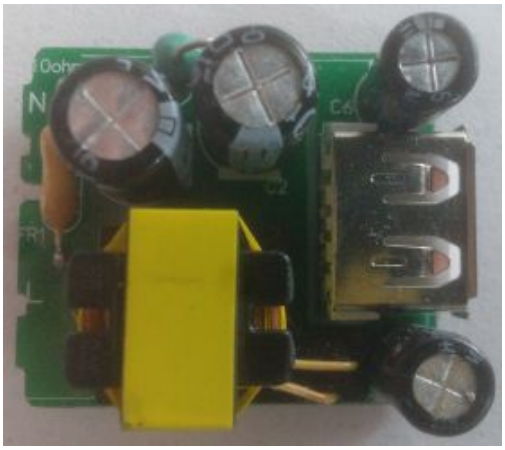
Developer Microelectronics Co.,ltd

SPECIFICATION

Battery charger
DP2525B_Charger5V1A



Safety Engineer	Electrical Engineer	Check	Edition	Date
			01	2016.4.19

SIGNED BY:

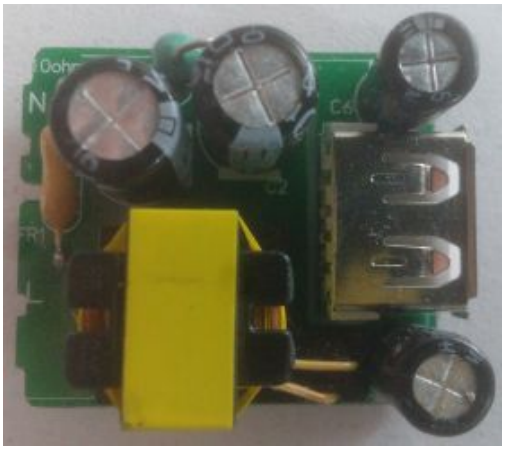
TABLE OF CONTENTS

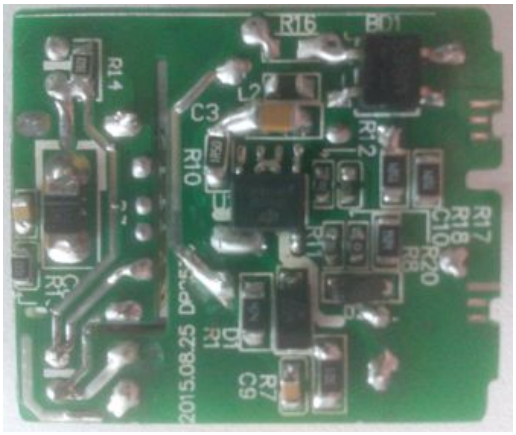
POWER SUPPLY SPECIFICATION

1. General Specification

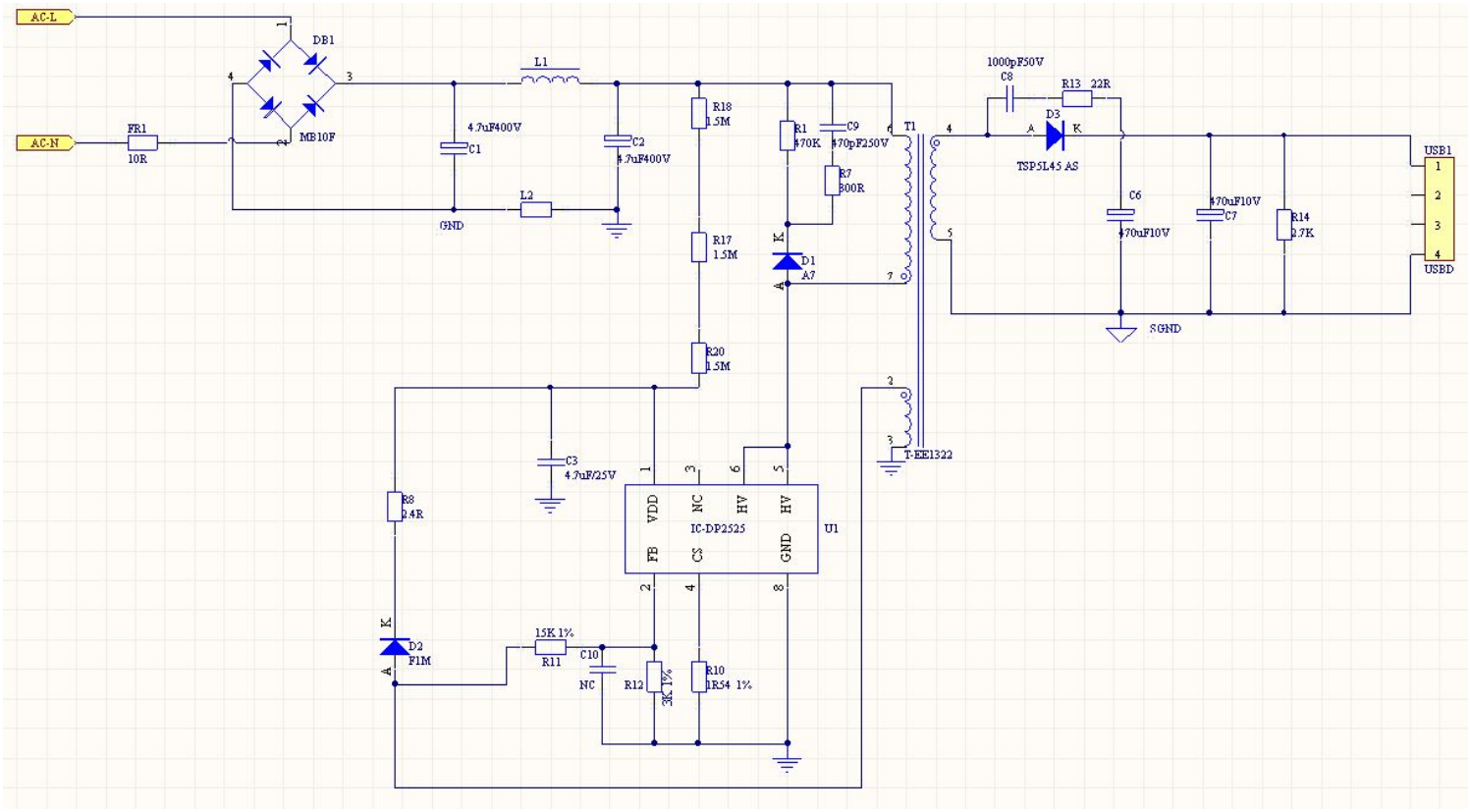
Specification	Symbol	Min	Max	Units	Comment
Input					
Voltage	V_{IN}	90	264	V_{AC}	
Frequency	F_I	47	63	Hz	
Standby Power (230VAC)	$P_{In\_Standby}$		75	mW	
Output					
Output Voltage	V_{OUT}	4.75	5.25	V	Measured at PCB end
Output Current	I_{OUT}	0	1	A	
Output ripple voltage	V_{RIPPLE}		200	mV_{P-P}	Measured at PCB end Vac=90V I_{OUT}=1A @TA=25°C 20MHz bandwidth
Output Power					
Full-load Output Power	P_{OUT}		5	W	
Peak Output Power	P_{OUT_MAX}		5	W	
Over-current protection	I_{OUT_MAX}		1	A	Auto-restart
Active mode efficiency	η	73.77			Measured at Line(Test with 24AWG 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}	-20	50	°C	

2. Photograph

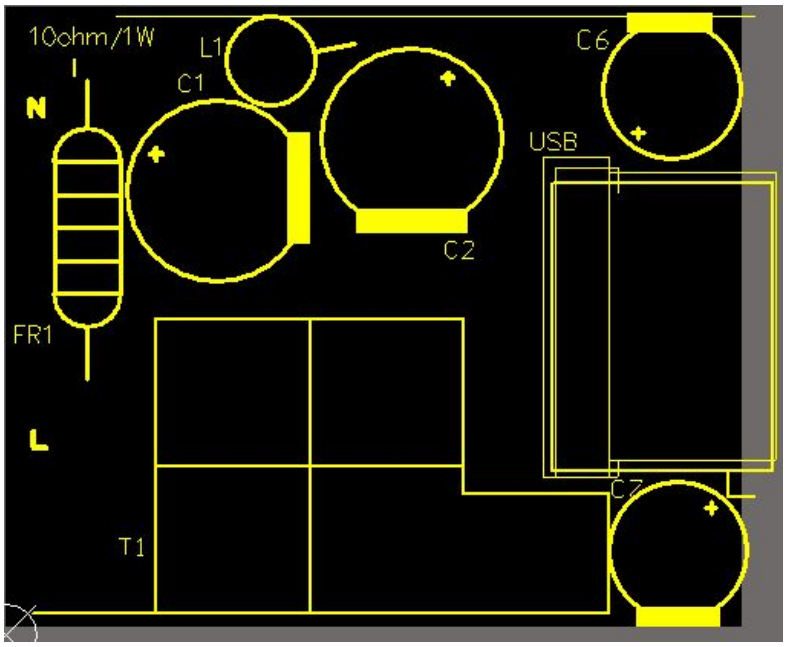




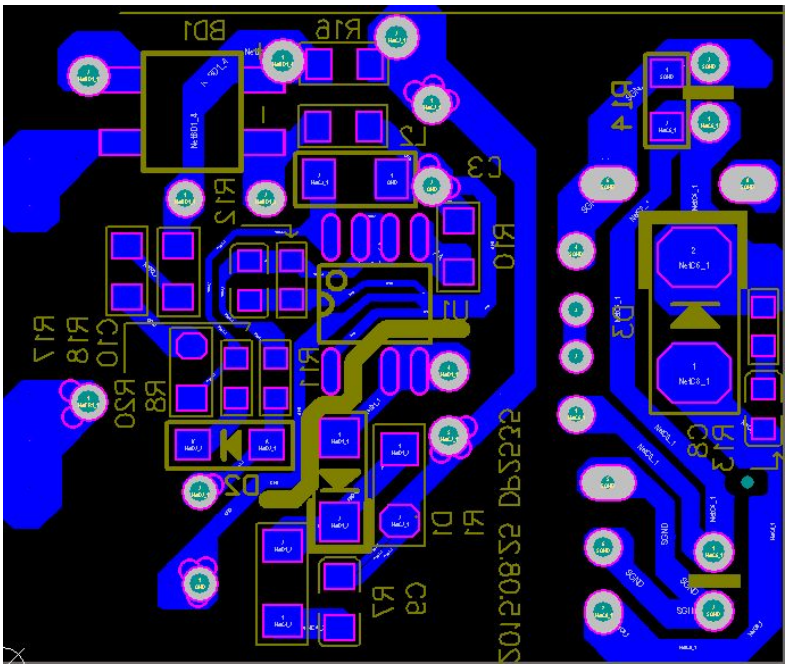
3.Schematics



3. Pcb Layout



Top PCB



Bottom PCB

4. Bill of material

Position	Quantity	Description	Package
C1,C2	2	4.7uF±20%/400V,-40～105℃,F2.5,GR,3KH	DIP8*11.5
C6,C7	2	470uF±20%/10,-40～105℃,F2.5,3KH	DIP 6.3*12
C3	1	4.7uF±10%/25V,X7R,T1.25,编带	1206
FR1	1	FUSE 1A/250V axial	
L1	1	AL0410,Φ0.06,1mH,±10%	AL0410
T1	1	EE-1322 L:1.8mH 5V1A	DIP
BD1	1	MB10F,1000V,500mA	MBS
C9	1	CAP 470pF±10%/500V,X7R	SMD 0805
C8	1	1nF±10%/50V,X7R,T0.8,编带	SMD 0603
U1	1	IC DP2525B	SOP-7
R10	1	RES 1.54R 1%	SMD 1206
R1	1	RES 470K 5%	SMD 1206
R7	1	RES 300R 5%	SMD 1206
R14	1	RES 2.7K 5%	SMD 0805
R13	1	RES 22R 5%	SMD 0603
R8	1	RES 2.4R 5%	SMD 0603
R12	1	RES 3K 1%	SMD 0603
R11	1	RES 15K 1%	SMD 0603
R17,R18,R20	3	RES 1.5M 5%	SMD 1206
L2	1	CHIP BEAD(FREE-LEAD) CBH201209W102T	SMD 0805
D1	1	Diode A7 1000V/1A	SOD-123
D2	1	Diode F1M 1000V/1A	SOD-123
D3	1	Schottky diode SCD34LH,40V,IF3A	DO-214AC
USB	1	4PIN USB	USB
PCB	1	34.8*29*1.2,2OZ	PCB

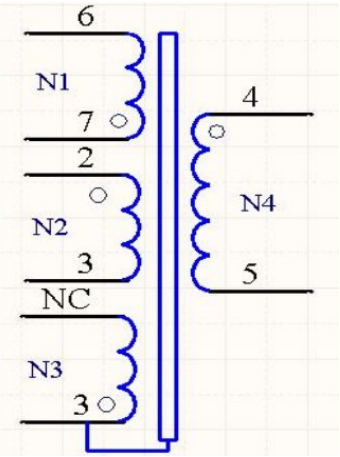
5. Transformer

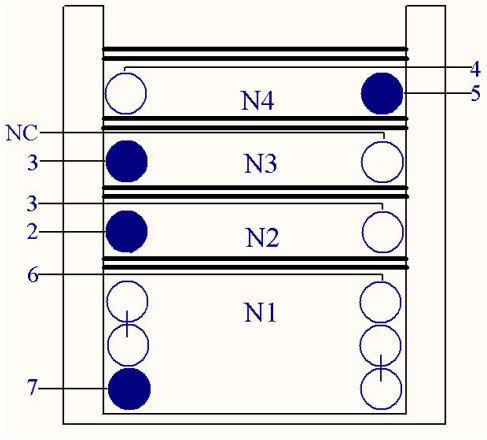
1) Transformer Specification

Bobbin：EE-1322（4+2）Lengthen

Core meteiral：PC40 Ae: 18.9mm*2

2) Structure/Material





Winging	Material	Start Pin	Finish Pin	Turns	Description
N1	Φ0.12mm*1 2UEW	7	6	105	Along, close winding 3 layer
Tape	TAPE W=5.5mm			2	
N2	Φ0.12mm*2 2UEW	2	3	15	Along, close winding 1 layer
Tape	TAPE W=5.5mm		2	2	
N3	Φ0.1mm*2 2UEW	3	NC	5	Along, **average divide** winding 1 layer
Tape	TAPE W=5.5mm			2	
N4	Φ0.45mm*1 TEX-E Wire	5	4	7	**Reverse**, close winding 1 layer
Tape	TAPE W=5.5mm			2	
N5	From PIN3 to connect magnetic core using bare 0.2mm copper wire.				

- Inductance: LP(N1) = 1.8mH ± 5%; (10KHZ 0.25V)
- Leakage inductance: LsN1 ＜90uH ; (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	DP2525B_Charger5V1A_SZ01
Test Date	2016/1/3
Test Temperature	Ambient
Test Equipment	**AC source:** 6810 AC POWER SOURCE (MG-0010) **Electronic load:** ITECH (IT8512B) **Power meter:** YOKOGAWA (WT210) **Oscilloscope:** Tektronix (GPO3014)
Test Items	1. Input Current 2. Standby Power 3. Efficiency 4. I-V Curve 5. Line & load regulation 6. Turn on time 7. Hold-up time 8. DC output rising time 9. Output ripple & noise 10. Over current protection 11. Short circuit protection 12. Voltage stress on mos & rectifier

1) Input current

Measure the AC input current at maximum loading

Input Voltage	Input current (mA)	Spec.
90V/60HZ	118.3	
264V/50HZ	53.6	

2) Standby Power

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

Input Voltage	Input wattage(mW)	Output voltage(V)	Spec.
90V/60Hz	23.4	5.053	**<75mW**
115V/60Hz	26.5	5.044	
230V/50Hz	53.5	5.021	
264V/60Hz	67.7	5.015	

3) Efficiency

3.1 Efficiency.

Output at rated load. Measured at PCB end.

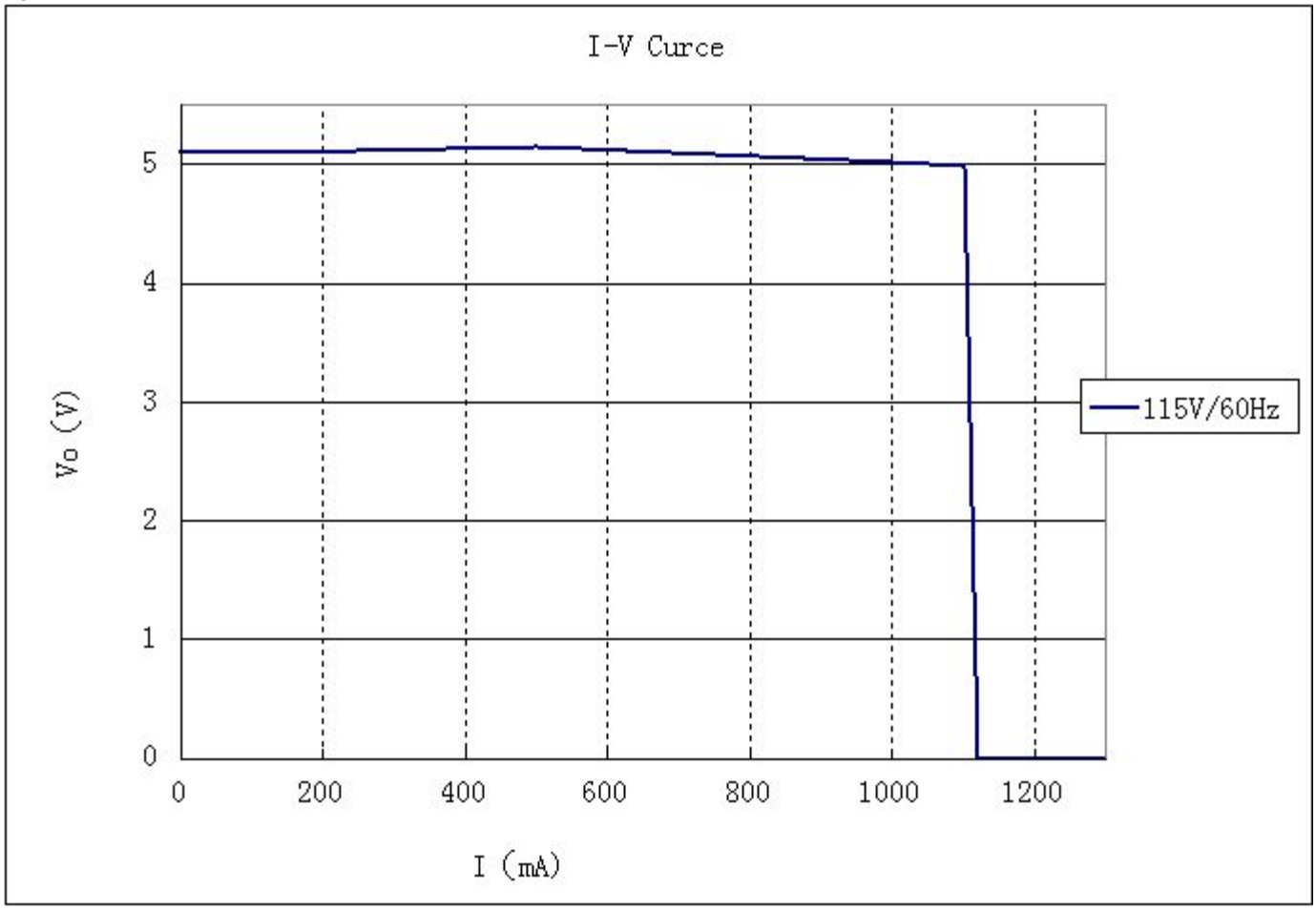
Input Voltage	Input Wattage(W)	Output Wattage(W)	Efficiency (%)	Spec.
90V/60Hz	6.83	5.232	76.60	
115V/60Hz	6.70	5.235	78.13	
132V/60Hz	6.68	5.241	78.45	
180V/50Hz	6.67	5.242	78.59	
230V/50Hz	6.73	5.244	77.91	
264V/50Hz	6.77	5.246	77.48	

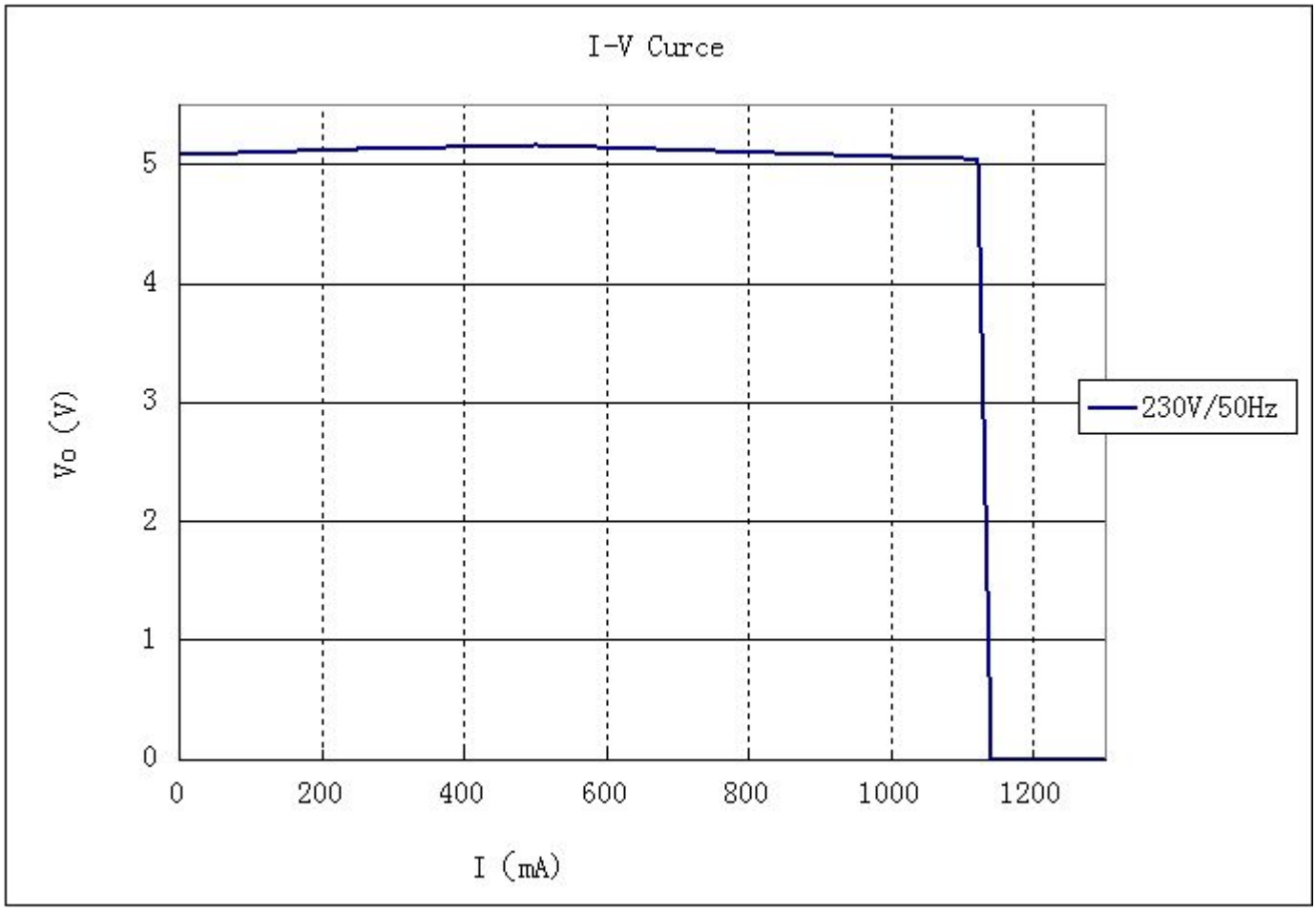
3.2 Avg Efficiency.

Measured at PCB end.

	Efficiency (%)						
Input Voltage	25% Load	50% Load	75% Load	100% Load	Avg	EPS2.0-6	10% Load
115V/60Hz	78.15	77.89	78.13	77.95	78.03	73.77%	75.01%
230V/50Hz	75.77	77.68	78.24	78.29	77.49		69.96%

4) I-V Curve





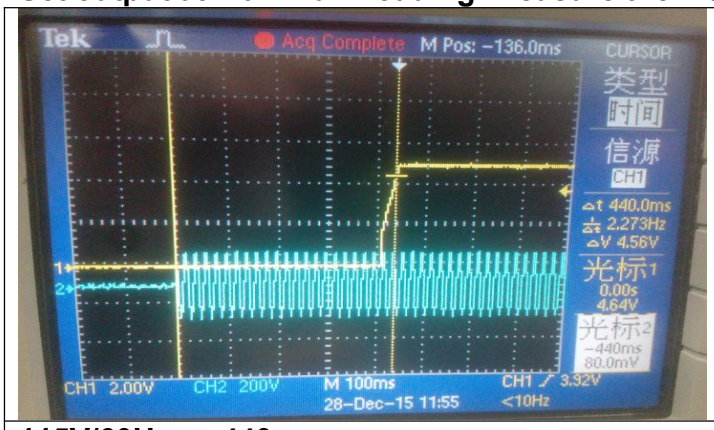
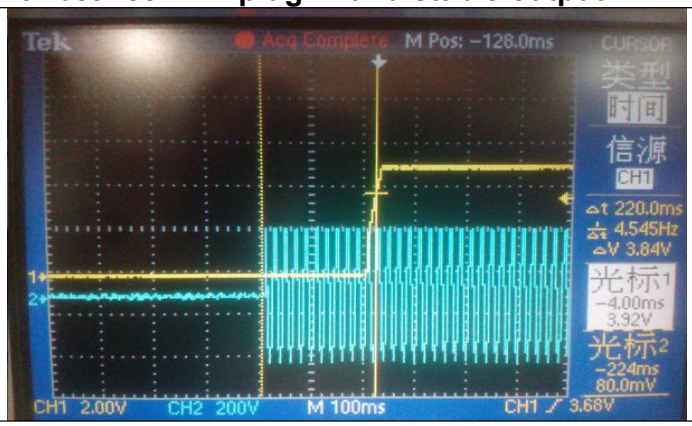
5) Line & Load Regulation

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	5.231	5.053	3.52	5.0V
115V/60Hz	5.238	5.044	3.84	
132V/60Hz	5.241	5.041	3.96	
180V/50Hz	5.244	5.032	4.21	
230V/50Hz	5.243	5.021	4.42	
264V/50Hz	5.242	5.015	4.52	
Line Regulation	0.22%	0.75%		

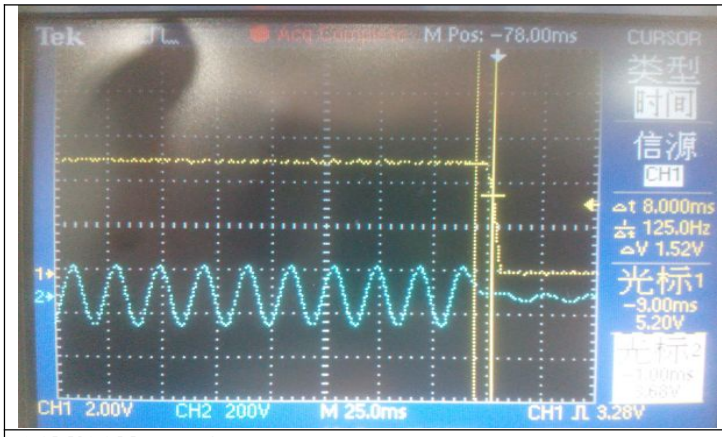
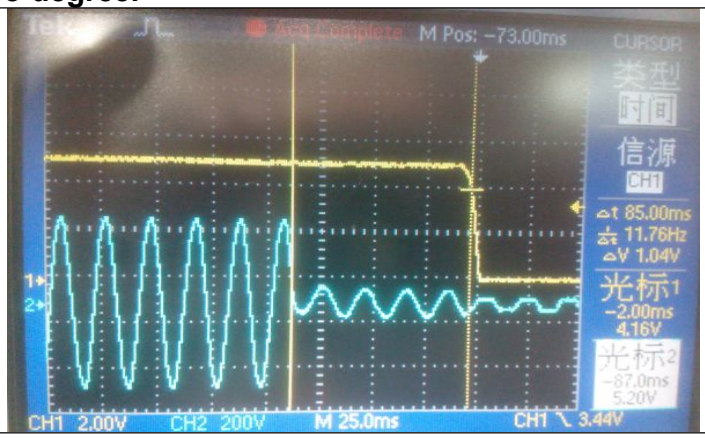
6) Turn on Time

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

	
115V/60Hz-----440ms	**230V/50Hz-----220ms**

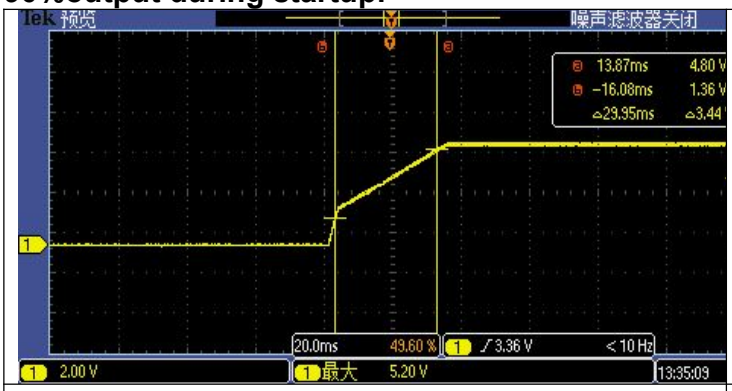
7) Hold-up Time

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.

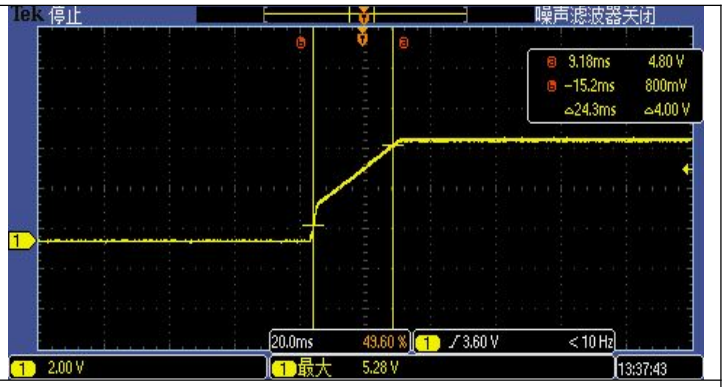
	
90V/60Hz-----8ms	**264V/50Hz-----85ms**

8) DC Output Rising Time

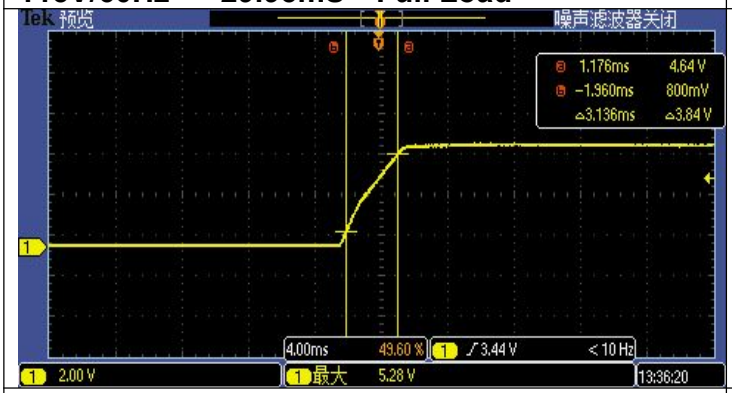
Set output at maximum loading and no loading. Measure the time interval between 10% to 90%output during startup.



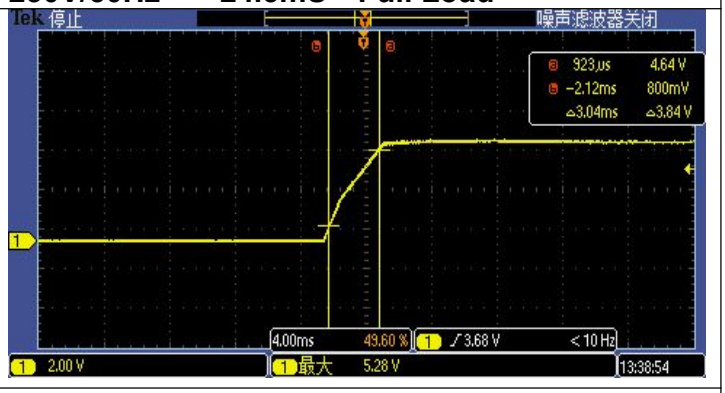
115V/60Hz-----29.95mS---Full Load



230V/50Hz----- 24.3mS---Full Load



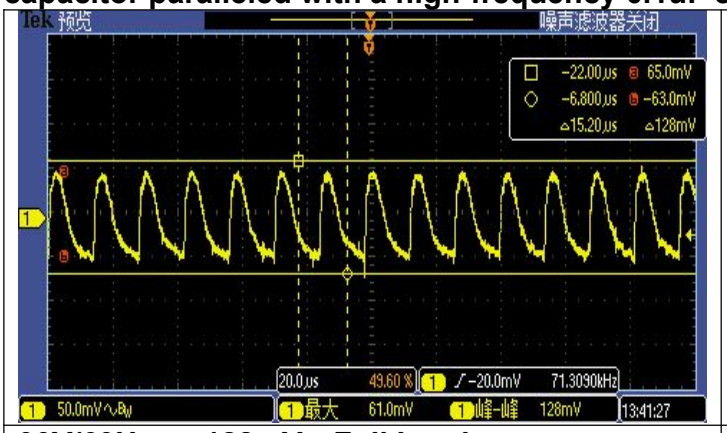
115V/60Hz-----3.136mS---No Load



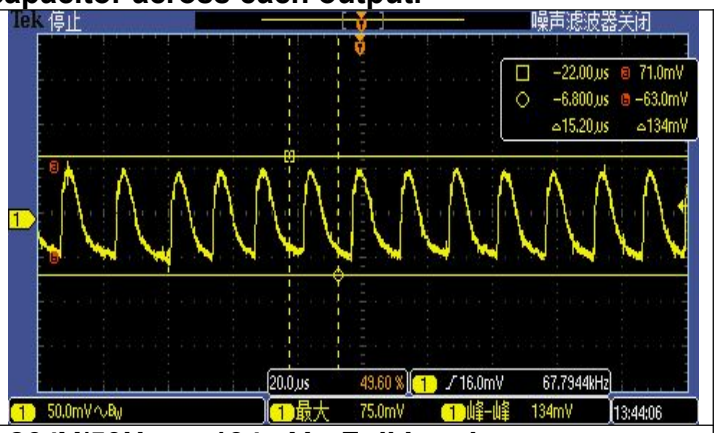
230V/50Hz-----3.04mS---No Load

9) Output Ripple & Noise

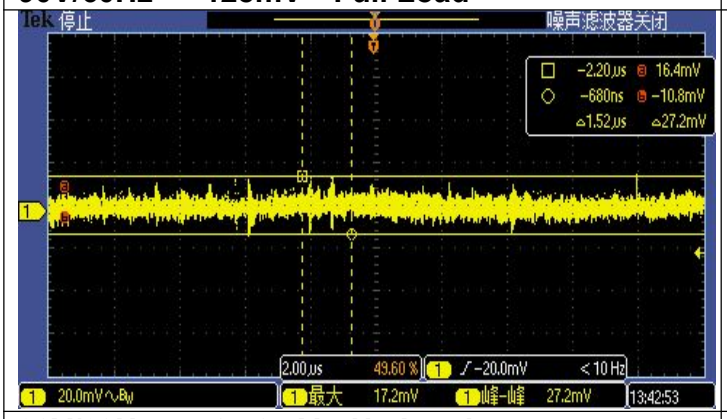
Ripple & noise are measured by using 20MHz bandwidth limited oscilloscope with a 10uF capacitor paralleled with a high-frequency 0.1uF capacitor across each output.



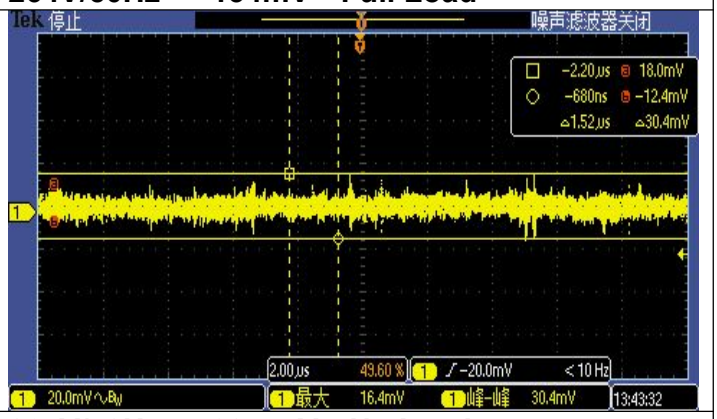
90V/60Hz-----128mV---Full Load



264V/50Hz-----134mV---Full Load



90V/60Hz----- 27.2mV---No Load

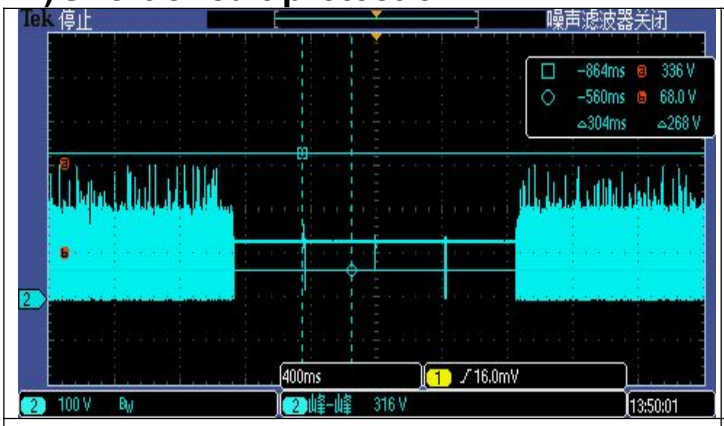


264V/50Hz-----30.4mV---No Load

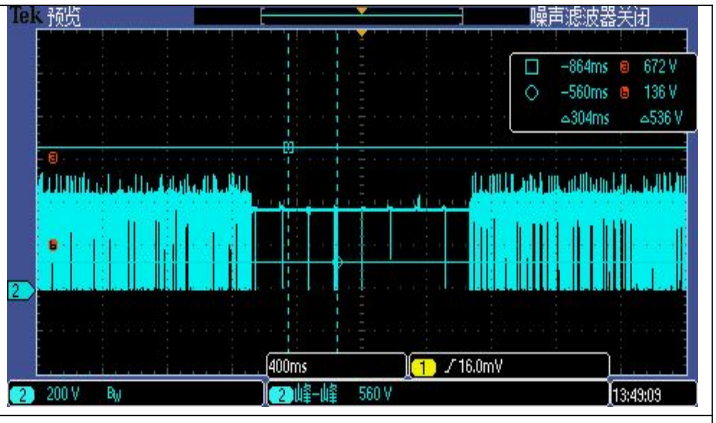
10) Over Current Protection

Input Voltage	Output Over current A)	Spec.
90V/60HZ	1.135	
264V/50HZ	1.168	

11) Short circuit protection

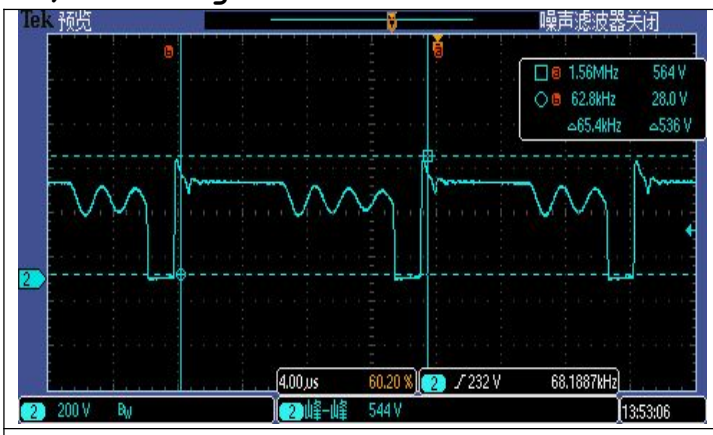


90V/60Hz-----BJT C-E Voltage Auto recovery

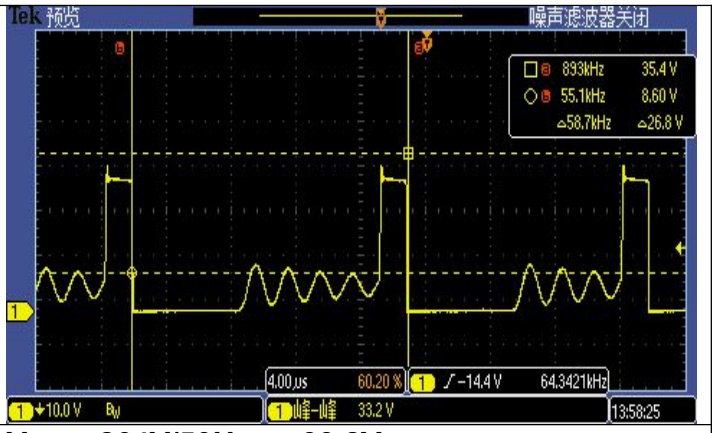


264V/50Hz---BJT C-E Voltage Auto recovery

12) Voltage Stress on BJT & Rectifier



BJT-Vce-264V/50Hz-----544V



Vrrm--264V/50Hz-----33.2V

7. EMI Test Data

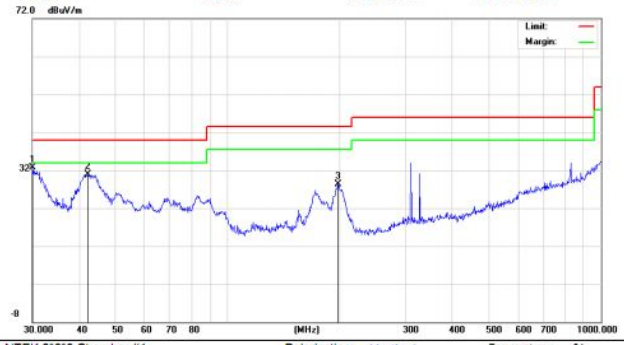
1）radiation

NTEK北测检测机构 EMC Testing Centre

NTEK Testing Technology Co., Ltd.
Fenda Science Park,Sanwei Community,Xixiang Street,Bao'an
Tel: (86)-0755-61156588 Fax: (86)-0755-61156599

Radiated Emission Measurement

File :RE0111 Data :#5 Date: 2018/01/11 Time: PM 07:37:55



Site NTEK 9*6*6 Chamber #1
Limit: FCC_PART15_B_03m_QP
EUT: ADAPTER
M/N:
Mode: FULL LOAD
Note: 2#

Polarization: *Vertical*
Power: AC 120V/60Hz
Distance:

Temperature: 24
Humidity: 50 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	30.1054	13.27	19.53	32.80	40.00	-7.20	peak			
2		42.3022	17.49	13.35	30.84	40.00	-9.16	peak			
3		197.8928	16.91	11.45	28.36	43.50	-15.14	peak			

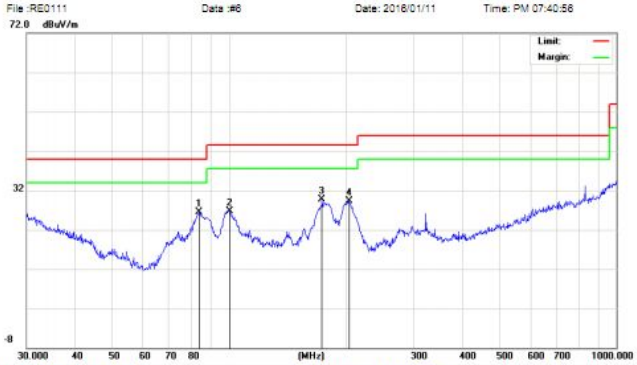
(AC120V Vetical)

NTEK北测检测机构 EMC Testing Centre

NTEK Testing Technology Co., Ltd.
Fenda Science Park,Sanwei Community,Xixiang Street,Bao'an
Tel: (86)-0755-61156588 Fax: (86)-0755-61156599

Radiated Emission Measurement

File :RE0111 Data :#6 Date: 2018/01/11 Time: PM 07:40:56



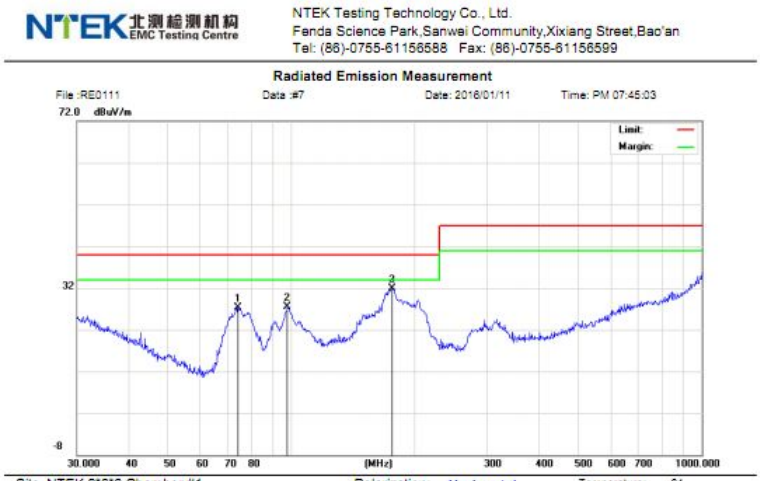
Site NTEK 9*6*6 Chamber #1
Limit: FCC_PART15_B_03m_QP
EUT: ADAPTER
M/N:
Mode: FULL LOAD
Note: 2#

Polarization: *Horizontal*
Power: AC 120V/60Hz
Distance:

Temperature: 24
Humidity: 50 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	83.5222	17.32	9.14	26.46	40.00	-13.54	peak			
2		100.5806	16.54	10.25	26.79	43.50	-16.71	peak			
3		173.8135	17.26	12.37	29.63	43.50	-13.87	peak			
4		204.2377	17.81	11.56	29.37	43.50	-14.13	peak			

(AC120V Horizontal)



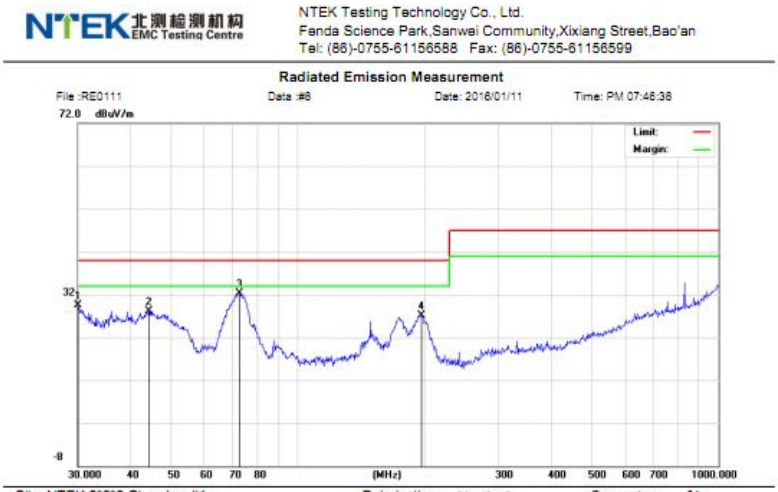
Site NTEK 9*6*6 Chamber #1
Limit: EN55022_B_3m_QP
EUT: ADAPTER
M/N:
Mode: FULL LOAD
Note: 2#

Polarization: *Horizontal*
Power: AC 230V/50Hz
Distance:

Temperature: 24
Humidity: 50 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		74.1351	17.49	9.79	27.28	40.00	-12.72	peak			
2		97.7983	17.12	10.42	27.54	40.00	-12.46	peak			
3	*	175.6516	19.58	12.26	31.84	40.00	-8.16	peak			

(AC230V Horizontal)



Site NTEK 9*6*6 Chamber #1
Limit: EN55022_B_3m_QP
EUT: ADAPTER
M/N:
Mode: FULL LOAD
Note: 2#

Polarization: *Vertical*
Power: AC 230V/50Hz
Distance:

Temperature: 24
Humidity: 50 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		30.1054	9.95	19.53	29.48	40.00	-10.52	peak			
2		44.2752	15.67	12.38	28.05	40.00	-11.95	peak			
3	*	72.8466	22.67	9.72	32.39	40.00	-7.61	peak			
4		197.2001	15.69	11.45	27.14	40.00	-12.86	peak			

(AC230V Vetical)

2）conduction

NTEK Testing Technology Co., Ltd.
Fenda Science Park,Sanwei Community,Xixiang Street,Bao'an District,Shenzhen
Tel: (86)-0755-61156588 Fax: (86)-0755-61156599 http://www.ntek.org.cn

Conducted Emission Measurement

File :1228 Data :#2 Date: 2015/12/28 Time: PM 04:13:32

Site CONDUCTION #1 Phase: L1 Temperature: 26
Limit: EN55022_Class B_(0.15-30MHz) _Main_QP Power: AC 230V/50Hz Humidity: 58 %
EUT: ADAPTER
M/N: 5V 1A DP2525
Mode: FULL LOAD
Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1620	37.16	10.12	47.28	65.36	-18.08	peak	
2		0.3899	21.90	10.05	31.95	48.06	-16.11	AVG	
3		0.6060	23.84	9.79	33.63	46.00	-12.37	AVG	
4		0.9900	37.23	9.85	47.08	56.00	-8.92	peak	
5	*	1.1340	27.52	9.83	37.35	46.00	-8.65	AVG	
6		2.0500	36.39	9.73	46.12	56.00	-9.88	peak	

(EN55022_CE_230V_L)

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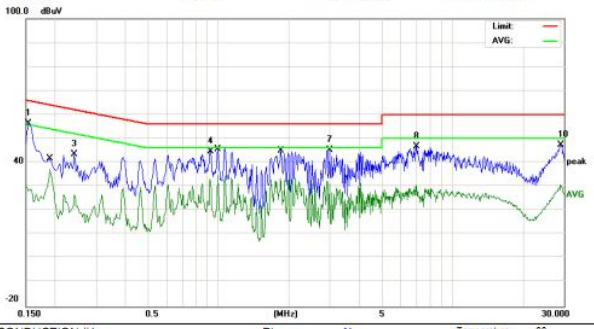
Conducted Emission Measurement

File :1228 Data :#5 Date: 2015/12/28 Time: PM 04:20:02



Site CONDUCTION #1 Phase: N Temperature: 26
Limit: EN55022_Class B_(0.15-30MHz) _Main_QP Power: AC 230V/50Hz Humidity: 58 %
EUT: ADAPTER
M/N: 5V 1A DP2525
Mode: FULL LOAD
Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	*	0.1539	46.34	10.08	56.42	65.78	-9.36	peak	
2		0.1900	27.07	10.03	37.10	54.03	-16.93	AVG	
3		0.2420	33.25	10.07	43.32	62.02	-18.70	peak	
4		0.9260	34.93	9.86	44.79	56.00	-11.21	peak	
5		0.9940	24.92	9.87	34.79	46.00	-11.21	AVG	
6		1.8420	23.80	9.77	33.57	46.00	-12.43	AVG	
7		2.9940	35.39	9.74	45.13	56.00	-10.87	peak	
8		7.0540	37.07	9.74	46.81	60.00	-13.19	peak	
9		29.0220	20.69	10.03	30.72	50.00	-19.28	AVG	
10		29.0700	37.24	10.04	47.28	60.00	-12.72	peak	

(EN55022_CE_230V_N)

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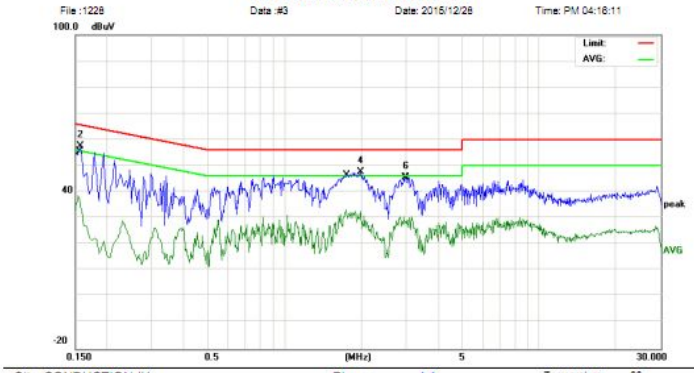
Conducted Emission Measurement



Site CONDUCTION #1 Phase: L1 Temperature: 26
Limit: FCC Part 15B_(0.15-30MHz) _Main_QP Power: AC 120V/60Hz Humidity: 58 %
EUT: ADAPTER
M/N: 5V 1A DP2525
Mode: FULL LOAD
Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1539	28.56	10.12	38.68	55.78	-17.10	AVG	
2	*	0.1580	47.44	10.12	57.56	65.56	-8.00	peak	
3		1.7380	23.54	9.76	33.30	46.00	-12.70	AVG	
4		1.9820	37.99	9.73	47.72	56.00	-8.28	peak	
5		2.9340	20.77	9.74	30.51	46.00	-15.49	AVG	
6		2.9860	35.92	9.74	45.66	56.00	-10.34	peak	

(EN55022_CE_120V_L)

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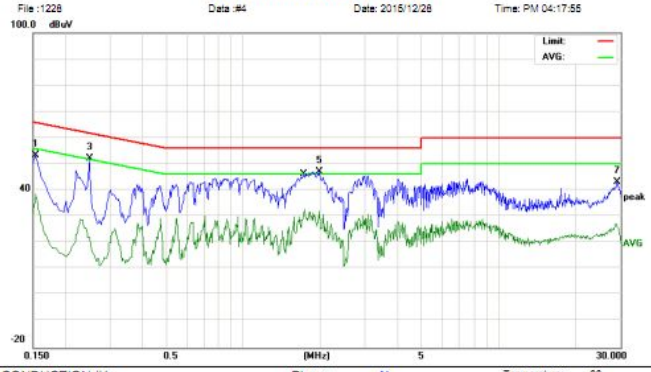
Conducted Emission Measurement



Site CONDUCTION #1 Phase: N Temperature: 26
Limit: FCC Part 15B_(0.15-30MHz) _Main_QP Power: AC 120V/60Hz Humidity: 58 %
EUT: ADAPTER
M/N: 5V 1A DP2525
Mode: FULL LOAD
Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1539	43.29	10.08	53.37	65.78	-12.41	peak	
2		0.1539	28.43	10.08	38.51	55.78	-17.27	AVG	
3		0.2500	42.22	10.08	52.30	61.75	-9.45	peak	
4		1.7380	22.83	9.78	32.61	46.00	-13.39	AVG	
5	*	1.9820	37.23	9.75	46.98	56.00	-9.02	peak	
6		28.7620	17.13	10.03	27.16	50.00	-22.84	AVG	
7		29.0940	33.13	10.04	43.17	60.00	-16.83	peak	

(EN55022_CE_120V_N)