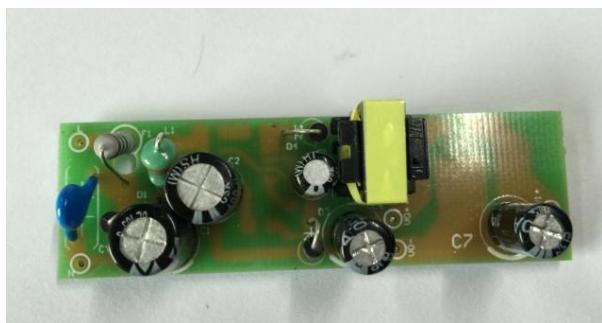


## <A &+ ' %\_Appliance\_12V0.25A\_SZ02 规格书

### 特点:

- ◆ 原边控制的非隔离反激式适配器
- ◆ 芯片内部集成高压功率 MOSFET , 外围精简
- ◆ 优异的线性调整率和负载调整率
- ◆ 电源系统各种保护齐全
- ◆ 工作温度范围-10°C~40°C
- ◆ 变压器适应自动绕线工艺
- ◆ 小体积 ( 长\*宽\*高=67\*20\*15mm )



认证工程师	结构工程师	电气工程师	审核

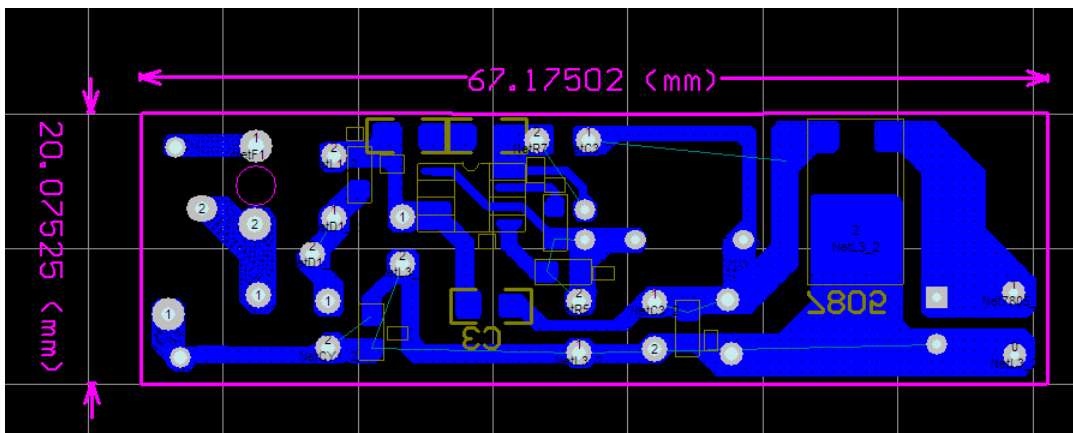
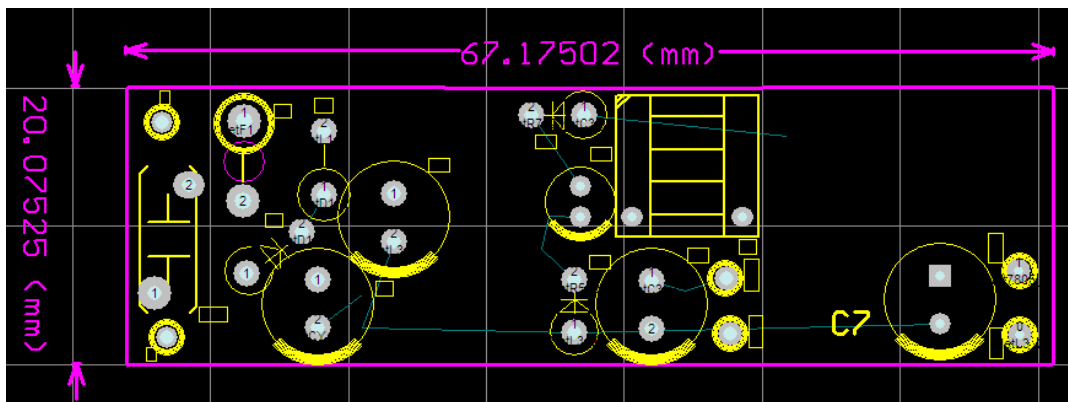
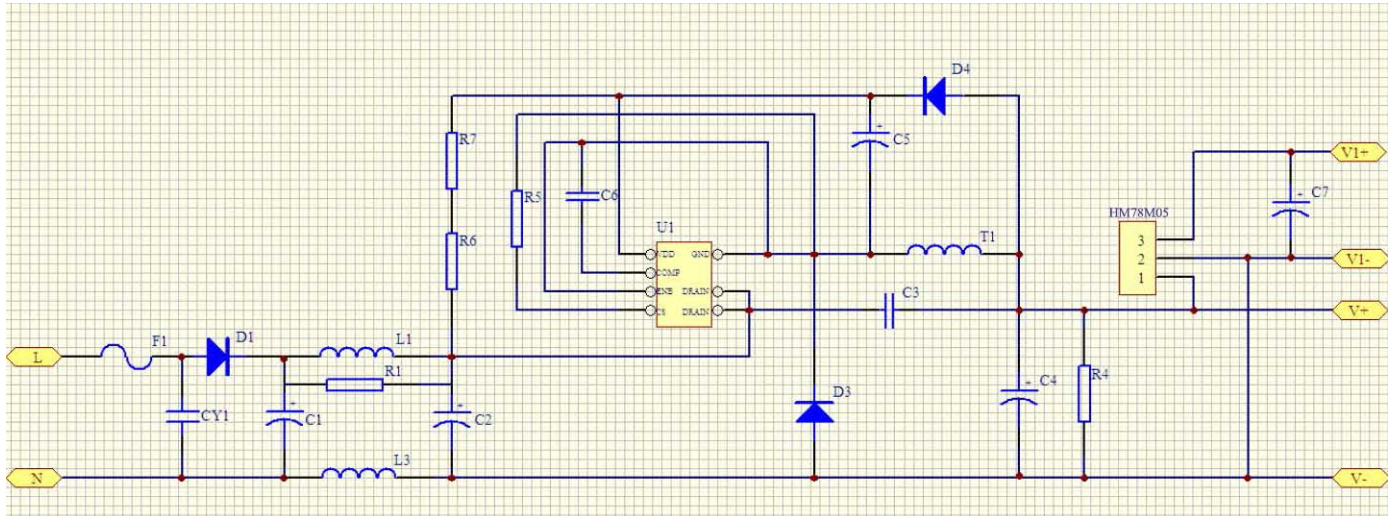
版本记录		
日期	版次	描述
2016/01/25	02	初定

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## 设计规格

项目	符号	最小值		最大值	单位	备注
输入规格						
输入电压	$V_{IN}$	90		264	$V_{AC}$	
输入频率	$F_I$	47		63	Hz	
静态功耗 (230V <sub>AC</sub> )	$P_{In\_Standby}$			160	mW	
输出规格						
输出电压	$V_{OUT}$	11.4		12.6	V	
输出电流	$I_{OUT}$		250		mA	
输出纹波	$V_{RIPPLE}$		100		mV	满载输出 @TA=25°C 频带宽度20MHz
输出功率						
满载输出功率	$P_{OUT}$		3		W	
电气性能&环境						
效率	$\eta$				%	230V <sub>AC</sub> /50Hz, 满载
线性调整率				±3	%	
负载调整率				±3	%	
工作环境温度	$T_{AMB}$	-10		40	°C	



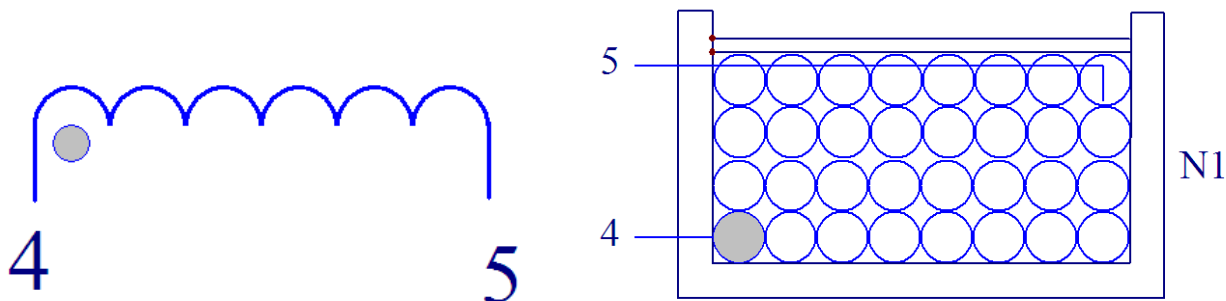
## PCB Layout 67mm\*20mm

### 3. 元件清单

		元件编号	元件描述及型号	数量	元件封装	品牌
1	DIP	F1	保险电阻 10R/1W 5%	1	DIP 4*11	
2	DIP	D1	Fast diode FR107	1	D0-41	
3	DIP	D4	Diode 1N4007	1	D0-41	
4	DIP	D3	Diode SF18	1	D0-41	
5	DIP	C1,C2	电解电容 4.7uF/400V	2	DIP 8*12	艾华
6	DIP	C4	电解电容 330uF/16V	1	DIP 8*12	艾华
7	DIP	C6	电解电容 100uF/25V	1	DIP 6*12	艾华
8	DIP	C5	电解电容 4.7Uf/50V	1	DIP 5*10	艾华
9	DIP	CY1	Y 电容 2.2Nf	1	P=11mm	
10	DIP	L1	色环电感 3.3mH	1	0410	
11	SMD	U1	J O 4953 SOP7	1	SOP7	
12	SMD	J O 9: O 27	稳压芯片 J O 9: O 27	1		
13	SMD	R1 R4	RES 0805 4.7K 5%	2	SMD 0805	
14	SMD	R5	RES 0805 2R4 1%	1	SMD 0805	
15	SMD	R6,R7	RES 1206 1.5M 5%	2	SMD 1206	
16	SMD	C6	Cap 220pF/50V	1	SMD 0805	
17	SMD	C3	Cap 10nF/1KV	1	SMD 1206	
18	SMD	L3	10uH	1	SMD 0805	
19	DIP	T1	1.0mH±5%	1	EE10 立式 (4+4)	
20		PCB	67*20*1.0mm CEM-1	1		

## 4. 变压器绕制

骨架类型	PIN 数目	针距	排距	备注	Ae
EE10	4+4	2.5mm	8mm	立式	12.1 mm <sup>2</sup>



绕组	绕 制 工 艺	匝数	线径*根数
N1	从PIN4（起线）到PIN5（收线），用1条 $\phi 0.14\text{mm}$ 漆包线密绕四层，绕制155TS。	160Ts	UEW $\phi 0.14\text{m} \times 1\text{P}$
	用裸露的0.2mm的漆包线链接磁芯和5脚		

◆ 电感 (Inductance):  $LP(N1) = 1\text{mH} \pm 5\%$ ; (10KHZ 0.25V)

## 5. 性能测试报告

Test Model	J O 4953_Appliance_12V0.25A _SZ0
Test Date	2016-01-25
Test Temperature	Ambient
Test Equipment	<b>AC source:</b> isolation AC power <b>Electronic load:</b> ITECH DC ELECTRONIC LOAD IT8512B <b>Power meter:</b> WT210 <b>Oscilloscope:</b> Agilent (DSO-X 2022A)
Test Items	1 Input Current 2 Input wattage at no load condition 3 Turn on time 4 Hold up time 5 DC output rising time 6 Line & load regulation 7 Efficiency 8 Output ripple & noise 9 Over current protection 10 Short circuit protection 11 Voltage stress on MOSFET & rectifiers 12 EMI test

### 1) Input current

#### 1.1 Test condition

Measure the AC input current at maximum loading

#### 1.2 Test result

Input Voltage	Input current (mA)	Spec.
90V/60HZ	108.2	<300mA
264V/50HZ	41.7	

### 2) Standby power

#### 2.1 Test condition

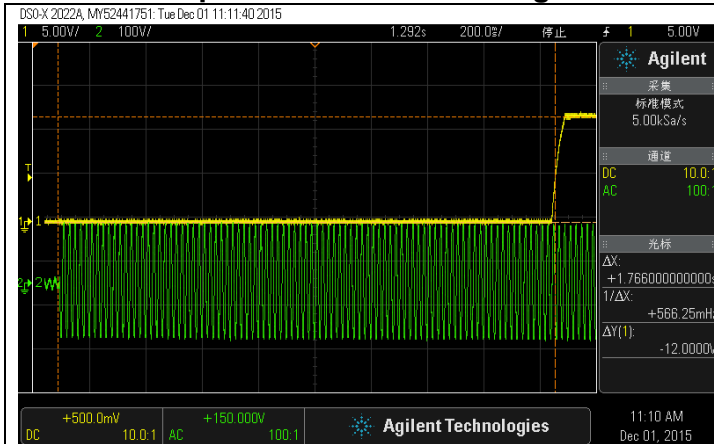
Measure the input wattage and output voltage at no load

Input Voltage	Input wattage(W)	Output voltage(V)	Spec.
90V/60Hz	0.06	12.45	<0.3W
120V/60Hz	0.06	12.44	
180V/50Hz	0.08	12.43	
220V/50Hz	0.08	12.44	
264V/50Hz	0.11	12.45	

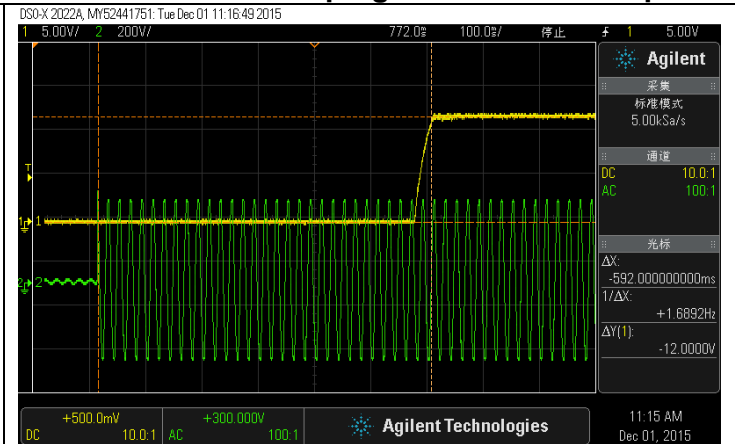
### 3) Turn on Time

#### 3.1 Test condition

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



**90V/60Hz-----1.766S**

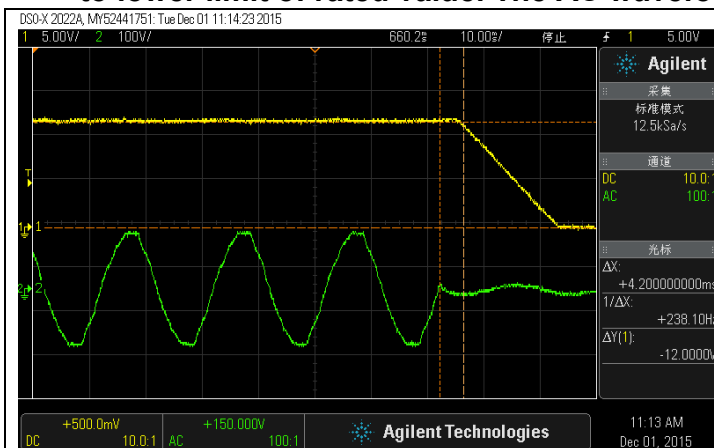


**264V/50Hz----0.592S**

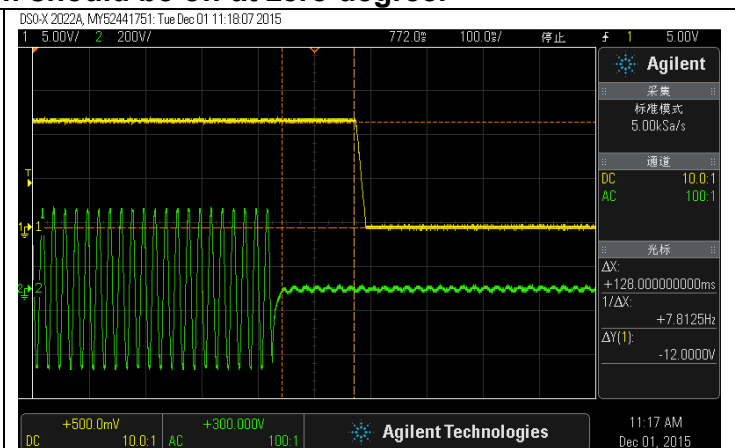
### 4) Hold-up Time

#### 4.1 Test condition

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.



**90V/60Hz-----4.2ms**



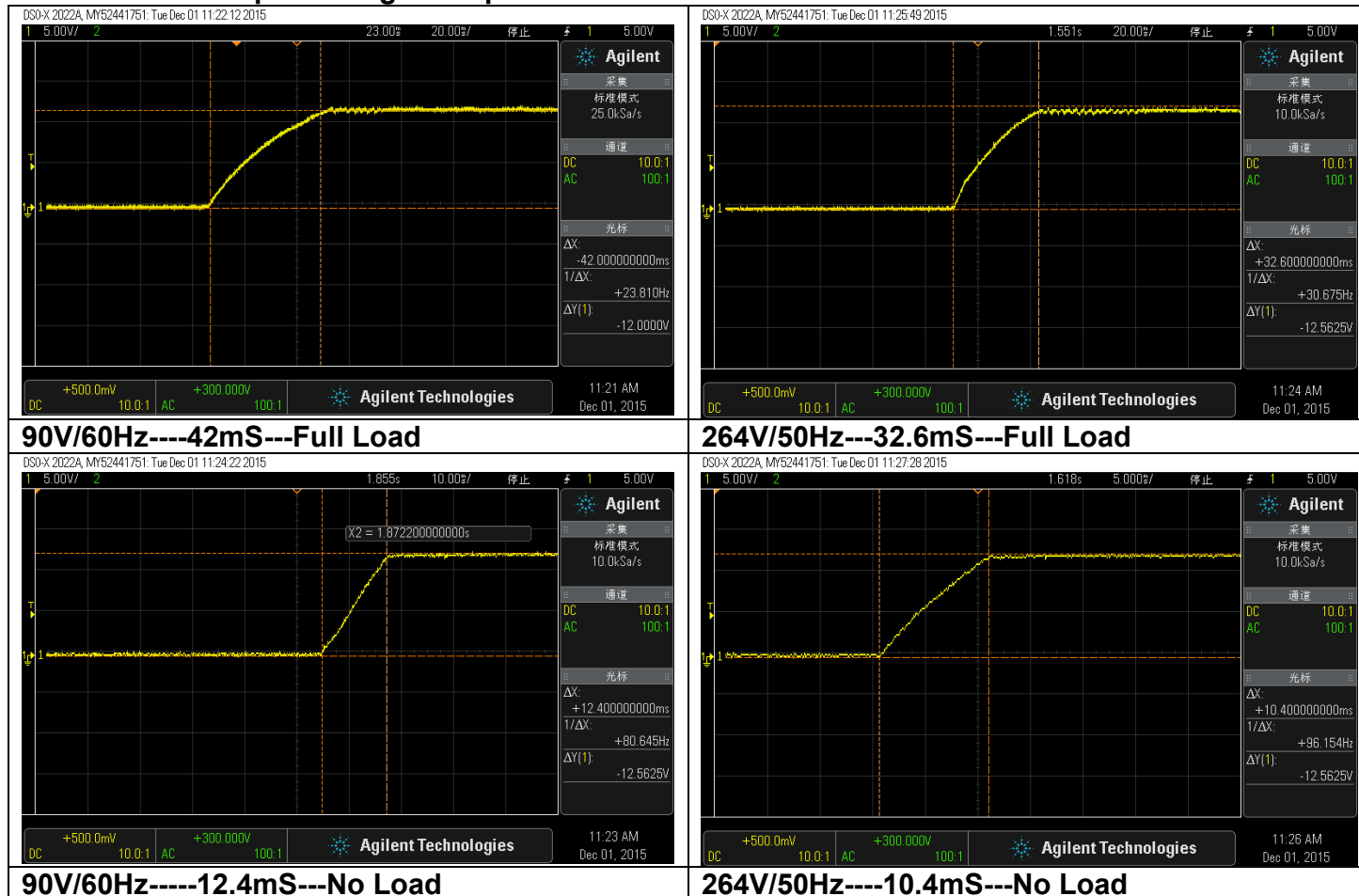
**264V/50Hz----128ms**



## 5) DC output rising time

### 5.1 Test condition

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



## 6) Line & load regulation

### 6.1 Test condition

Measure line & load regulation according to below table load conditon: CC 0.25A

Input Voltage	Output V at Max. load(V)	Output V at Min. load(V)	Load Regulation (%)	Spec.
90V/60Hz	12.094	12.461	2.99%	<5%
120V/60Hz	12.092	12.457	2.97%	
180V/50Hz	12.088	12.454	2.98%	
220V/50Hz	12.085	12.458	3.04%	
264V/50Hz	12.088	12.474	3.14%	
Line Regulation	0.07%	0.16%		

## 7) Efficiency

### 7.1 Test condition

Output at max. load (CC 0.25A)。

Input Voltage	Input Wattage(W)	Output Wattage(W)	Efficiency (%)
90V/60Hz	4.24	3.023	71.29
120V/60Hz	3.97	3.023	76.14
180V/50Hz	3.98	3.023	75.95
220V/50Hz	4.05	3.021	74.59
264V/50Hz	4.12	3.022	73.35

### 7.2 Avg Efficiency

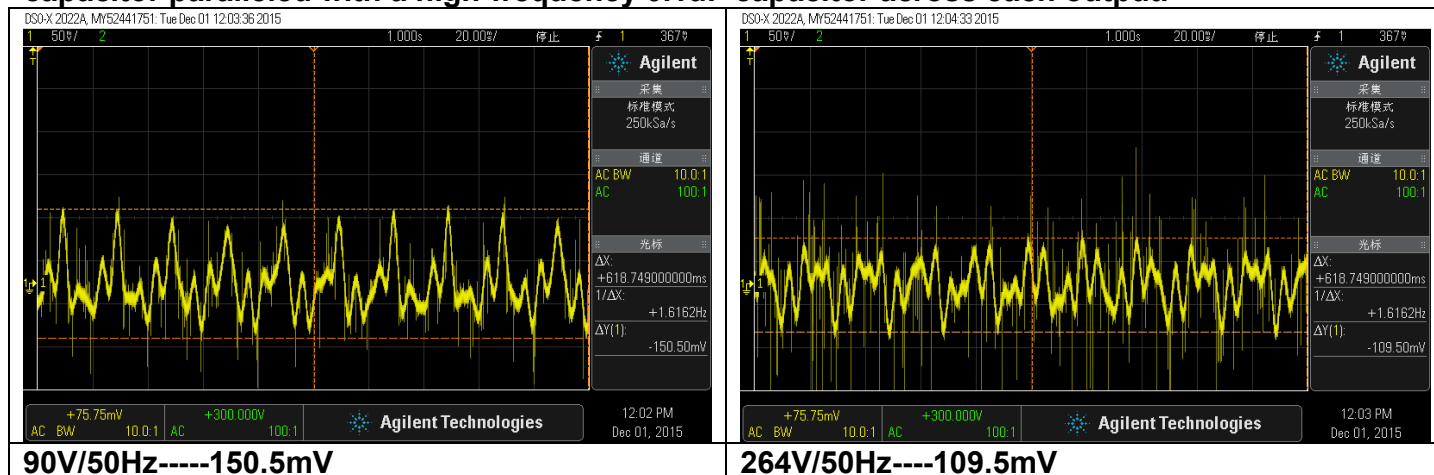
	Efficiency (%)				
Input Voltage	25% Load	50% Load	75% Load	100% Load	Avg
120V/60Hz	82.93	81.31	77.9	76.14	79.57
220V/50Hz	78.57	80.31	77.31	74.59	77.69

注：以上测试数据是在PCB板端测试所得。

## 8) Output ripple & noise

### 8.1 Test condition

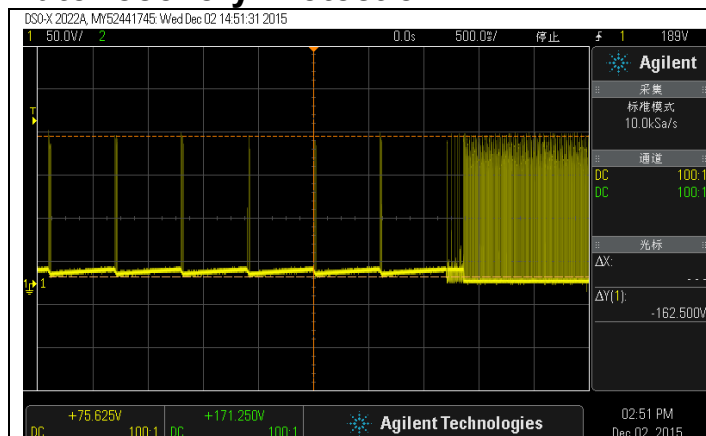
Ripple & noise are measured by using 20MHz bandwidth limited oscilloscope with a 10uF capacitor paralleled with a high-frequency 0.1uF capacitor across each output.



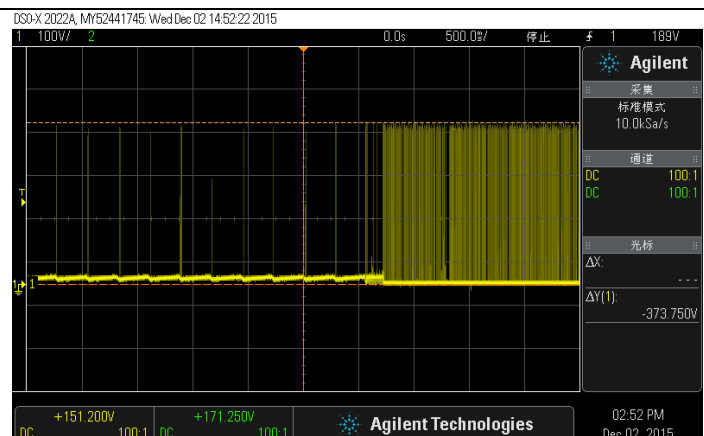
## 9) Over current protection

Input Voltage	Output Over current A)	Spec.
90V/60HZ	0.272	0.3A
264V/50HZ	0.29	

## 10) Short circuit protection Auto recovery Protection



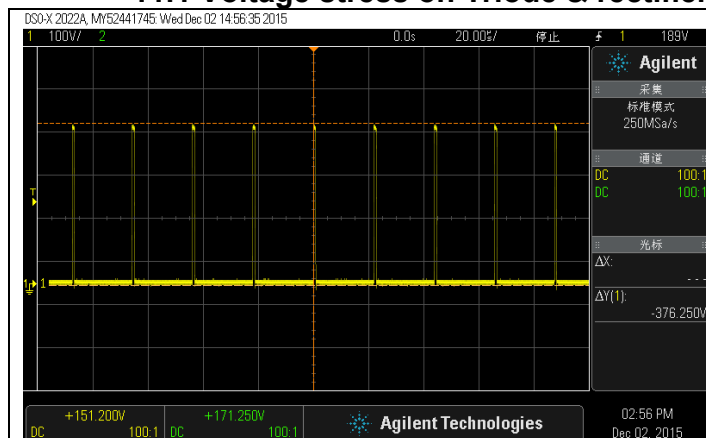
**MOSFET-VDS-120V/50Hz-----162.5V(Auto recovery Protection)**



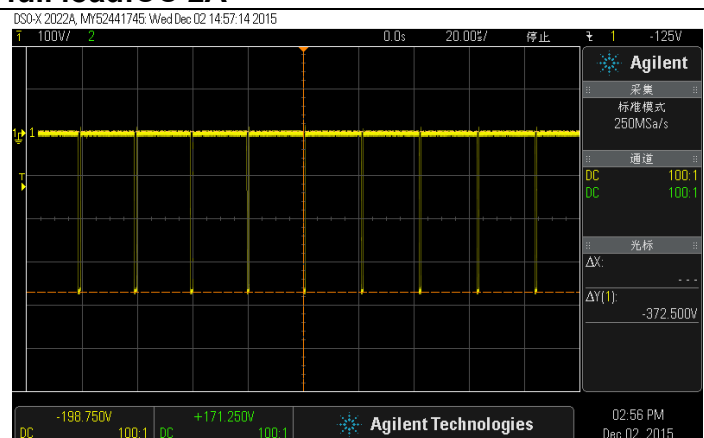
**MOSFET-VDS-373.5V/50Hz-----600V(Auto recovery)**

## 11) Voltage stress on MOSFET & Rectifiers

### 11.1 Voltage stress on Triode & rectifiers full load:CC 2A



**MOSFET-VDS-264V/50Hz-----376.25V**



**Diode-Vrrm--264V/50Hz----372.5V**

**12) Temperature rise**

编号	测试项目	90VAC	264AC
1	变压器磁芯	83.1℃	83.5℃
2	变压器线包	91.0℃	92.1℃
3	输入电解	66.7℃	59.4℃
4	IC	95℃	91.3℃
5	输出二极管	77.9℃	76.3℃
9	壳内温度	63.8℃	60.5℃

### 13) EMI test

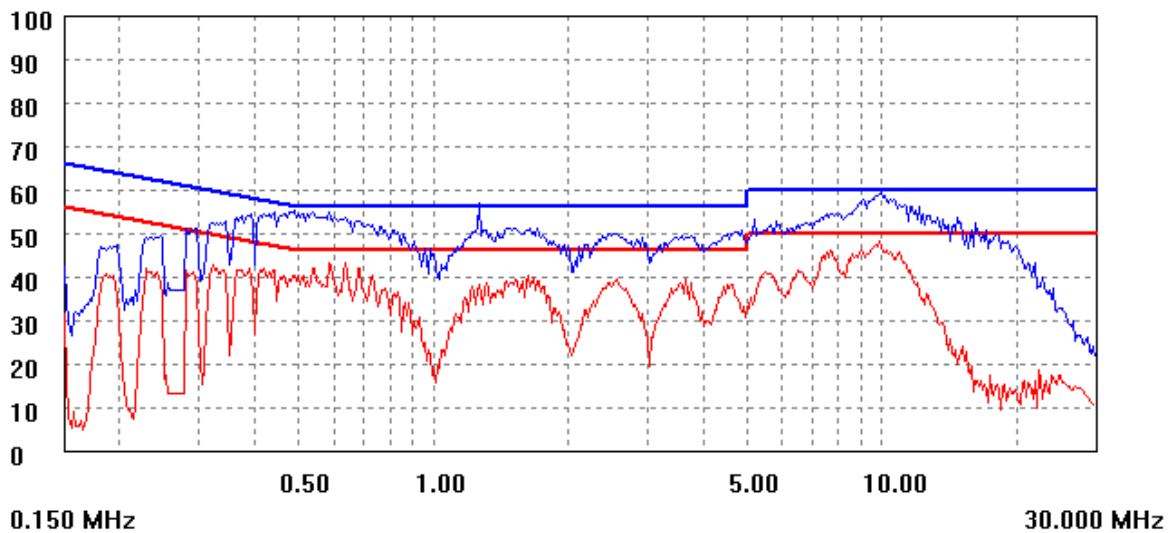
传导

#### EMI TEST REPORT

Organization:		Operator:	EUT:
Place:		Time: 2016/1/14/16:57	Test equipment: KH3932
Detector:	PK+AV	Test-time(ms): 30	SN: 1232276
Limit:	EN55022B	Transductor(PK/AV): PK-1 / AV-1	
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

dBuV



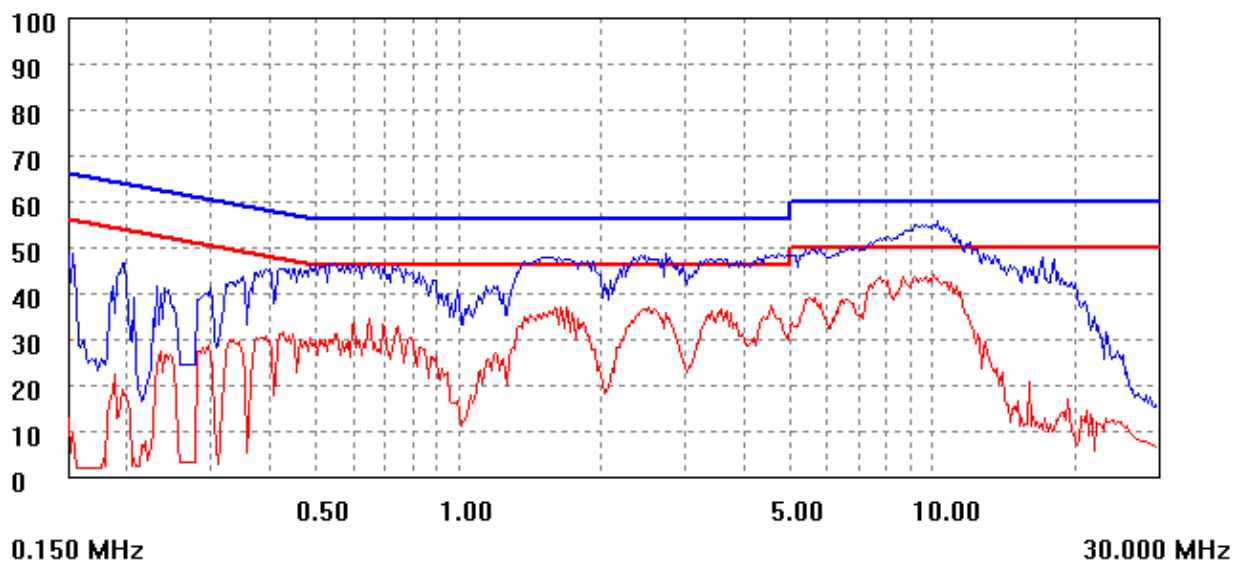
230Vac L

## EMI TEST REPORT

<b>Organization:</b>	<b>Operator:</b>	<b>EUT:</b>
<b>Place:</b>	<b>Time:</b> 2016/1/14/16:54	<b>Test equipment:</b> KH3932
<b>Detector:</b> PK+AV	<b>Test-time(ms):</b> 30	<b>SN:</b> 1232276
<b>Limit:</b> EN55022B	<b>Transductor(PK/AV):</b> PK-1 / AV-1	
<b>Remark:</b>		

<b>Start(MHz)</b>	<b>End(MHz)</b>	<b>Step(MHz)</b>
0.150	2.000	0.002
2.000	10.000	0.010
10.000	30.000	0.025

**dBuV**



230Vac N

## EMI TEST REPORT

Organization:

Operator:

EUT:

Place:

Time: 2016/1/14/17:12

Test equipment: KH3932

Detector: PK+AV

Test-time(ms): 30

SN: 1232276

Limit: EN55022B

Transductor(PK/AV): PK-1 / AV-1

Remark:

Start(MHz)

End(MHz)

Step(MHz)

0.150

2.000

0.002

2.000

10.000

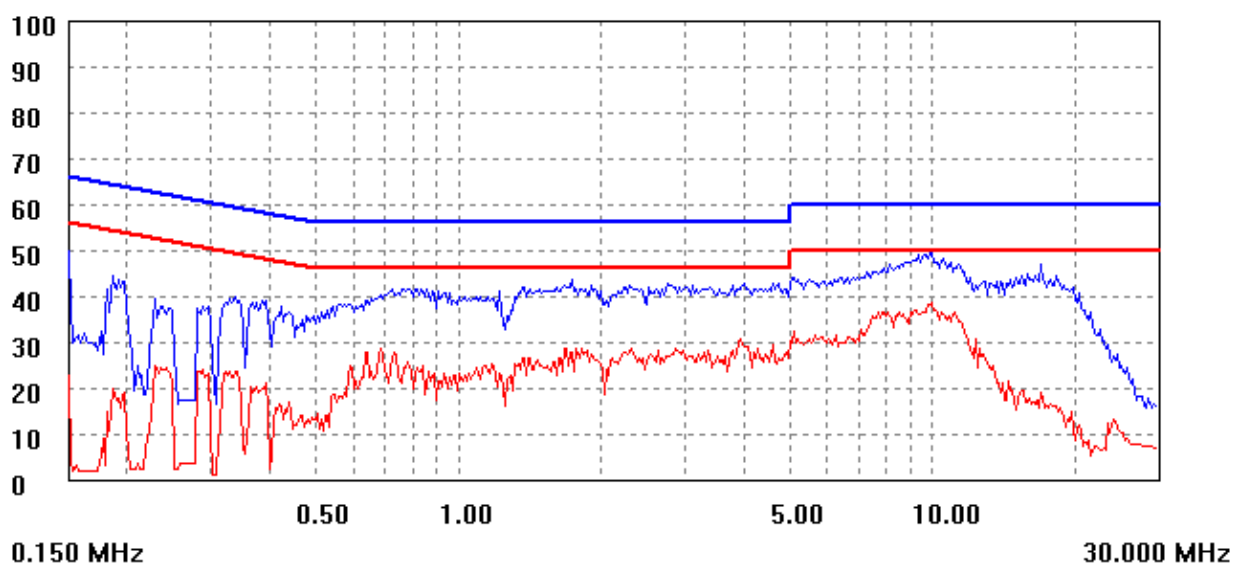
0.010

10.000

30.000

0.025

dBuV



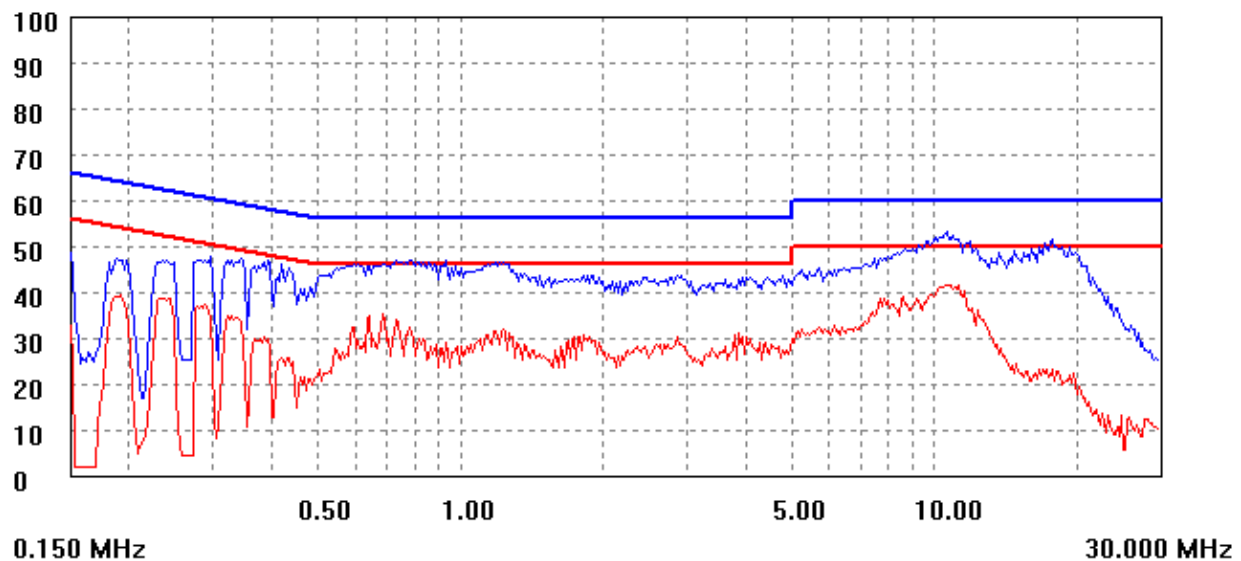
120Vac N

## EMI TEST REPORT

<b>Organization:</b>	<b>Operator:</b>	<b>EUT:</b>
<b>Place:</b>	<b>Time:</b> 2016/1/14/17:8	<b>Test equipment:</b> KH3932
<b>Detector:</b> PK+AV	<b>Test-time(ms):</b> 30	<b>SN:</b> 1232276
<b>Limit:</b> EN55022B	<b>Transductor(PK/AV):</b> PK-1 / AV-1	
<b>Remark:</b>		

<b>Start(MHz)</b>	<b>End(MHz)</b>	<b>Step(MHz)</b>
0.150	2.000	0.002
2.000	10.000	0.010
10.000	30.000	0.025

**dBuV**

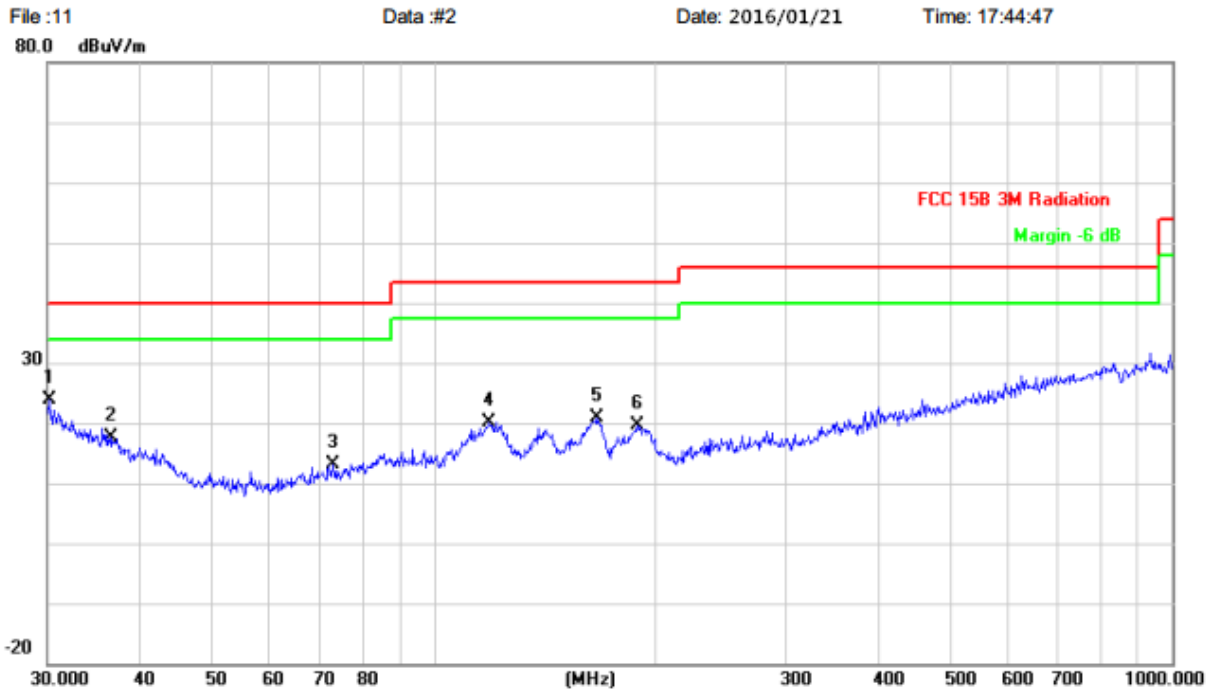


120Vac L



辐射

Radiated Emission Measurement



Site TOBY ETS Chamber #1

Limit: FCC 15B 3M Radiation

EUT: adapter

M/N: 1901

Mode: Full load

Note: 原始

Polarization: **Horizontal**

Power: AC 120V/60Hz

Distance:

Temperature: 26

Humidity: 55 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	30.2111	37.98	-14.09	23.89	40.00	-16.11	peak		
2		36.6375	35.80	-18.07	17.73	40.00	-22.27	peak		
3		73.1025	36.57	-23.52	13.05	40.00	-26.95	peak		
4		119.0180	42.57	-22.44	20.13	43.50	-23.37	peak		
5		166.0680	41.73	-20.91	20.82	43.50	-22.68	peak		
6		188.4125	40.38	-20.85	19.53	43.50	-23.97	peak		

120Vac 水平

# Radiated Emission Measurement

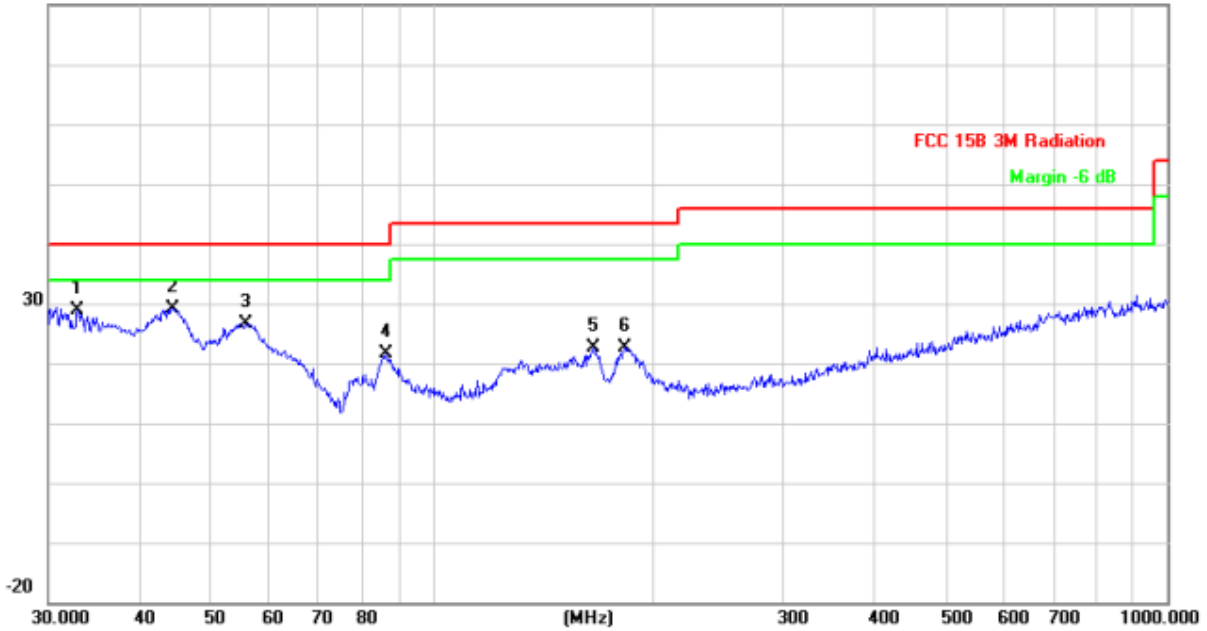
File :11

Data :#1

Date: 2016/01/21

Time: 17:43:50

80.0 dBuV/m



Site TOBY ETS Chamber #1

Polarization: **Vertical**

Temperature: 26

Limit: FCC 15B 3M Radiation

Power: AC 120V/60Hz

Humidity: 55 %

EUT: adapter

Distance:

M/N: 1901

Mode: Full load

Note: 原始

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Antenna	Table	
		MHz	Level	Factor	ment			Height	Degree	Comment
			dBuV	dB/m	dBuV/m	dBuV/m	dB	cm	degree	
1		32.8637	44.59	-15.73	28.86	40.00	-11.14	peak		
2	*	44.2752	51.09	-21.97	29.12	40.00	-10.88	peak		
3		55.6094	51.19	-24.46	26.73	40.00	-13.27	peak		
4		86.5029	44.47	-22.89	21.58	40.00	-18.42	peak		
5		165.4866	43.40	-20.88	22.52	43.50	-20.98	peak		
6		182.5592	43.27	-20.65	22.62	43.50	-20.88	peak		

120Vac垂直

### Radiated Emission Measurement

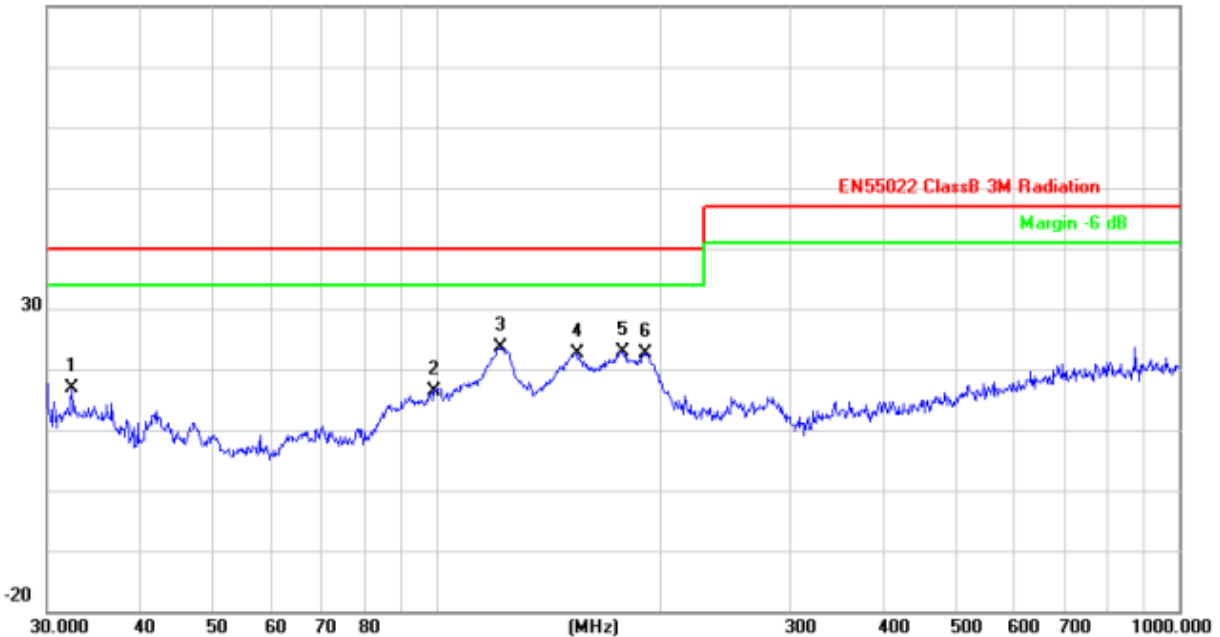
File :11

Data :#4

Date: 2016/01/21

Time: 17:48:36

80.0 dBuV/m



Site TOBY ETS Chamber #1

Polarization: **Horizontal**

Temperature: 26

Limit: EN55022 ClassB 3M Radiation

Power: AC 230V/50Hz

Humidity: 55 %

EUT: adapter

Distance:

M/N: 1901

Mode: Full load

Note: 原始

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Antenna Height cm	Table Degree degree	Comment
1		32.4059	32.35	-15.45	16.90	40.00	-23.10	peak		
2		99.5281	38.36	-21.86	16.50	40.00	-23.50	peak		
3	*	121.9755	46.11	-22.44	23.67	40.00	-16.33	peak		
4		154.8204	43.43	-20.86	22.57	40.00	-17.43	peak		
5		178.7584	43.61	-20.64	22.97	40.00	-17.03	peak		
6		191.7450	43.54	-20.81	22.73	40.00	-17.27	peak		

230Vac 水平

Radiated Emission Measurement

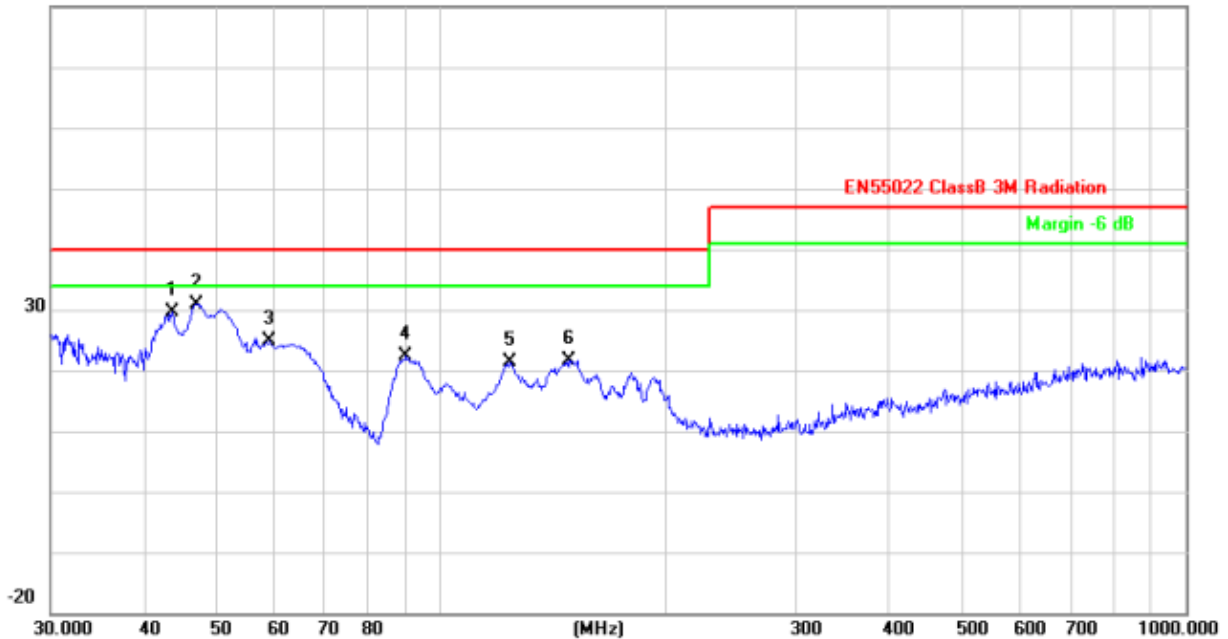
File :11

Data :#3

Date: 2016/01/21

Time: 17:47:51

80.0 dBuV/m



Site TOBY ETS Chamber #1

Polarization: **Vertical**

Temperature: 26

Limit: EN55022 ClassB 3M Radiation

Power: AC 230V/50Hz

Humidity: 55 %

EUT: adapter

Distance:

M/N: 1901

Mode: Full load

Note: 原始

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Antenna Height cm	Table Degree degree	Comment
1		43.6584	51.22	-21.70	29.52	40.00	-10.48	peak		
2	*	47.1599	54.17	-23.19	30.98	40.00	-9.02	peak		
3		59.0251	49.33	-24.51	24.82	40.00	-15.18	peak		
4		89.9047	44.97	-22.69	22.28	40.00	-17.72	peak		
5		123.6985	43.73	-22.39	21.34	40.00	-18.66	peak		
6		148.4410	42.95	-21.30	21.65	40.00	-18.35	peak		

230Vac 垂直

**CDN**

**EMI TEST REPORT**

Organization:

Operator:

EUT:

Place:

Time: 2016/1/14/17:5

Test equipment:KH3932

Detector: PK+AV

Test-time(ms): 30

SN: 1232276

Limit: EN55013

Transductor(PK/AV): 10 / 10

Remark:

Start(MHz)

End(MHz)

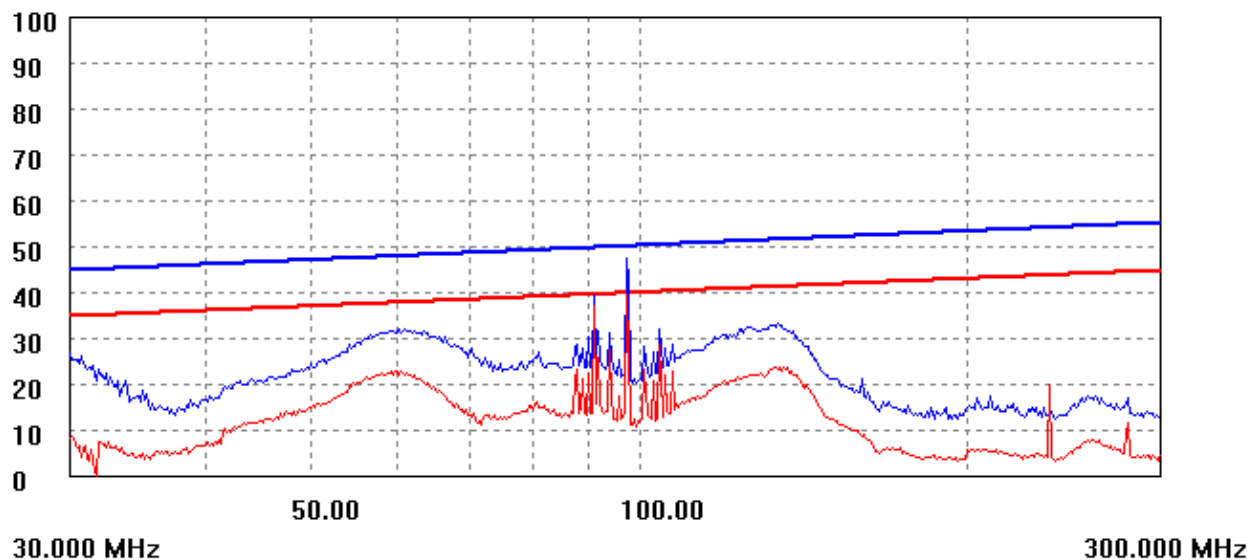
Step(MHz)

30.000

300.000

0.100

dBuV



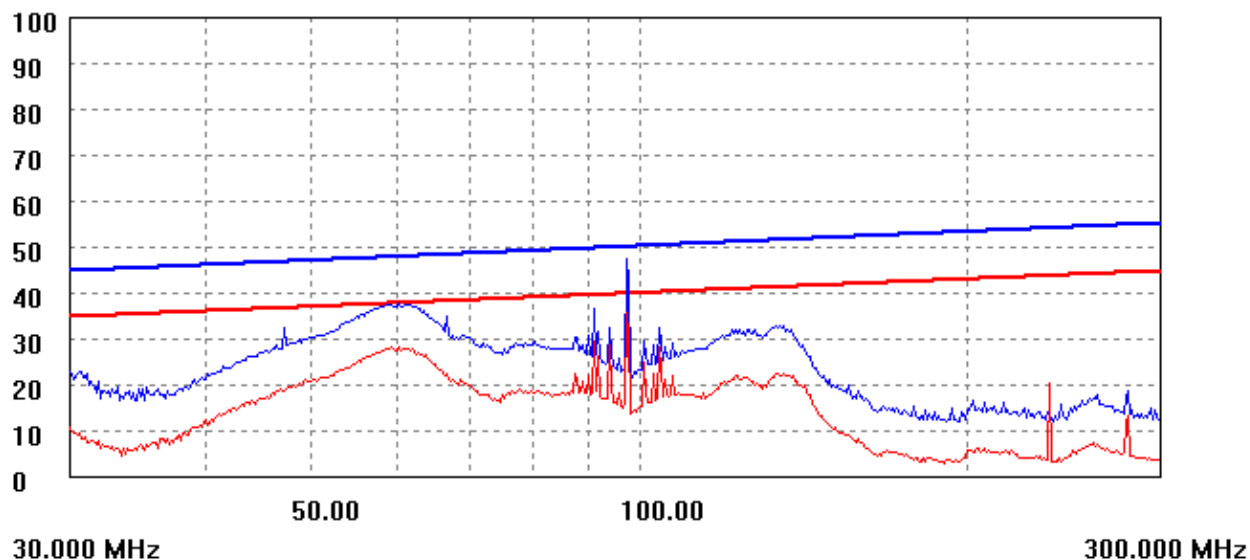
**120V CDN**

## EMI TEST REPORT

<b>Organization:</b>		<b>Operator:</b>	<b>EUT:</b>
<b>Place:</b>		<b>Time:</b> 2016/1/14/17:0	<b>Test equipment:</b> KH3932
<b>Detector:</b> PK+AV		<b>Test-time(ms):</b> 30	<b>SN:</b> 1232276
<b>Limit:</b> EN55013		<b>Transductor(PK/AV):</b> 10 / 10	
<b>Remark:</b>			

<b>Start(MHz)</b>	<b>End(MHz)</b>	<b>Step(MHz)</b>
30.000	300.000	0.100

**dBuV**



230V CDN