

PN8160T+PN8308L 12V2A

多模式（高低压分频+PFM+PWM+QR）

专利高压启动模块+低工作电流

超低待机功耗小于60mW

PN8160T DIP8封装，集成功率MOSFET

PN8308L SOP8封装，集成功率MOSFET

六级能效裕量充足



General Design Specification:

- 1** AC Input Range 90-264VAC
- 2** DC Output 12V/2A
- 3** Meet “75mW@12V” No-Load Standby Power Consumption Requirement
- 4** Meet “DOE LEVEL VI” Efficiency Requirement
- 5** Max Output Ripple & Noise < 100mV

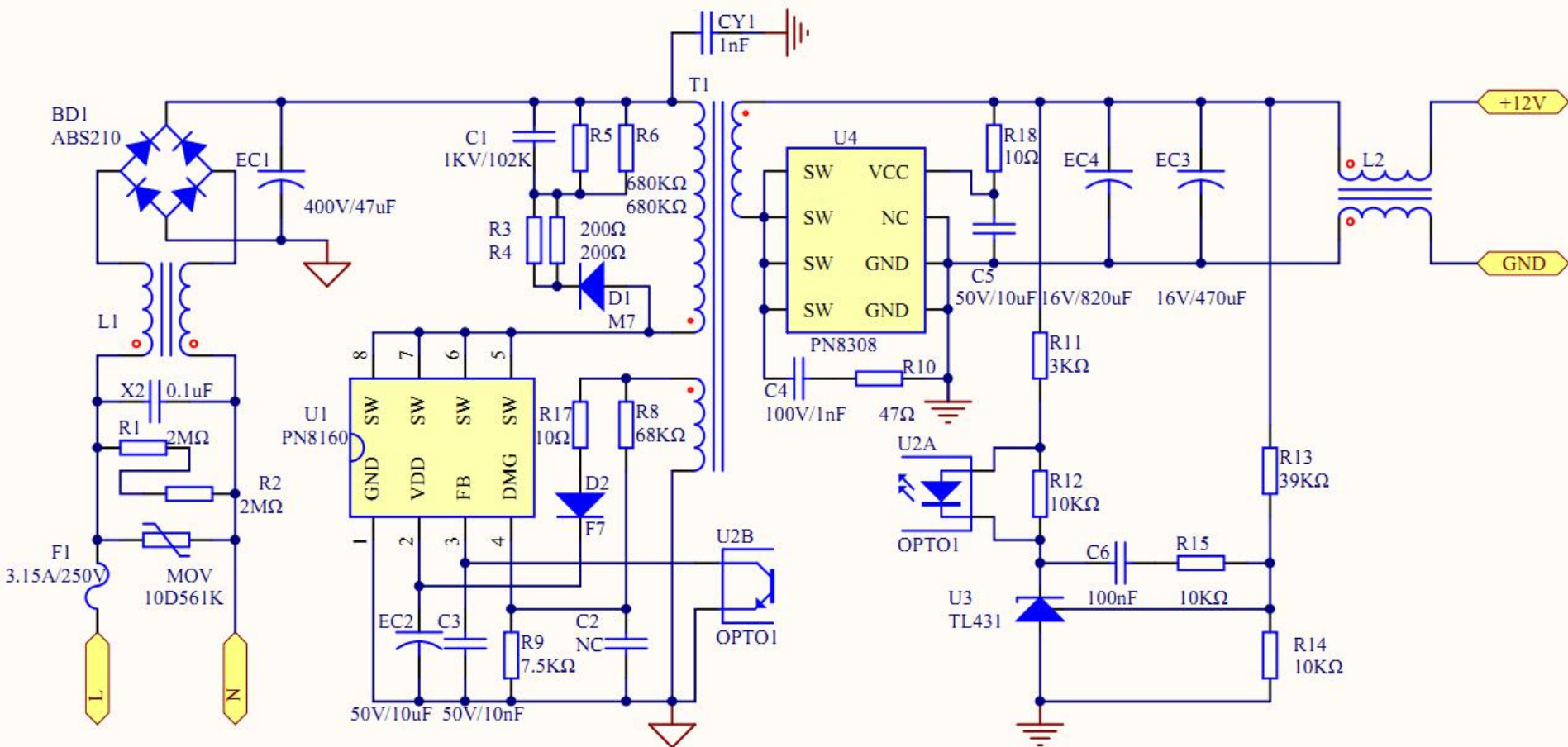
1、Specifcator

Description	Symbol	Min	Typ	Max	Unit	Comment
Input						
Voltage	Vin	90		264	V	
Frequency	Fs	50		60	Hz	
No-Load Input Power(230V)				60	mW	
Output						
12V/2A	Output Voltage	Vout	11.87		12.18	V
	Output Current	Iout	0		2	A
	Over Current Protection	Iocp			3.04	A
	Ripple & Noise	Vripple			90	mVp-p
	Average Efficiency	η	88.33%			
Ambient Temperature	Tamb	0		40	°C	

Test condition:

Test at the end of the line terminal(22AWG/1.5m)

2、Schematic

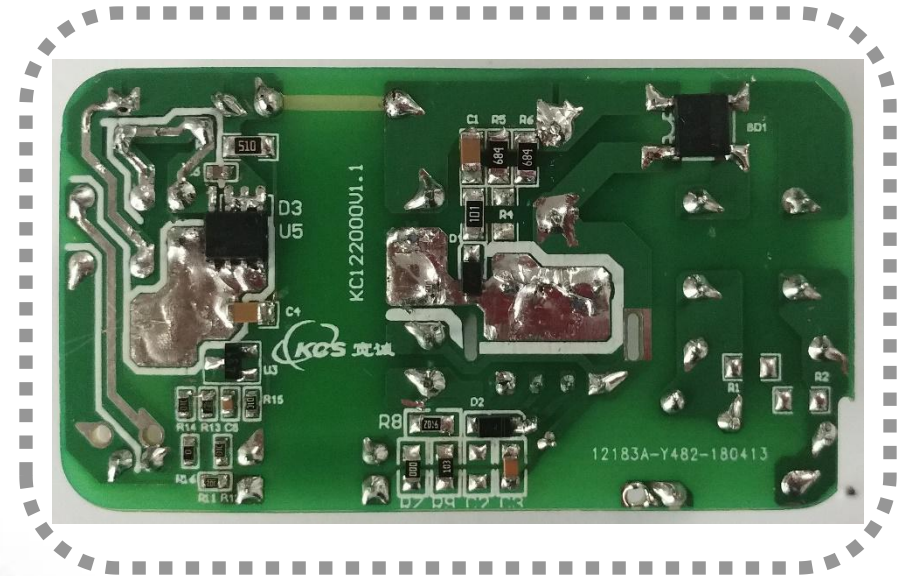


3、Circuit Board Photograph

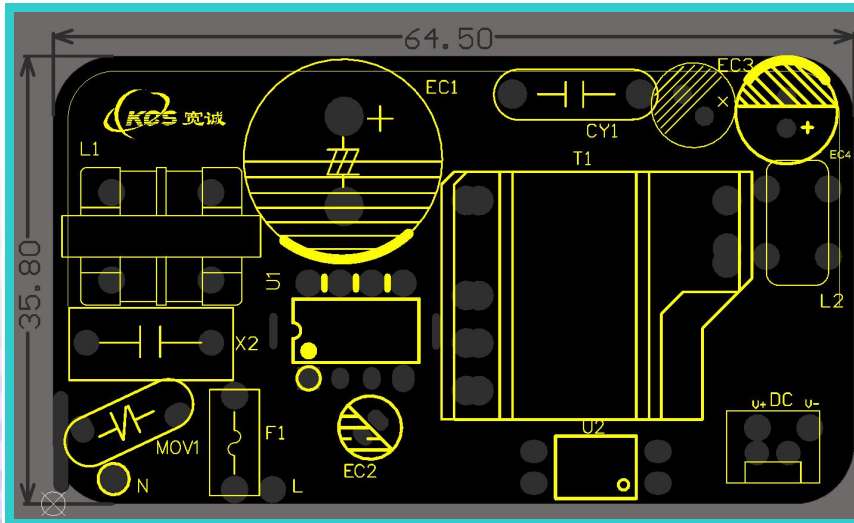
Top View



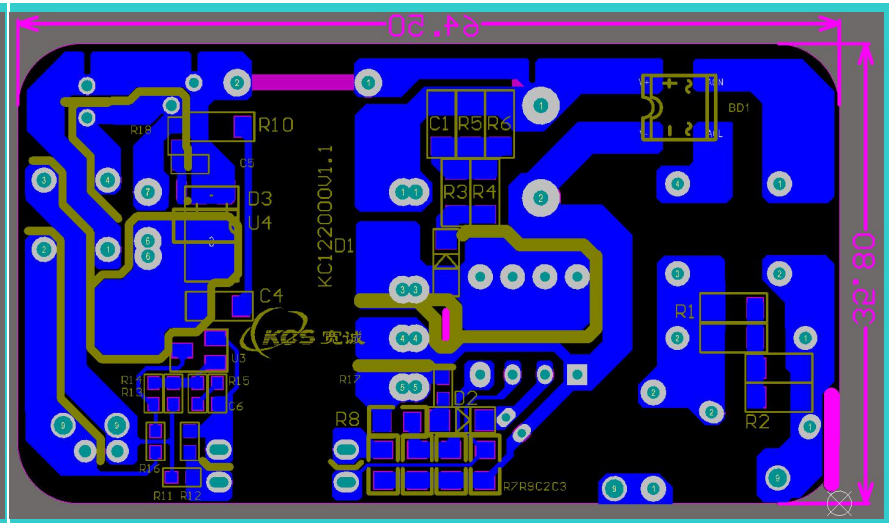
Bottom View



4、Layout



top layer



bottom layer

5.1、Bill of Material

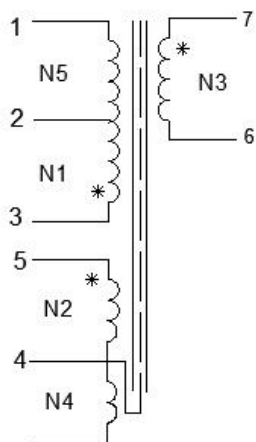
序号	元件标号	元件名称	元件型号	封装尺寸	数量	备注
1	BD1	整流桥	ABS210	SMD SOP4	1	
2	C1	陶瓷电容	1nF/1KV	SMD 1206	1	
3	C2		NC	SMD 0805		
4	C3		10nF/50V 5% 0805	SMD 0805	1	
5	C4		1nF/100V 5%1206	SMD 1206	1	
6	C5		10uF/50V/0603	SMD 0603	1	
7	C6		100nF/25V 0603	SMD 0603	1	
8	CY1	Y安规电容	1nF P=10mm	DIP 脚距10.0mm	1	
9	D1	二极管	M7 SOD-123	SMD SOD-123FL	1	
10	D2		M7 SOD-123	SMD SOD-123FL	1	
11	EC1	电解电容	电解电容47uF/400V φ16*20mm	Φ16*20mm	1	
12	EC2		电解电容10uF/50V φ5.0*11mm	Φ5*11mm	1	
13	EC3		电解电容680uF/16V φ8.0*15mm	Φ8*15mm	1	
14	EC4		电解电容470uF/16V φ6.3*13mm	Φ6.3*13mm	1	
15	F1	保险丝	3.15A/250V φ3.6*10mm	脚距7.5mm	1	
16	L1	电感	UU9.8 30mH 0.2mm	DIP4	1	
17	L2		T9*5*3 0.5mm 6TS 200uH	DIP4	1	
18	MOV	压敏电阻	10D561K P=7.8mm	脚距7.8mm	1	
19	R1	电阻	NC	SMD 1206		
20	R2		NC	SMD 1206		
21	R3		200Ω 5% 1206	SMD 1206	1	
22	R4		200Ω 5% 1206	SMD 1206	1	
23	R5		680k 5% 1206	SMD 1206	1	
24	R6		680k 5% 1206	SMD 1206	1	
25	R7		0R 5% 0805	SMD 0805	1	
26	R8		91K 5% 0805	SMD1206	1	

5.2、Bill of Material

序号	元件标号	元件名称	元件型号	封装尺寸	数量	备注
27	R9		10K 5% 0805	SMD 0805	1	
28	R10		47Ω 5% 1206	SMD 1206	1	
29	R11		3k 5% 0603	SMD 0603	1	
30	R12		10k 5% 0603	SMD 0603	1	
31	R13		39k 1% 0603	SMD 0603	1	1%
32	R14		10k 1% 0603	SMD 0603	1	1%
33	R15		10k 5% 0603	SMD 0603	1	
34	R16		0R 5% 0603	SMD 0603	1	
35	R17		10Ω 5% 0603	SMD 0603	1	
36	R18		10Ω 5% 0603	SMD 0603	1	
37	T1	变压器	EE22 立式加宽5+2 1.8MH	EE22立式加宽5+2	1	刘生13148805055
38	U1	IC	PN8160T	DIP8	1	
39	U2	光耦	EL817 DIP4	DIP4	1	
40	U3	431	TL431 SOT-23	SOT-23	1	
41	U4	同步整流	PN8308L SOP8	SOP8	1	
42	X2	X2电容	X2 0.1uF 13*6mm P=10mm	P=10mm	1	

6、Transformer Drawing

1.原理图



<<NOTE>>

1. N3绕组使用三层绝缘线.
2. 气隙研磨中柱.
3. 磁芯中柱可点黑胶固定
4. 磁芯接地

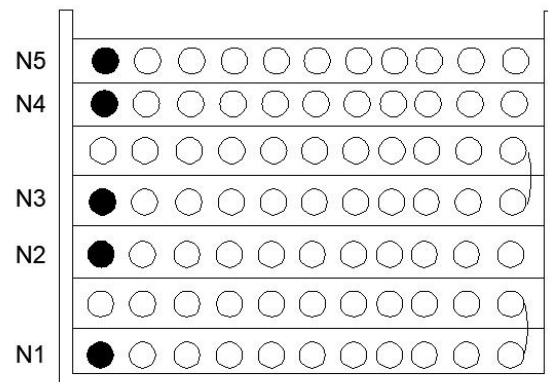
3.电气特性:

- 1.1 电感量:PIN 3- 1 1.8mH +/-5%; 测试条件: 1KHz 0.25V
- 1.2 漏感量:PIN 3- 1 120uH Max 测试条件: 10KHz 0.25V; PIN 8-7 5-4 短路.
- 1.3 高压测试:
 - 1.3.1 初级-次级 3750VAC 5mA 60S
 - 1.3.2 初、次级-磁芯 1500VAC 5mA 60S
- 1.4 绝缘电阻: 100Mohm Min; 测试条件: 500VDC

2.绕线结构

绕组	起末端	漆包线	圈数(TS)	胶带圈数(TS)	绕线方式	备注
N1	3 -- 2	2UEW \varnothing 0.27mm X 1P	57	2	平整密绕	两层
N2	5 -- 4	2UEW \varnothing 0.17mm X 2P	14	2	均匀疏绕	一层
N3	7 -- 6	TEX-B \varnothing 0.55mm X 2P	10	2	平整密绕	一层
N4	4 -- NC	2UEW \varnothing 0.17mm X 1P	37	2	平整密绕	一层
N5	2 -- 1	2UEW \varnothing 0.27mm X 1P	24	2	平整密绕	一层

4. 绕线剖面示意图



BOBBIN

EE22加宽立式 $A_e=62\text{mm}^2$ 5+2pin PC40

7、 Regulation, Ripple and Efficiency

Vin (V)	Pin (W)	Iout (A)	Vout (V)	η (%)	Avg η (%)	OCP (A)	Vripple MAX (mV)	Doe Level VI Requirement
115Vac /60Hz	0.04	0	12.18		88.10%	3.04	79	86.20%
	2.78	0.2	12.15	87.39%				
	6.76	0.5	12.10	89.48%				
	13.42	1	12.02	89.55%				
	20.56	1.5	11.97	87.32%				
	27.66	2	11.90	86.03%				
230Vac /50Hz	0.06	0	12.18		88.55%	3.09	90	
	2.88	0.2	12.15	84.36%				
	6.86	0.5	12.10	88.21%				
	13.47	1	12.02	89.27%				
	20.07	1.5	11.95	89.29%				
	27.15	2	11.87	87.43%				

Test condition:

Test at the end of the line terminal(22AWG/1.5m)

传导测试



Anbotek Compliance Laboratory Limited

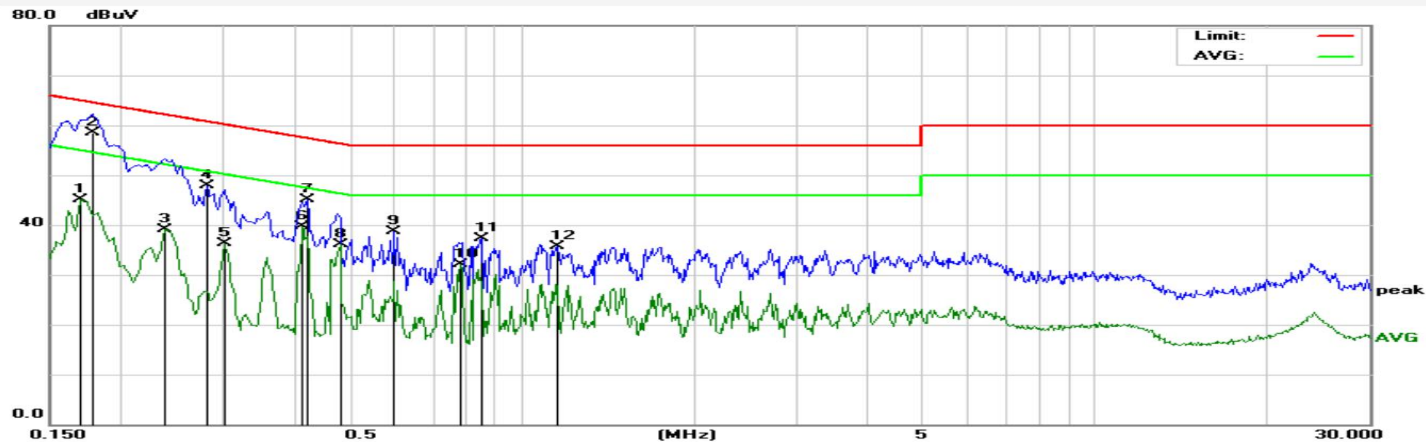
1/F, Building D, Sogood Science and Technology Park, Sanwei community,
Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China. 518102

Tel: (86)755-26066365
Fax: (86)755-26014772

Job No.: SZAWW180426002
Standard: EN55032 CE-Class B_QP
Test item: Conduction Test
Temp.(C)/Hum.(%) 23.4 / 57 %
EUT: Power Adapter
Mode: Charge Mode
Model: KC122000 CV1

Phase: L1
Power Source: AC 230V/50Hz
Date: 2018/05/23
Time: 21:44:21
Engineer Signature:

Note:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Over Limit (dB)	Detector	Remark
1	0.1700	25.13	19.90	45.03	54.96	-9.93	AVG	
2	0.1780	38.57	19.90	58.47	64.57	-6.10	QP	
3	0.2380	19.12	19.89	39.01	52.16	-13.15	AVG	
4	0.2819	27.92	19.89	47.81	60.76	-12.95	QP	
5	0.3020	16.41	19.89	36.30	50.19	-13.89	AVG	
6	0.4140	19.70	19.94	39.64	47.57	-7.93	AVG	
7	0.4220	25.11	19.94	45.05	57.41	-12.36	QP	
8	0.4820	16.07	19.97	36.04	46.30	-10.26	AVG	
9	0.5980	18.65	20.01	38.66	56.00	-17.34	QP	
10	0.7820	12.10	20.06	32.16	46.00	-13.84	AVG	
11	0.8500	17.30	20.08	37.38	56.00	-18.62	QP	
12	1.1539	15.54	20.12	35.66	56.00	-20.34	QP	

传导测试



Anbotek Compliance Laboratory Limited

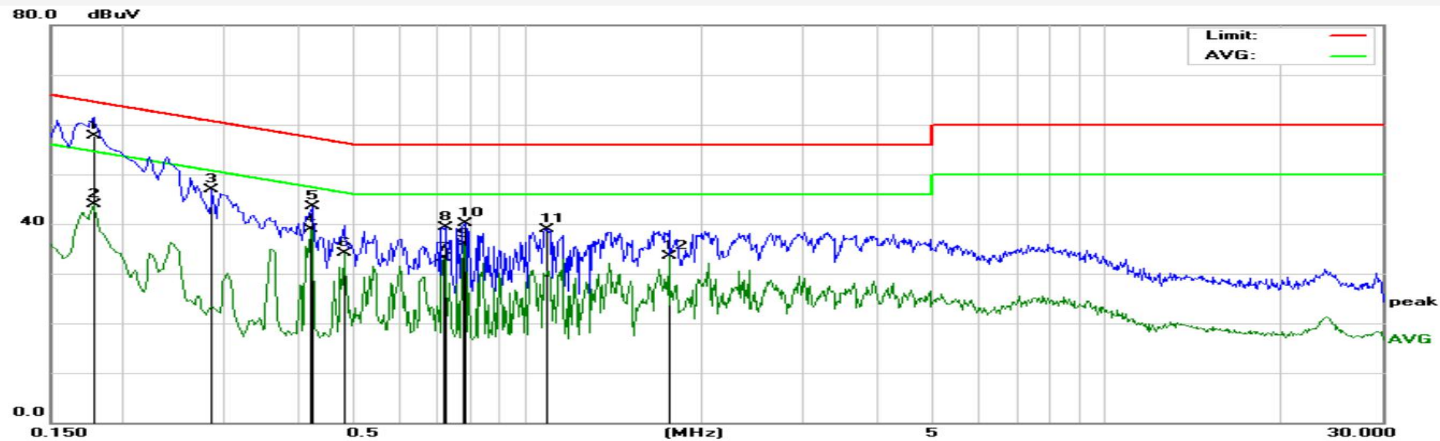
1/F, Building D, Sogood Science and Technology Park, Sanwei community,
Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China. 518102

Tel: (86)755-26066365
Fax: (86)755-26014772

Job No.: SZAWW180426002
Standard: EN55032 CE-Class B_QP
Test item: Conduction Test
Temp.(C)/Hum.(%) 23.4 / 57 %
EUT: Power Adapter
Mode: Charge Mode
Model: KC122000 CV1

Phase: N
Power Source: AC 230V/50Hz
Date: 2018/05/23
Time: 21:46:14
Engineer Signature:

Note:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Over Limit (dB)	Detector	Remark
1	0.1780	37.77	19.90	57.67	64.57	-6.90	QP	
2	0.1780	24.06	19.90	43.96	54.57	-10.61	AVG	
3	0.2860	27.08	19.89	46.97	60.64	-13.67	QP	
4	0.4220	18.95	19.94	38.89	47.41	-8.52	AVG	
5	0.4260	23.62	19.95	43.57	57.33	-13.76	QP	
6	0.4820	14.12	19.97	34.09	46.30	-12.21	AVG	
7	0.7180	12.97	20.04	33.01	46.00	-12.99	AVG	
8	0.7220	19.32	20.05	39.37	56.00	-16.63	QP	
9	0.7780	15.75	20.06	35.81	46.00	-10.19	AVG	
10	0.7820	20.02	20.06	40.08	56.00	-15.92	QP	
11	1.0859	18.87	20.12	38.99	56.00	-17.01	QP	
12	1.7540	13.39	20.14	33.53	46.00	-12.47	AVG	

辐射测试



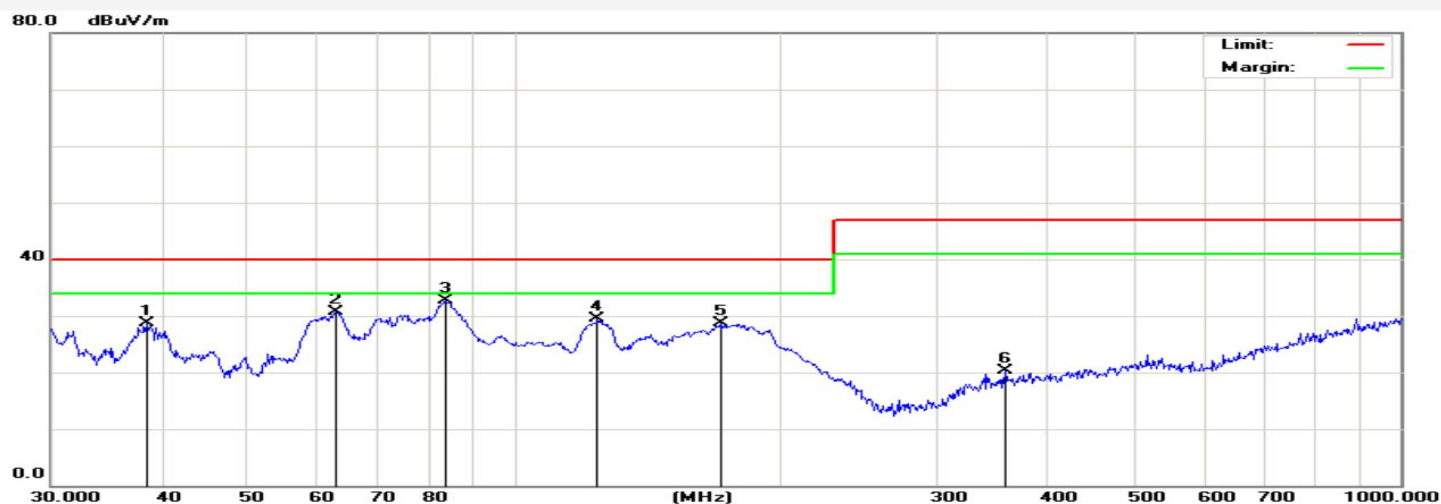
Anbotek Compliance Laboratory Limited
 1/F, Building D, Sogood Science and Technology Park, Sanwei community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China.

Site: 966 Chamber#2
 Tel: (86)755-26066365
 Fax: (86)755-26014772

Job No.: SZAWW180426002
 Standard: (RE)EN55032_class B_3m
 Test item: Radiation Test
 Temp.(C)/Hum.(%) 23.2 / 54 %
 EUT: Power Adapter
 Mode: full load
 Model: KC122000 CV1

Polarization: Vertical
 Power Source: AC 220V/50Hz
 Date: 2018/05/24
 Time: 0:21:50
 Engineer Signature:
 Distance: 3m

Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	38.4809	42.93	-14.20	28.73	40.00	-11.27	peak			
2	62.8708	47.77	-17.07	30.70	40.00	-9.30	peak			
3	83.5222	51.10	-18.48	32.62	40.00	-7.38	peak			
4	124.1330	45.46	-15.95	29.51	40.00	-10.49	peak			
5	170.7926	45.12	-16.50	28.62	40.00	-11.38	peak			
6	357.9287	33.09	-12.73	20.36	47.00	-26.64	peak			

辐射测试



Anbotek Compliance Laboratory Limited
 1/F, Building D, Sogood Science and Technology Park, Sanwei community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China.

Site: 966 Chamber#2
 Tel: (86)755-26066365
 Fax: (86)755-26014772

Job No.: SZAWW180426002
 Standard: (RE)EN55032_class B_3m
 Test item: Radiation Test
 Temp.(C)/Hum.(%) 23.2 / 54 %
 EUT: Power Adapter
 Mode: full load
 Model: KC122000 CV1

Polarization: Horizontal
 Power Source: AC 220V/50Hz
 Date: 2018/05/24
 Time: 0:20:29
 Engineer Signature:
 Distance: 3m

Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	39.7146	34.63	-14.52	20.11	40.00	-19.89	peak			
2	60.0691	37.80	-17.03	20.77	40.00	-19.23	peak			
3	83.8156	52.45	-21.38	31.07	40.00	-8.93	peak			
4	104.5361	45.18	-20.69	24.49	40.00	-15.51	peak			
5	124.1330	45.92	-21.50	24.42	40.00	-15.58	peak			
6	187.7530	42.62	-19.91	22.71	40.00	-17.29	peak			



Thank you

深圳市宽诚集成电路技术有限公司

地址：深圳市南山区西丽丽水路同富裕工业区9栋5楼

电话：17688168966(任生) 传真：0755-33902231

QQ：465930054 E-mail:renxq@kcsemitech.com

网址：www.kcsemitech.com

