2A

Safety Engineer	Electrical Engineer	Check	Edition	Date
	dww		01	2016.10.25

SIGNED BY:



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POWER SUPPLY SPECIFICATION

1. General Specification

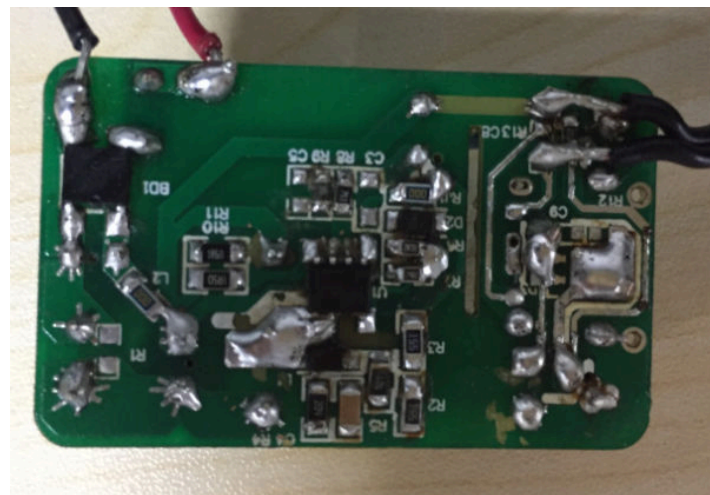
Specification	Symbol	Min	Max	Units	Comment
Input					
Voltage	V_{IN}	90	264	V_{AC}	
Frequency	F_I	47	63	Hz	
Standby Power (230VAC)	$P_{In_Standby}$		75	mW	
Output					
Output Voltage	V_{OUT}	4.75	5.25	V	Measured at Line(Test with 20AWG 1.0m)
Output Current	I_{OUT}	0	2	A	
Output ripple voltage	V_{RIPPLE}		150	mV_{P-P}	Measured at Line(Test with 20AWG 1.0m) $I_{OUT}=2A @TA=25^{\circ}C$ 20MHz bandwidth
Output Power					
Full-load Output Power	P_{OUT}		10	W	
Peak Output Power	P_{OUT_MAX}		12	W	
Over-current protection	I_{OUT_MAX}		2.4	A	Auto-restart
Active mode efficiency	η	79.003 %			Measured at Line(Test with 20AWG 1.0m) end Vac=115V and 230V (TAMB=25°C)
Environmental					
Conducted EMI Meets		CISPR22B/EN55022B			
Safety		Designed to meet IEC950, UL1950 Class II			
Ambient temperature	T_{AMB}	0	40	°C	

2. Photograph



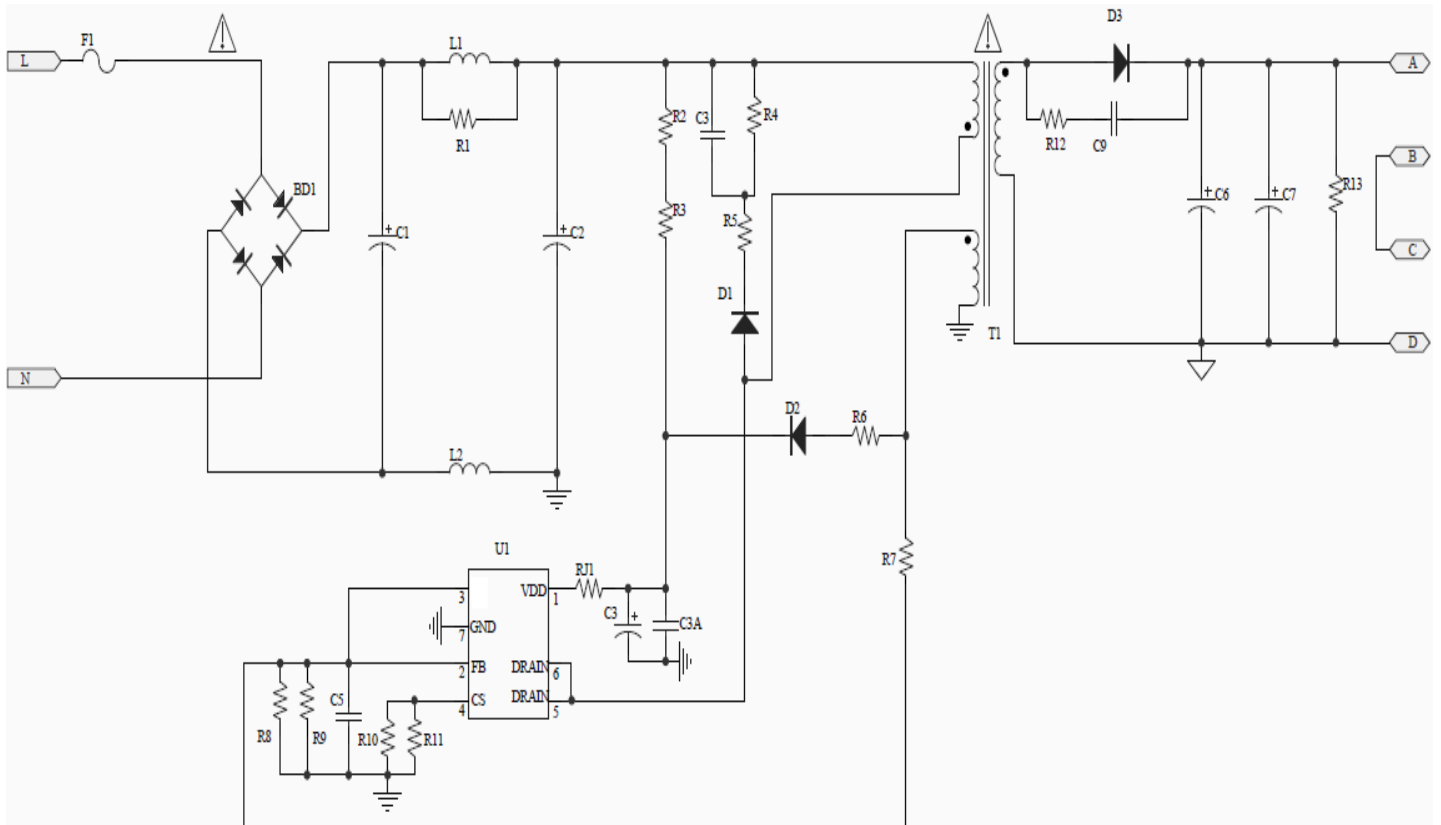
DP2537B

10W(5V2A) CC/CV Charger Module Using DP2537B





3.Schematics





4. Bill of material

Position	Quantity	Description	Package
C1, C2	2	10 μ F \pm 20%/400V, -40~105 $^{\circ}$ C, F3. 5, GR, 3KH	DIP8*17
C6, C7	2	470 μ F \pm 20%/6. 3V, -40~105 $^{\circ}$ C, F2. 5, 3KH	DIP 6. 3*8. 5
C3	1	4. 7 μ F \pm 20%/50V, -40~105 $^{\circ}$ C, F2. 5, 3KH	DIP 5*11
F1	1	FUSE; T1A/250V; 8*4*7mm	
L1	1	AL0510, Φ 0. 06, 470UH, \pm 10%	AL0510
T1	1	EE16 L:1. 3mH 5V2A	DIP
BD1	1	ABS10 1000V 1A	ABS
C4	1	CAP 1000pF \pm 10%/500V, X7R	SMD 1206
R2 R3	2	RES 1. 5M 5%	SMD 1206
R4	1	RES 200K 5%	SMD 1206
U1	1	IC PWM DP2537B	SOP-7
R5	1	RES 100R 5%	SMD 1206
R6	1	RES 5. 1R 5%	SMD 0805
R7	1	RES 24K 1%	SMD 0805
R8	1	RES 3. 3K 1%	SMD 0805
R9	1	RES 75K 1%	SMD 0805
R10 R11	2	RES 1. 6R 1%	SMD 1206
R13	1	RES 2K 5%	SMD 0805
RJ1 L2	2	RES 0R 5%	SMD 0805
CY1	1	102M	DIP
D1	1	Diode A7 1000V/1A	SOD-123
D2	1	Diode F1M 1000V/1A	SOD-123
D3	1	Schottky diode SR10U45L, 45V, IF10A	DO-27
USB	1	4PIN USB	USB
PCB	1	31*50mm T=1. 2mm 单面板 REV A"GP	PCB



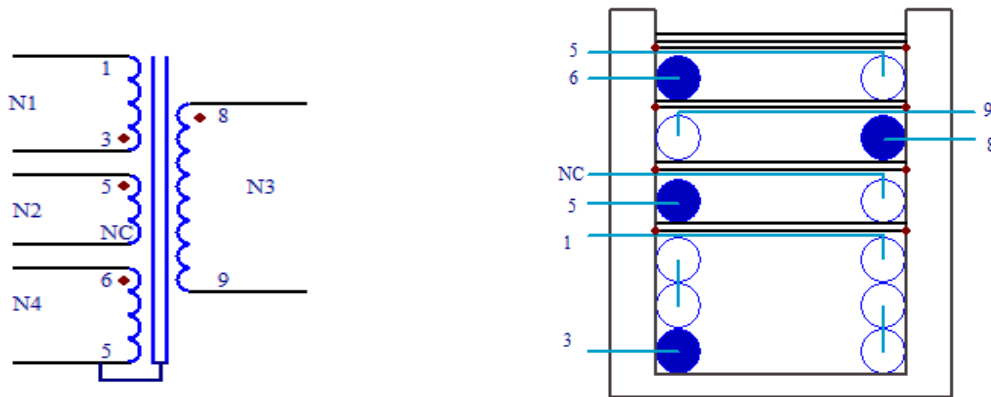
5. Transformer

1) Transformer Specification

Bobbin: EE16 (5+2+2) Lengthen

Core material: PC95 Ae: 38.25mm*2

2) Structure/Material



Winding	Material	Start Pin	Finish Pin	Turns	Description
N1	φ 0.22mm*1 2UEW	3	1	80	Along, close winding 3 layer
Tape	TAPE W=7mm				
N2	φ 0.12mm*2 2UEW	5	NC	6	Along, average divide winding 1 layer
Tape	TAPE W=7mm				
N3	φ 0.4mm*2 TEX-E Wire	8	9	5	Along, close winding 1 layer
Tape	TAPE W=7mm				
N4	φ 0.12mm*2 2UEW	6	5	14.5	Center for a tightly wound
Tape	TAPE W=7mm				
From PIN5 to connect magnetic core using bare 0.22mm copper wire.					

- ◆ Inductance : $LP(N1) = 1.3mH \pm 5\%$ (10KHZ 0.25V)
- ◆ Leakage inductance : $LsN1 < 60uH$ (40KHZ 0.25V short other PIN)
- ◆ Pressure Testing:
 - PRI (N1) - SEC (N3) 3750VAC 5mA/5S ;
 - PRI/SEC - CORE 2500VAC 5mA/5S.



6. Function Test Report

Test Model	DP2537B_Charger5V2A_DP01
Test Date	2016/10/25
Test Temperature	Ambient
Test Equipment	AC source: 6810 AC POWER SOURCE (MG-0010) Electronic load: ITECH (IT8512) Power meter: Choma (66202) Oscilloscope: Tektronix (MSO 2024B)
Test Items	<ol style="list-style-type: none">1. Input Current2. Standby Power3. Efficiency4. I-V Curve5. Line & load regulation6. Turn on time7. Hold-up time8. DC output rising time9. Output ripple & noise10. Over current protection11. Short circuit protection12. Voltage stress on mos & rectifier13. Transformer Flux Density14. Dynamic Load Response15. Power Component thermal

1) Input current

Measure the AC input current at maximum loading

Input Voltage	Input current (mA)	Spec.
90V/60HZ	226	
264V/50HZ	108	

2) Standby Power

Measure the input wattage and output voltage(line end) at no load

Input Voltage	Input wattage(W)	Output voltage(V)	Spec.
90V/60Hz	0.0348	5.1093	230V/50 Hz <0.075W
115V/60Hz	0.0389	5.0926	
230V/50Hz	0.064	5.0799	
264V/60Hz	0.084	5.0896	



3) Efficiency

3.1 Efficiency.

Output at rated load. Measured at Line(Test with 20AWG 1.0m) end.

Input Voltage	Input Wattage(W)	Output Wattage(W)	Efficiency (%)	Spec.
90V/60Hz	13.185	10.2184	77.50	
115V/60Hz	13.025	10.245	78.656	
132V/60Hz	12.920	10.224	79.133	
180V/50Hz	12.841	10.244	79.777	
230V/50Hz	12.899	10.251	79.47	
264V/50Hz	12.902	10.2152	79.175	

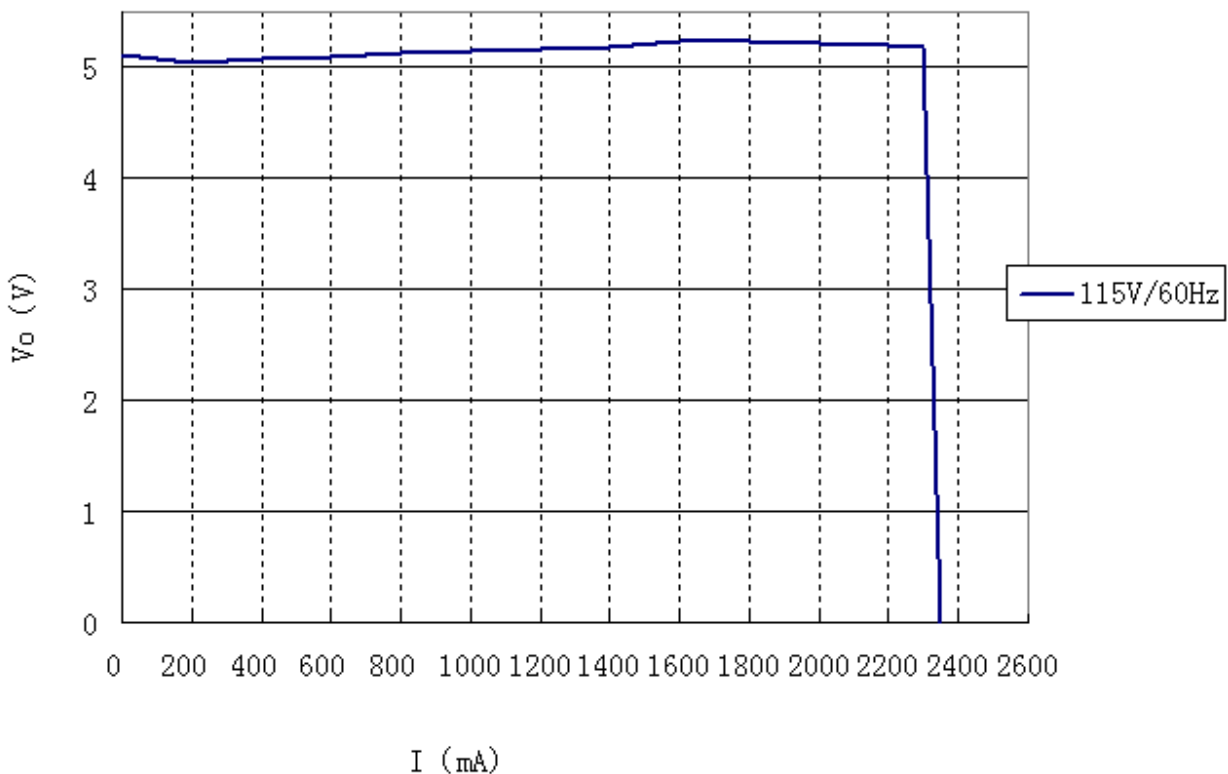
3.2 Avg Efficiency.

Measured at Line(Test with 20AWG 1.0m) end.

Input Voltage	Efficiency (%)					Avg	EPS2.0-6 %	10% Load
	25% Load	50% Load	75% Load	100% Load				
115V/60Hz	82.038	80.992	79.649	78.656	80.334	79.003	81.03%	
230V/50Hz	80.657	80.836	80.123	79.47	80.272		77.765%	

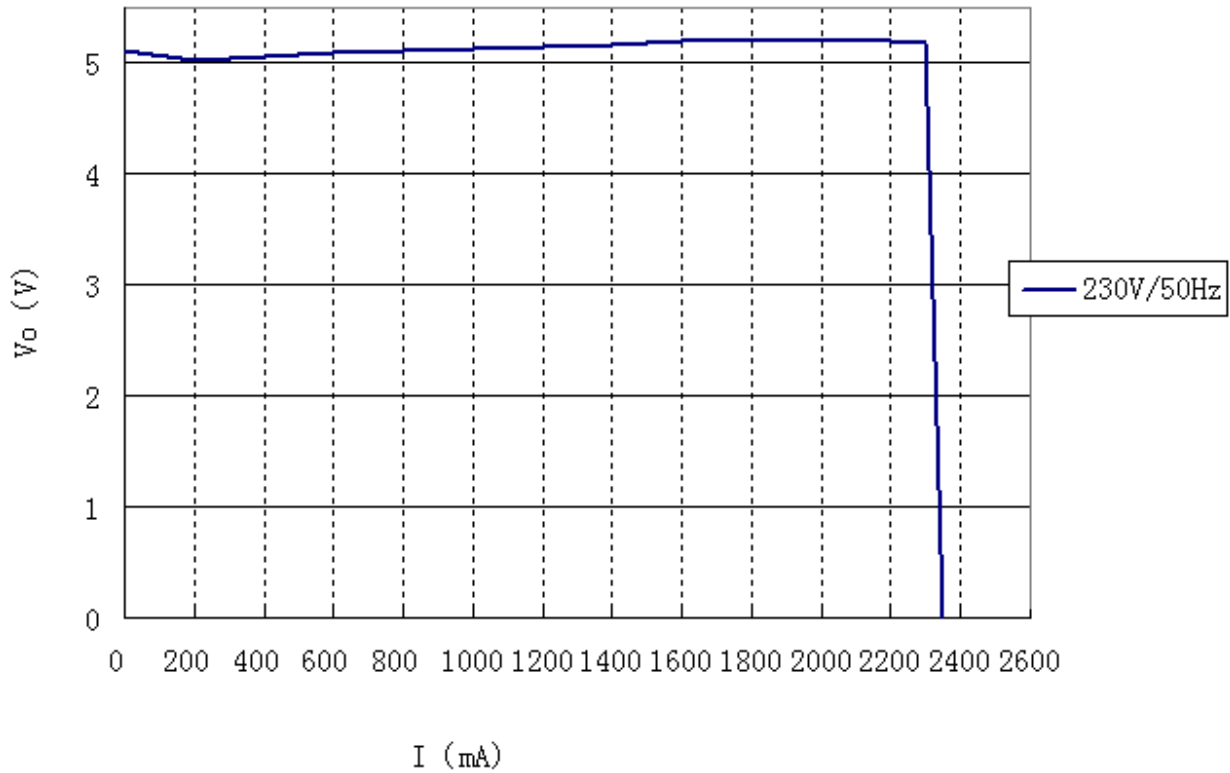
4) I-V Curve

I-V Curve





I-V Curce



5) Line & Load Regulation

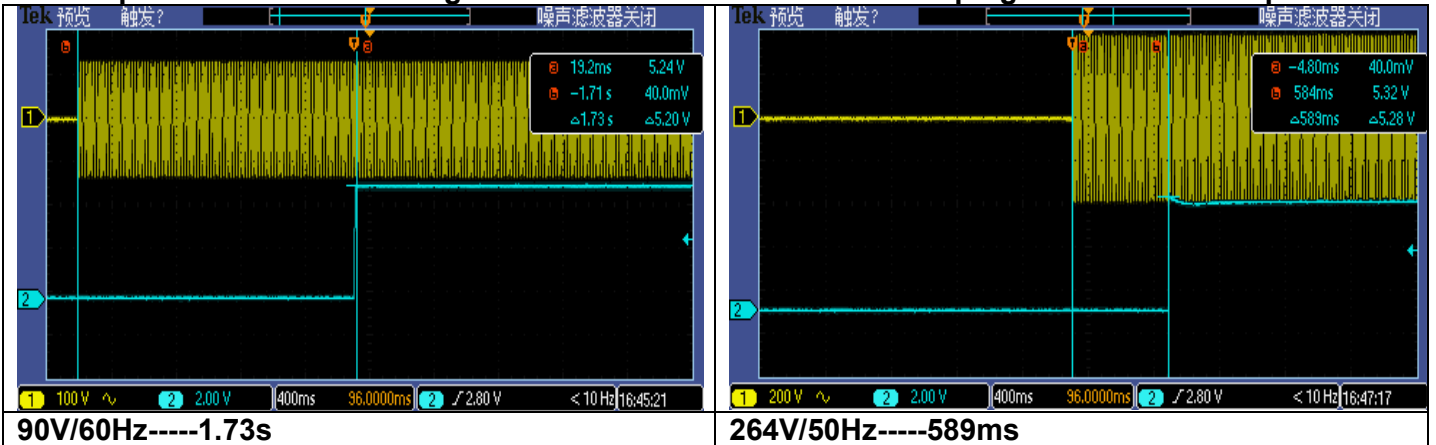
Measure line & load regulation according to below table. Measured at PCB end.

Input Voltage	Output V at rated. load(V)	Output V at No. load(V)	Load Regulation (%)	Spec.
90V/60Hz	5.1093	5.1456	0.73%	5.0V
115V/60Hz	5.1225	5.1440	0.43%	
132V/60Hz	5.112	5.1456	0.67%	
180V/50Hz	5.1221	5.1380	0.32%	
230V/50Hz	5.1255	5.1238	0.03%	
264V/50Hz	5.1076	5.1214	0.28%	
Line Regulation	0.36%	0.48%		



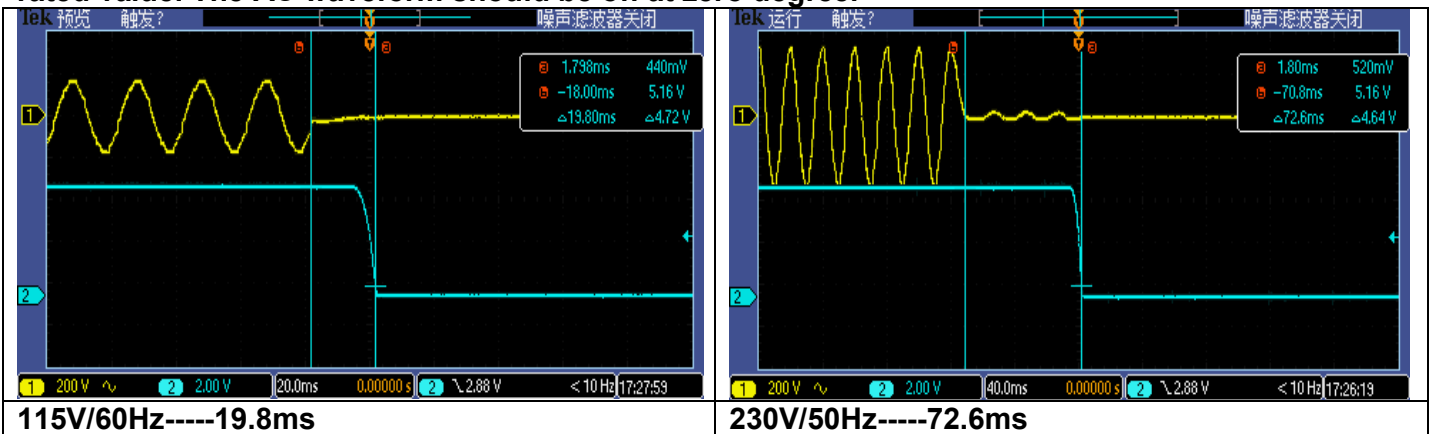
6) Turn on Time

Set output at maximum loading. Measure the interval between AC plug-in and stable output.



7) Hold-up Time

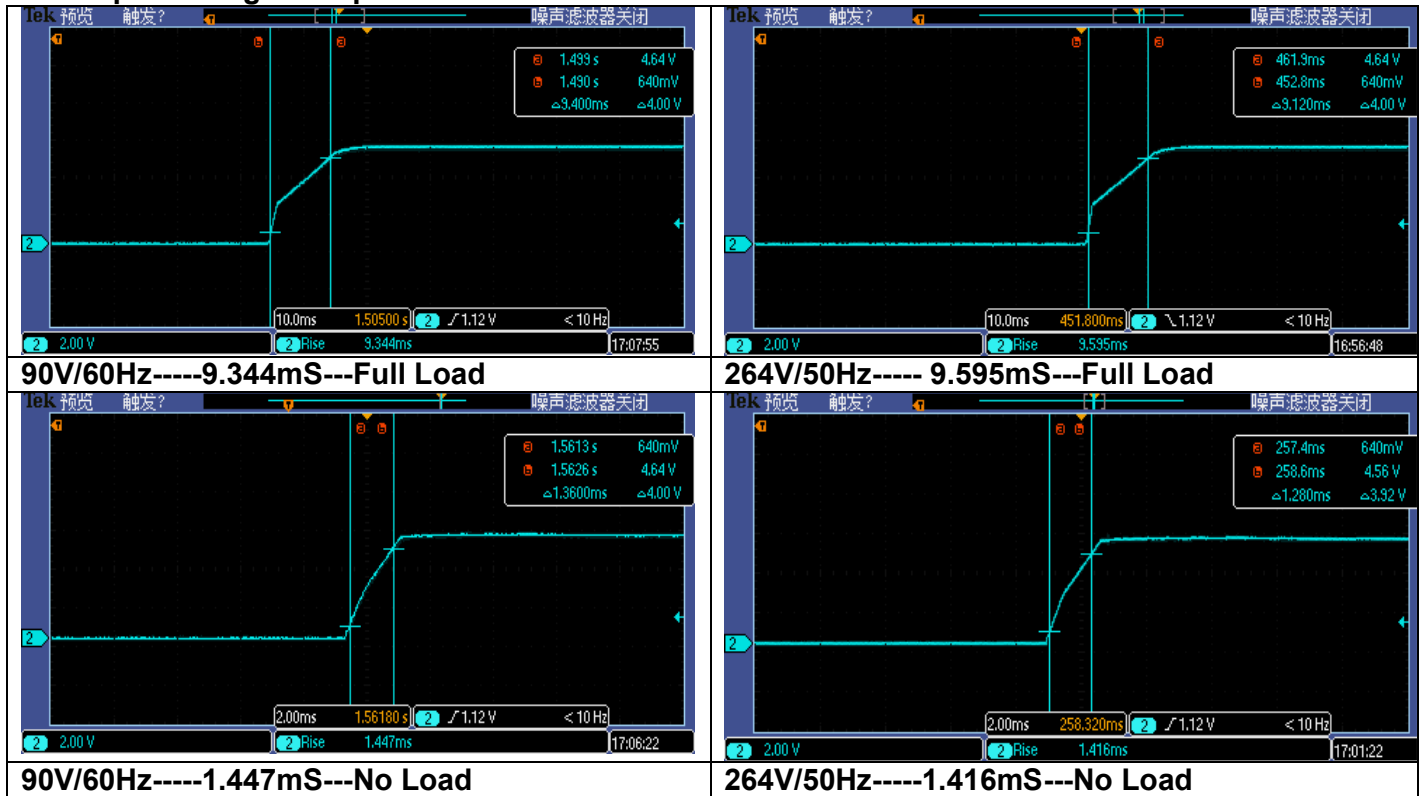
Set output at maximum load. Measure the time interval between AC off and output to lower limit of rated value. The AC waveform should be off at zero degree.





8) DC Output Rising Time

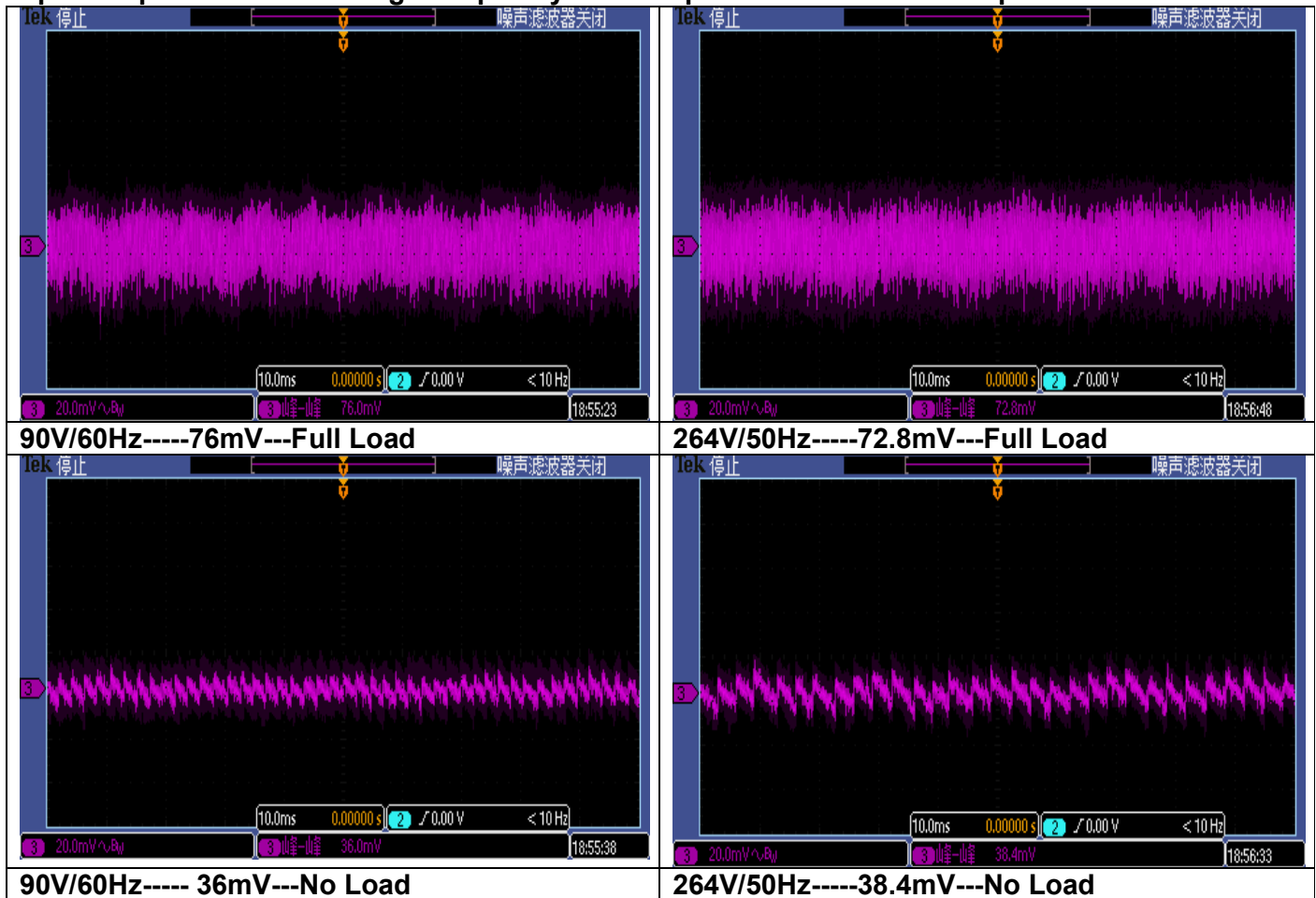
Set output at maximum loading and no loading. Measure the time interval between 10% to 90% output during startup.





9) Output Ripple & Noise

Ripple & noise are measured by using 20MHz bandwidth limited oscilloscope with a 10uF capacitor paralleled with a high-frequency 0.1uF capacitor across each output.

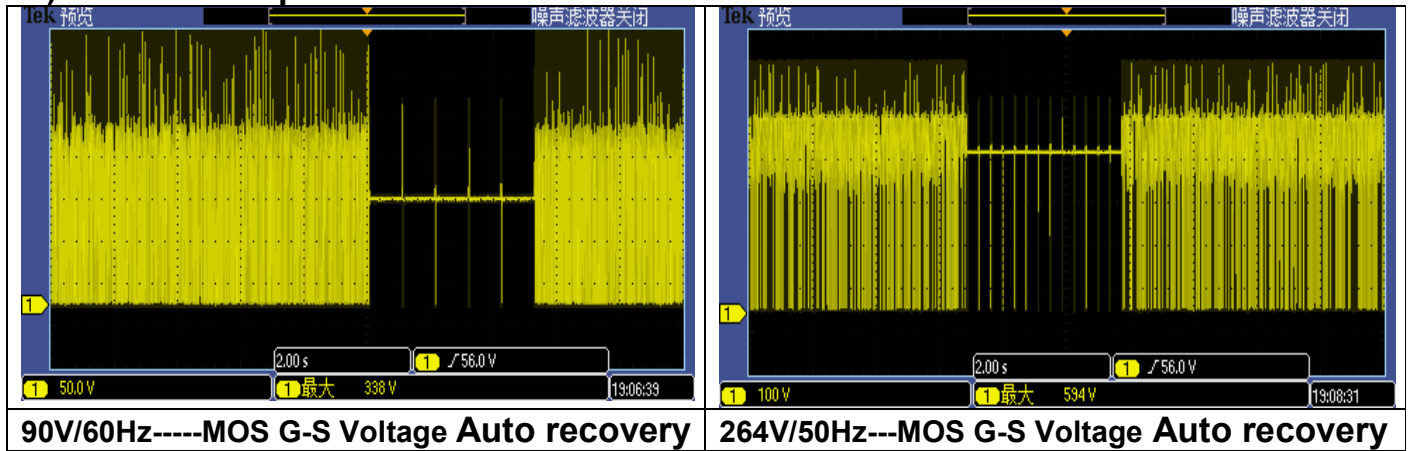


10) Over Current Protection

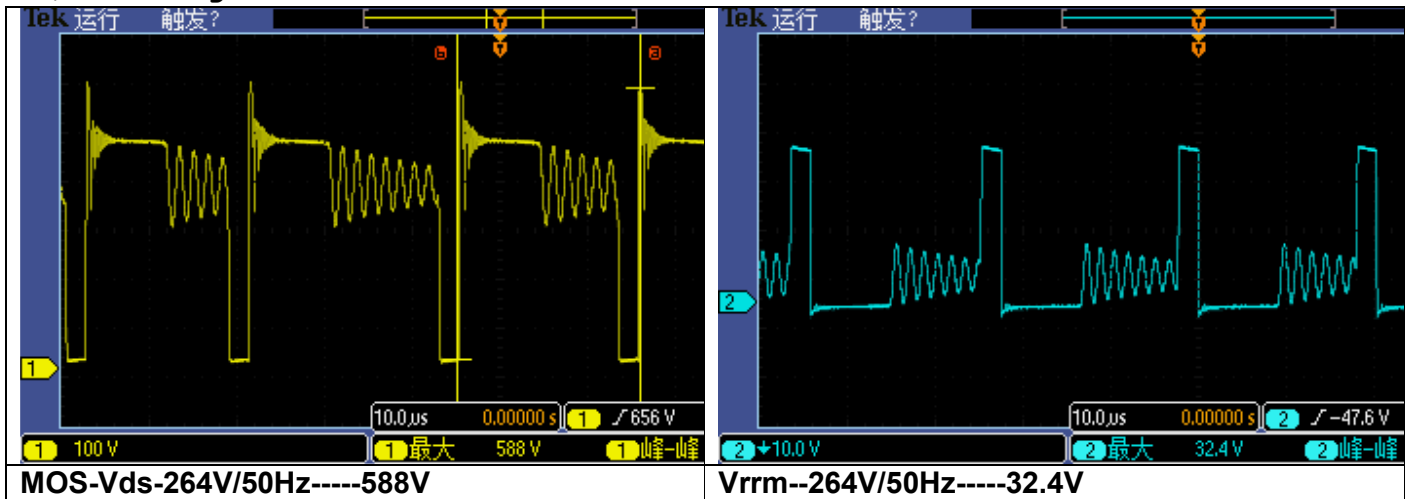
Input Voltage	Output Over current A)	Spec.
90V/60HZ	2.236	
264V/50HZ	2.275	



11) Short circuit protection

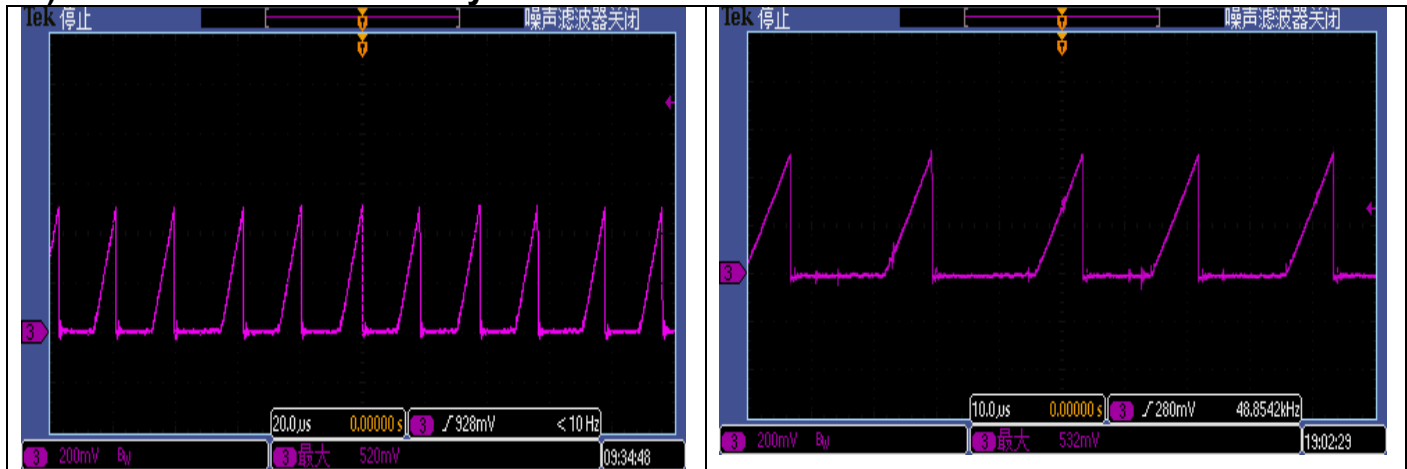


12) Voltage Stress on MOS & Rectifier





13) Transformer Flux Density



90Vac/60Hz, Full Load, Normal Id Wave

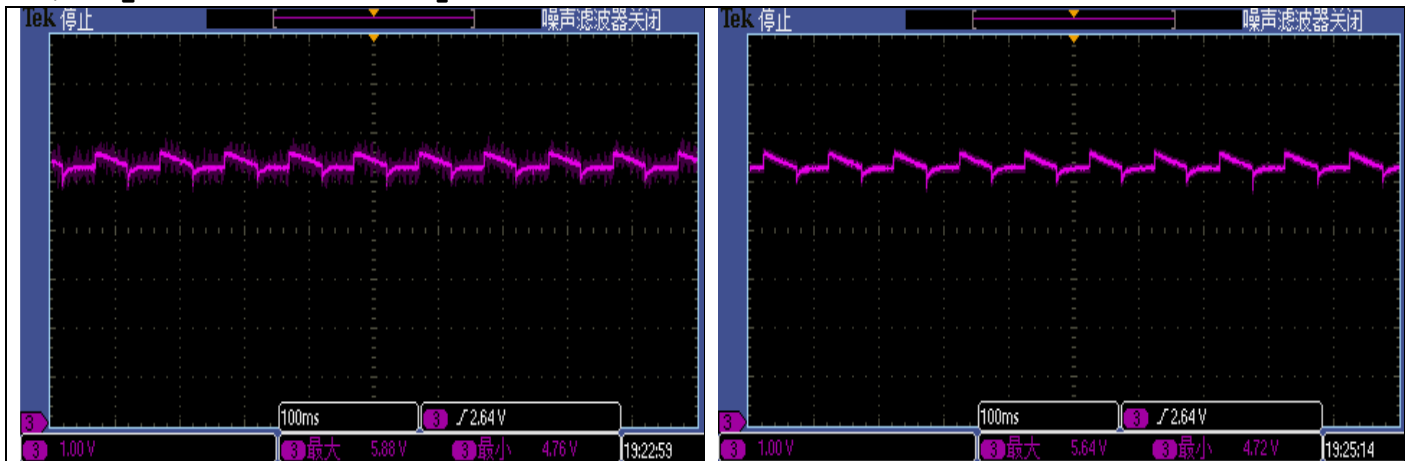
90Vac/60Hz, Over Load Id Wave

$N_p=80T_s$, $L_m=1.3mH$, $A_e=38mm^2$ -EE-16)

Input	+5V output2A Bmax	+5V output2.2A Bmax
90Vac /60Hz	3100Guass	3200Guass

$\Delta B=(I_p \cdot L_p)/(N_p \cdot A_e)$

14) Dynamic Load Response



Vin=90V Vmax=5.88 Vmin=4.76

Vin=264V Vmax=5.64 Vmin=4.72

- Test Condition:
- Output: 10-90%, T1=T2=50ms, Slew Rate: 0.1A/us
- Ambient Temperature: 25°C

15) Power Component thermal

Location	Io=2A			
	Vin=90Vac/60Hz		Vin=264Vac/50Hz	
	T(°C)	Tr(°C)	T(°C)	Tr(°C)



IC	105.9		96.9	
Tcoil	104.2		100	
Tcore	90.5		86.6	
SBD	110.6		109.8	
Ambient Temperature	40.6		40.9	

7. EMI Test Data

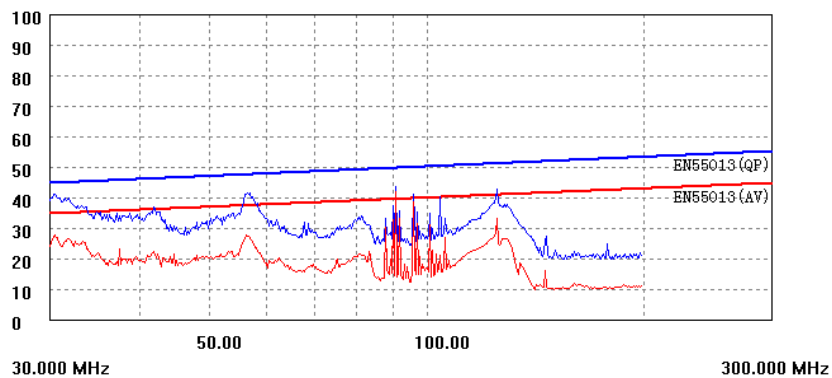
1) radiation

EMI TEST REPORT

Organization:	Operator:	EUT:	parameter
Place:	Time: 2016/10/27/15:5	Test equipment: KH3932	
Detector: PK+AV	Test-time(ms): 30	SN: 1532515	
Limit: EN55013	Transductor(PK/AV): PK / AV	JZ: 2,14,1291	
Remark:			

Start(MHz)	End(MHz)	Step(MHz)	freq, step
30.000	100.000	0.100	
100.000	230.000	0.200	
230.000	300.000	0.200	

scan result



(AC120V Vertical)

(AC120V Horizontal)

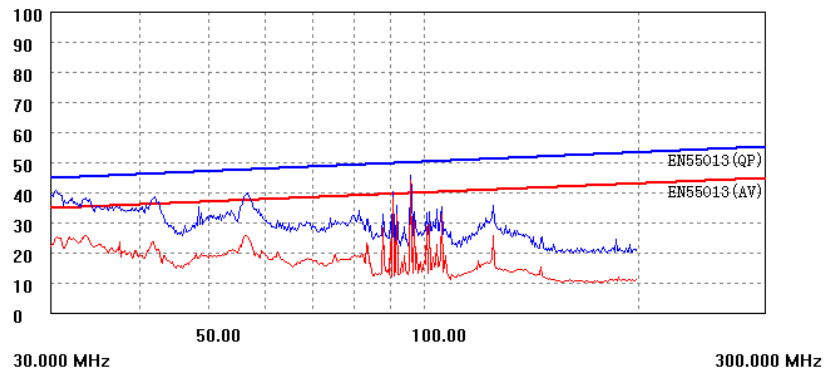


EMI TEST REPORT

Organization:	Operator:	EUT:
Place:	Time: 2016/10/27/15:2	Test equipment:KH3932
Detector: PK+AV	Test-time(ms): 30	SN: 1532515
Limit: EN55013	Transductor(PK/AV): PK / AV	JZ: 2,14,1296
Remark:		

Start(MHz)	End(MHz)	Step(MHz)
30.000	100.000	0.100
100.000	230.000	0.200
230.000	300.000	0.200

dBuV



(AC230V Vertical)

(AC230V Horizontal)

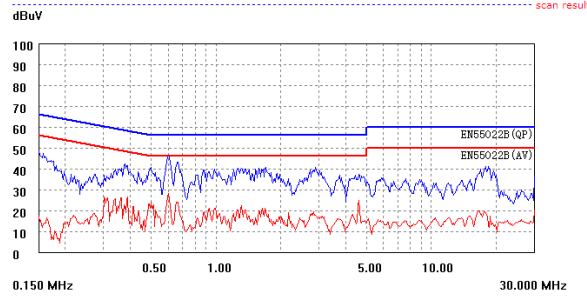


2) conduction

EMI TEST REPORT

Organization: Operator: EUT: parameter
Place: Time: 2016/10/27/14:55 Test equipment: KH3932
Detector: PK+AV Test-time(ms): 30 SN: 1532515
Limit: EN55022B Transductor(PK/AV): PK / AV JZ: 2,14,1318
Remark:

Start(MHz) End(MHz) Step(MHz) freq. step
0.150 2.000 0.002
2.000 10.000 0.010
10.000 30.000 0.025

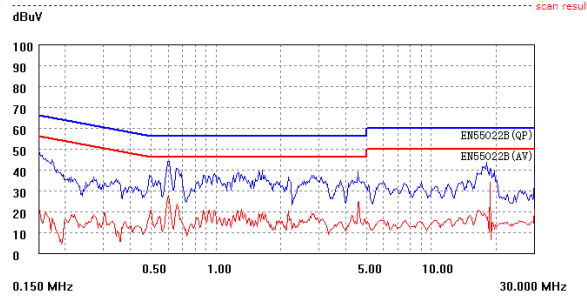


(EN55022_CE_230V_L)

EMI TEST REPORT

Organization: Operator: EUT: parameter
Place: Time: 2016/10/27/15:0 Test equipment: KH3932
Detector: PK+AV Test-time(ms): 30 SN: 1532515
Limit: EN55022B Transductor(PK/AV): PK / AV JZ: 2,14,1306
Remark:

Start(MHz) End(MHz) Step(MHz) freq. step
0.150 2.000 0.002
2.000 10.000 0.010
10.000 30.000 0.025



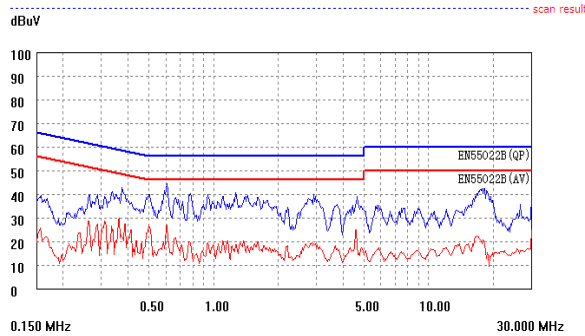
(EN55022_CE_230V_N)



EMI TEST REPORT

Organization:	Operator:	EUT:
Place:	Time: 2016/10/27/14:50	Test equipment:KH3932
Detector: PK+AV	Test-time(ms): 30	SN: 1532515
Limit: EN55022B	Transducer(PK/AV): PK / AV	JZ: 2,15,530
Remark:		

Start(MHz)	End(MHz)	Step(MHz)
0.150	2.000	0.002
2.000	10.000	0.010
10.000	30.000	0.025

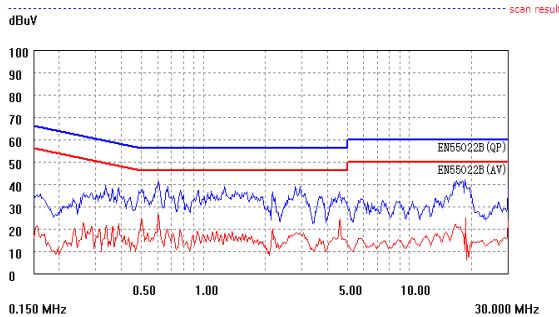


(EN55022_CE_120V_L)

EMI TEST REPORT

Organization:	Operator:	EUT:
Place:	Time: 2016/10/27/14:44	Test equipment:KH3932
Detector: PK+AV	Test-time(ms): 30	SN: 1532515
Limit: EN55022B	Transducer(PK/AV): PK / AV	JZ: 2,14,1356
Remark:		

Start(MHz)	End(MHz)	Step(MHz)
0.150	2.000	0.002
2.000	10.000	0.010
10.000	30.000	0.025



(EN55022_CE_120V_N)