



# Test Report

## SY5814A demo board

Prepared by Silergy Corp.

18/05/2012



# Outline

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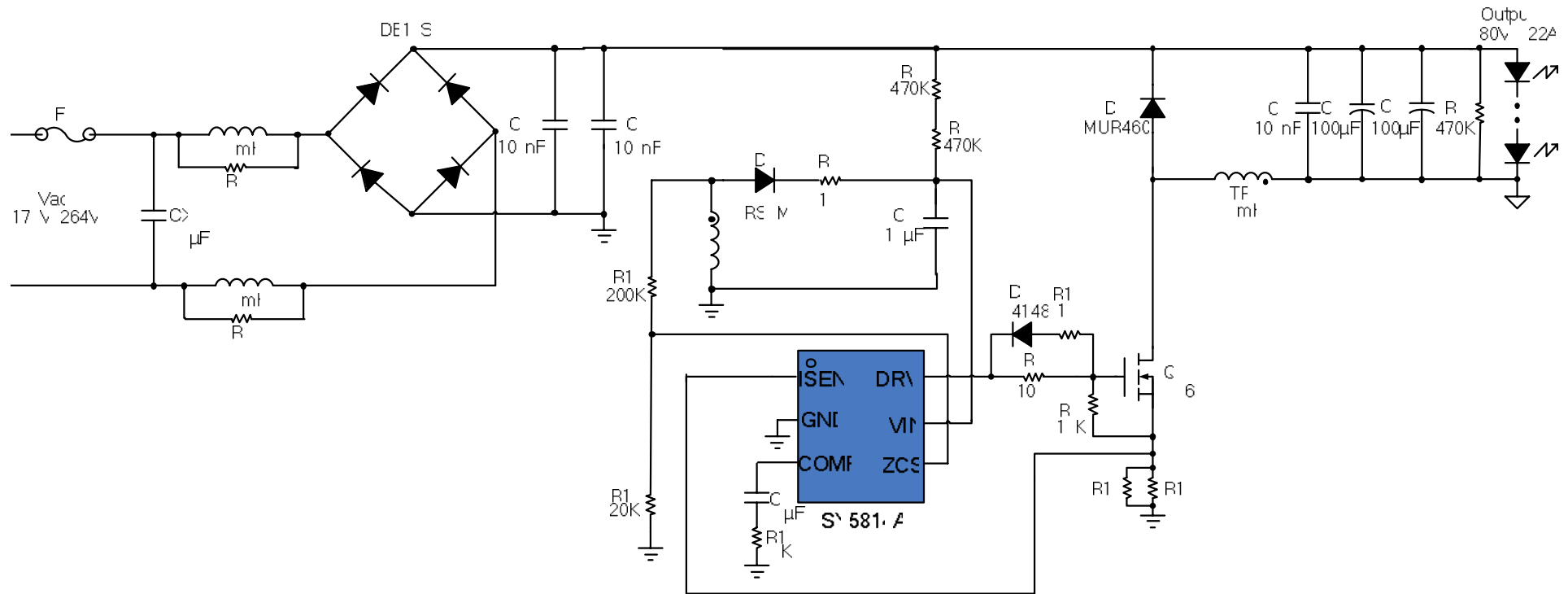
- Application condition
- Circuit Diagram
- Transformer design
- Bom List
- PCB
- Facade
- Steady states
- Output ripples
- Start up & Shut down
- Line Transient
- Open Loop Protection(OLP)
- Short Circuit Protection(SCP)
- Line regulation
- PF
- Efficiency
- Standby power
- THD
- EMI



## Application condition

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- Input: 176Vac~264Vac
- Output :  $V_{OUT}=80V$   
 $I_{OUT}=220mA$
- Function: PFC





# Transformer design

机型	80V /0.22A	拟制		安规		审核	
底视图: 	磁芯	规格	EFD 15			气隙	
		平面料号	PC 40				
		气隙料号					
	骨架	规格	EFD 15				
		料号					
是否加铁氟龙套管	是						
剪脚位				可并脚位			
电气性能规格:							
要求	测试频率: 40KHz 测试电压: 1V						
项目	感量	圈数 (T)	直流电阻 $\Omega$ CR				
P 7-P 6	1000uH						
绕制工艺:							
<p>1、骨架两边加0mm 隔带，从7脚开始,用 40.19线1根均匀顺绕230TS,收至6脚,加1层胶带。</p> <p>2、骨架两边加0mm 隔带，从2脚开始,用 40.12线1根均匀顺绕35TS,收至1脚,加2层胶带。</p>							
配套磁性元件绕制工艺:				磁性元件尺寸要求:			
							单位: mm

Tested result:  
Lm=1mH



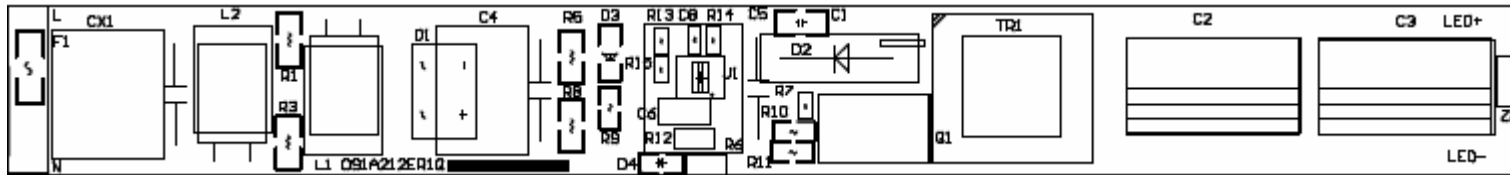
# Bom List

I <sub>LED</sub> =220mA (SMD Component)			
Part Number	Reference	Part Name	Description
1	DB1	DB10s	/
2	R1, R3	5. 1K Ω /1206	/
3	R2, R5, R8	470K Ω /1206	/
2	R9, R12	10 Ω /0805	/
1	R7	10K Ω /0603	/
2	R10, R11	1 Ω /0805	/
1	R6	100 Ω /0805	/
1	R13	200K Ω /0603	/
1	R14	1K Ω /0603	/
1	R15	20K Ω /0603	/
2	C4, C5	100nF/400V/CBB	/
1	C6	10 μ F/25V/1206	/
1	C8	2. 2 μ F/16V/0603	/

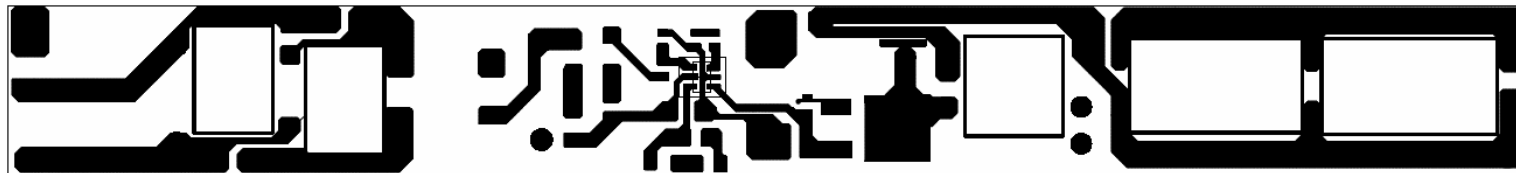


# Bom List

I <sub>LED</sub> =220mA (SMD Component)			
Part Number	Reference	Part Name	Description
1	D3	RS1M/SMA	/
1	D2	MUR460	/
1	D4	1N4148	/
1	CX1	0.1 μ F/275VAC	/
1	Q1	MTN4N60J3/ T0252	/
1	F1	1A/250V	/
2	L1, L2	2.5mH/ φ 8	/
2	C2, C3	100 μ F/100V	/
1	C1	100nF/100V/0805	/
1	TR1	1mH/EFD15	/
1	U1	SY5814A/S0T23	/



Top overlay

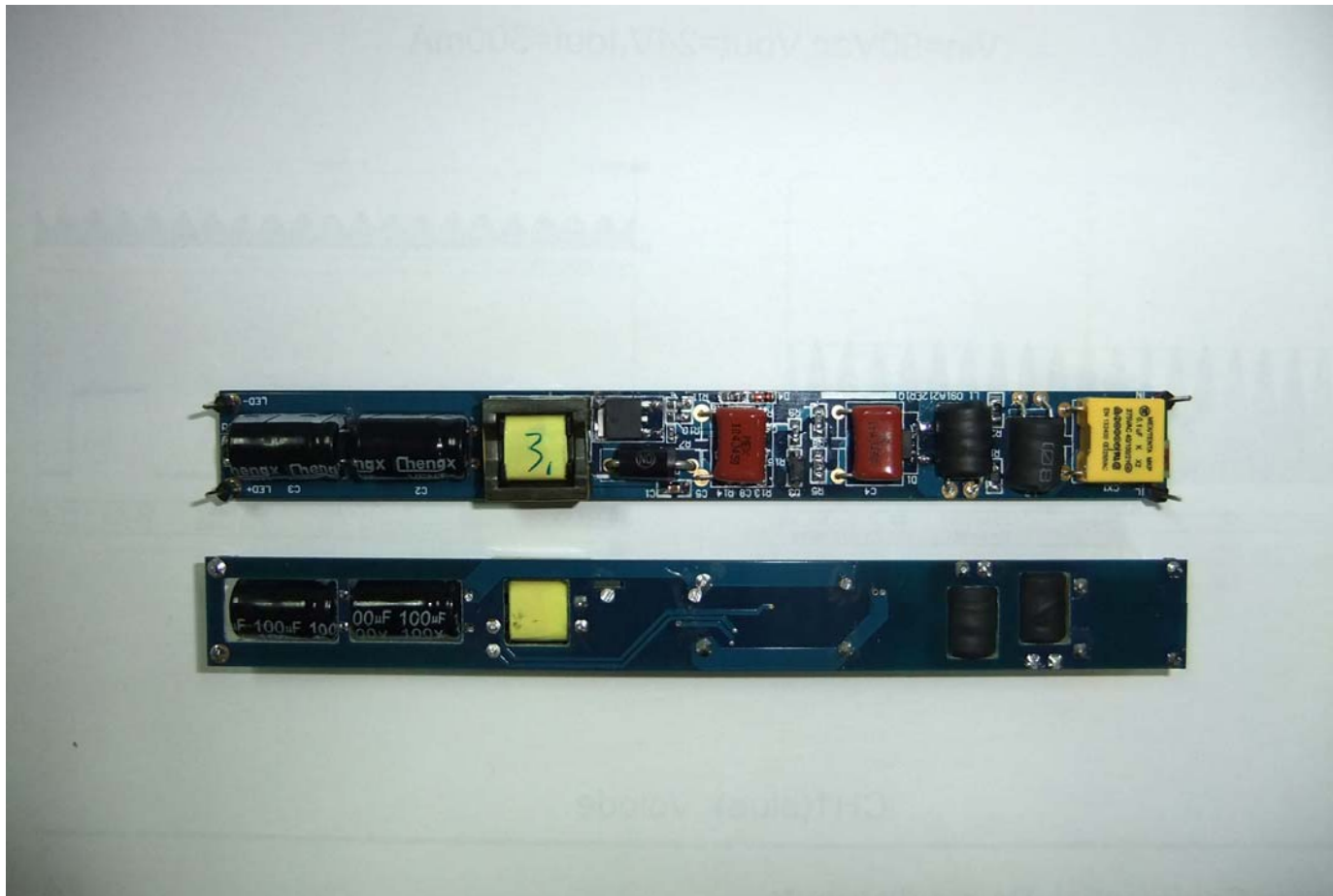


Top Layer



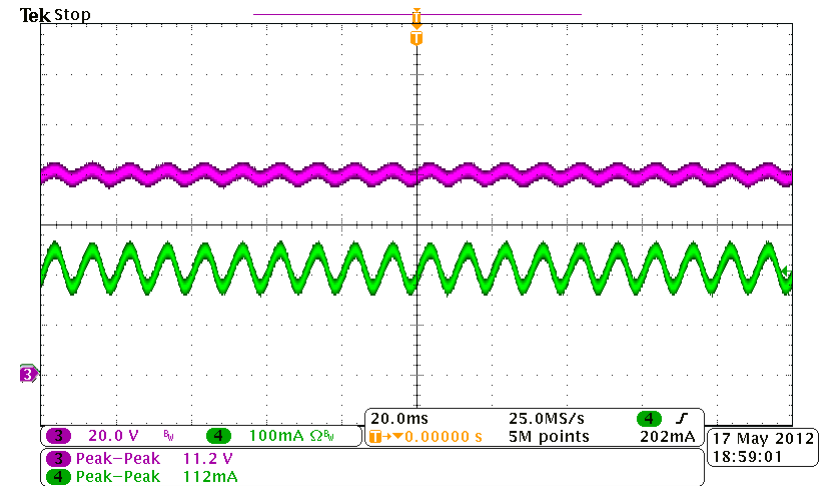
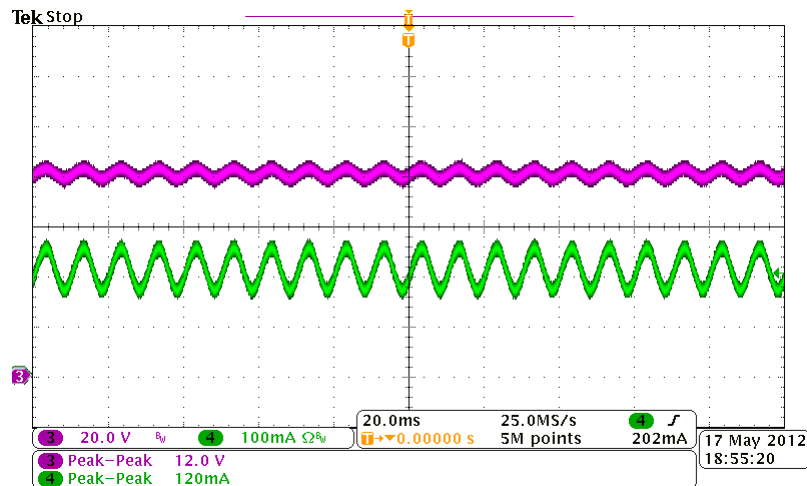
Bottom Layer





Vin=176Vac, Vout=78.2V, Iout=207mA

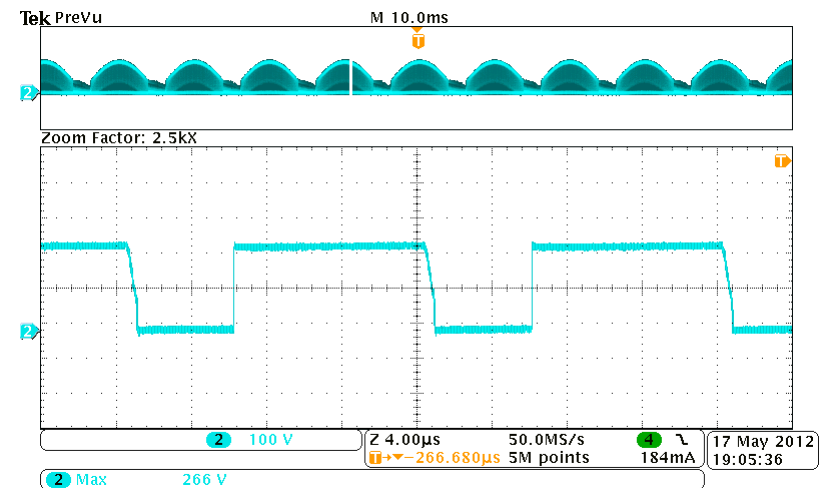
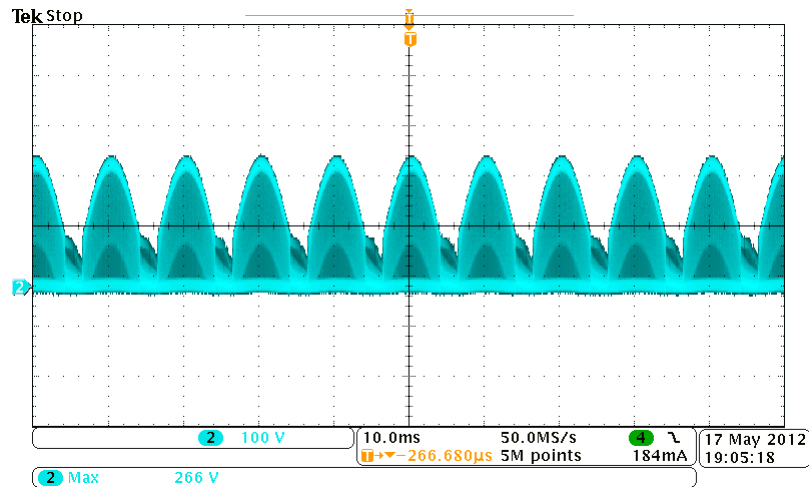
Vin=264Vac, Vout=77.4V, Iout=207mA



CH3(pink): Vout

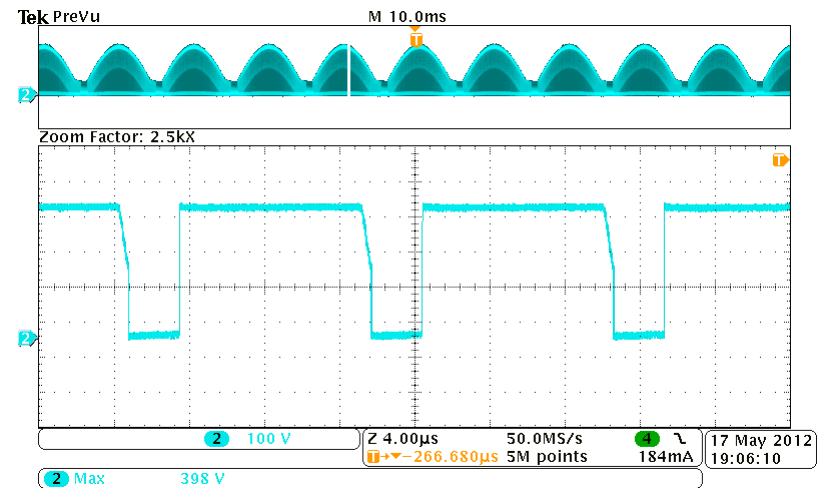
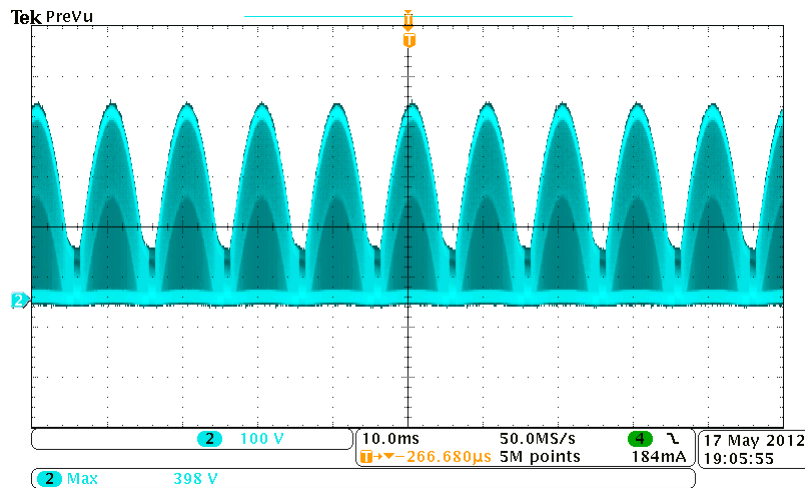
CH4(green): Iout

$V_{in}=176V_{ac}, V_{out}=78.2V, I_{out}=207mA$



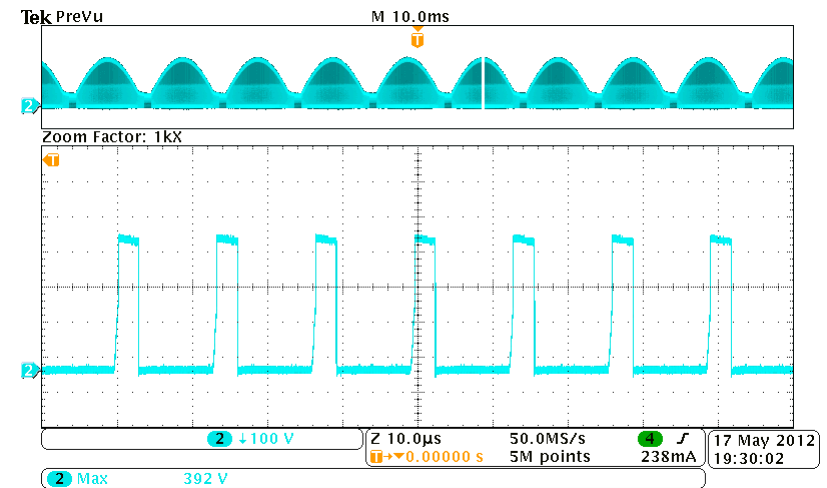
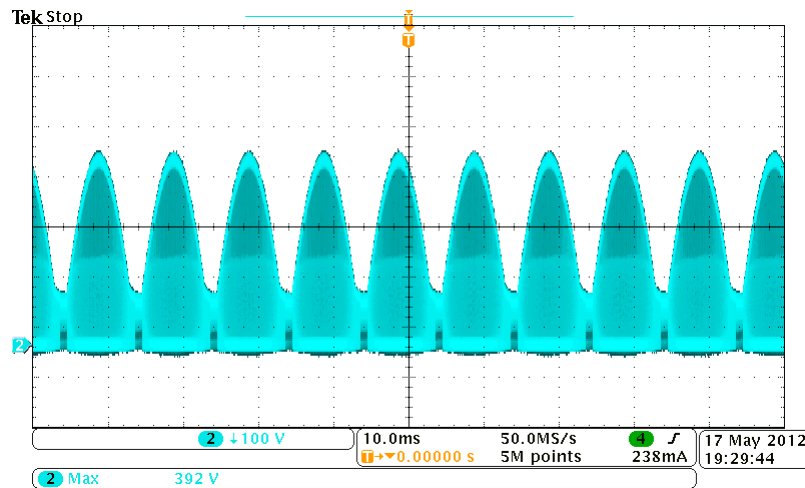
CH2(cyan): Vdrain

$V_{in}=264V_{ac}$ ,  $V_{out}=77.4V$ ,  $I_{out}=207mA$



CH2(cyan): Vdrain

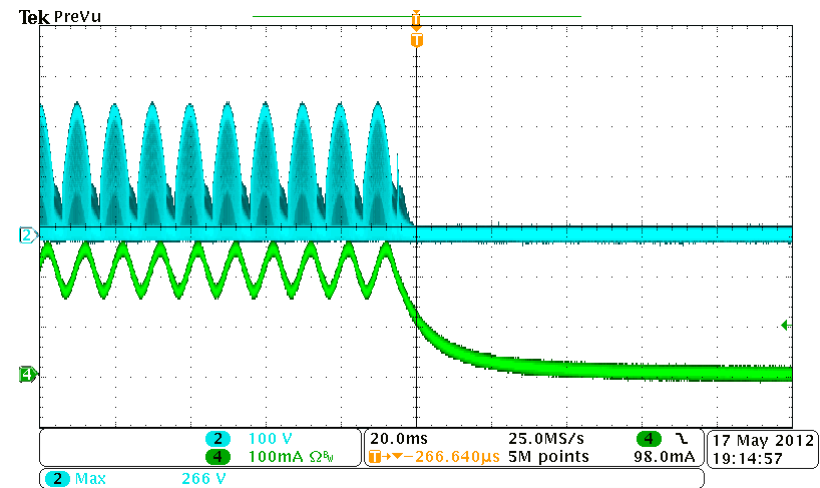
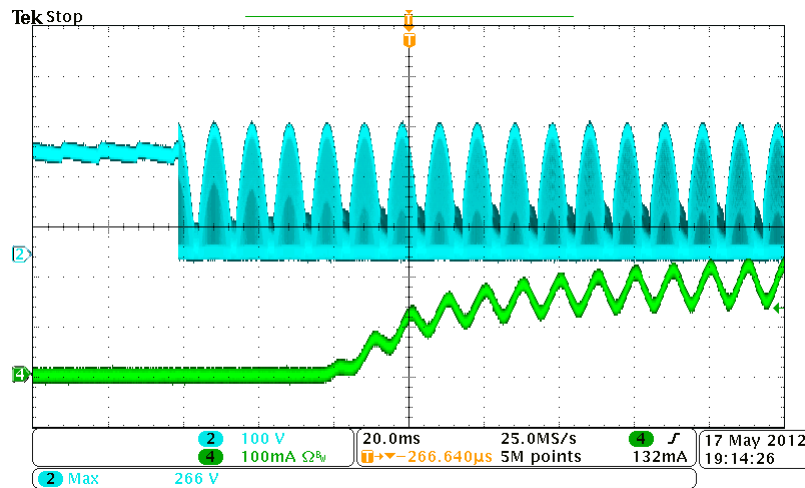
$V_{in}=264V_{ac}$ ,  $V_{out}=77.4V$ ,  $I_{out}=207mA$



CH2(cyan): Vdiode

# Start up & Shut down

$V_{in}=176V_{ac}$ ,  $V_{out}=78.2V$ ,  $I_{out}=207mA$

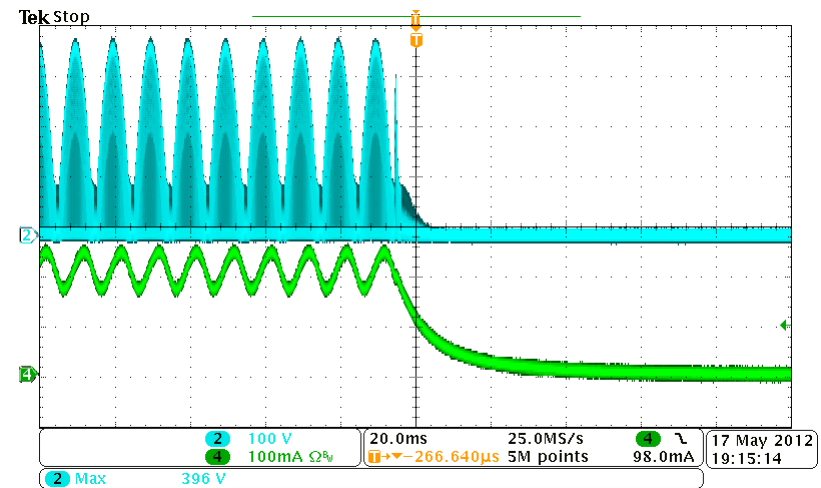
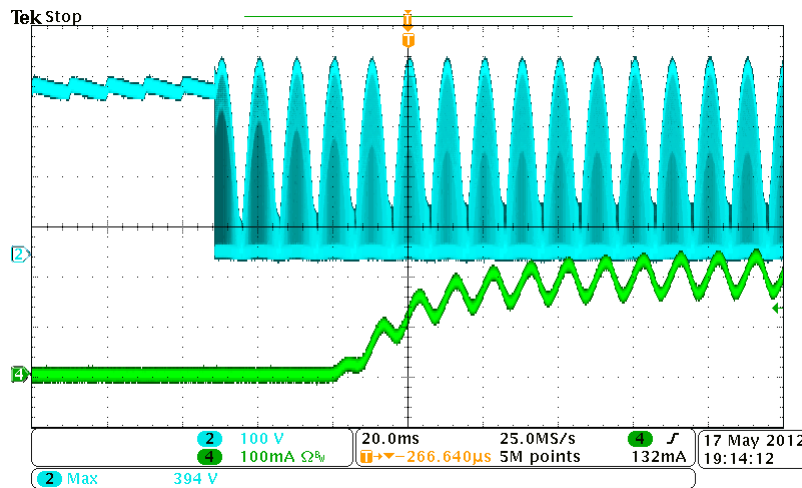


CH2(cyan): Vdrain

CH4(green): Iout

# Start up & Shut down

$V_{in}=264V_{ac}$ ,  $V_{out}=77.4V$ ,  $I_{out}=207mA$

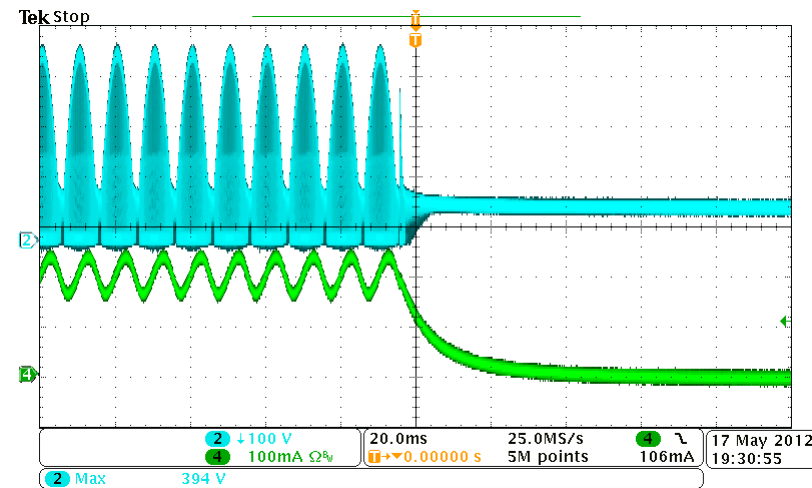
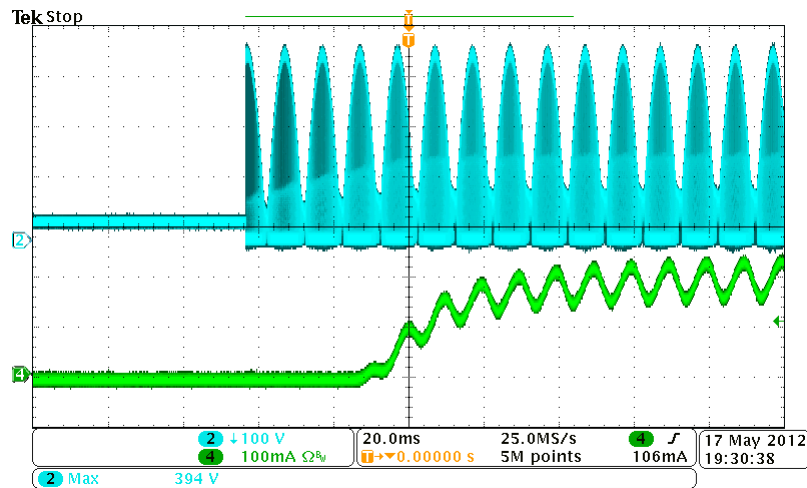


CH2(cyan): Vdrain    CH4(green):Iout



# Start up & Shut down

$V_{in}=264V_{ac}$ ,  $V_{out}=77.4V$ ,  $I_{out}=207mA$



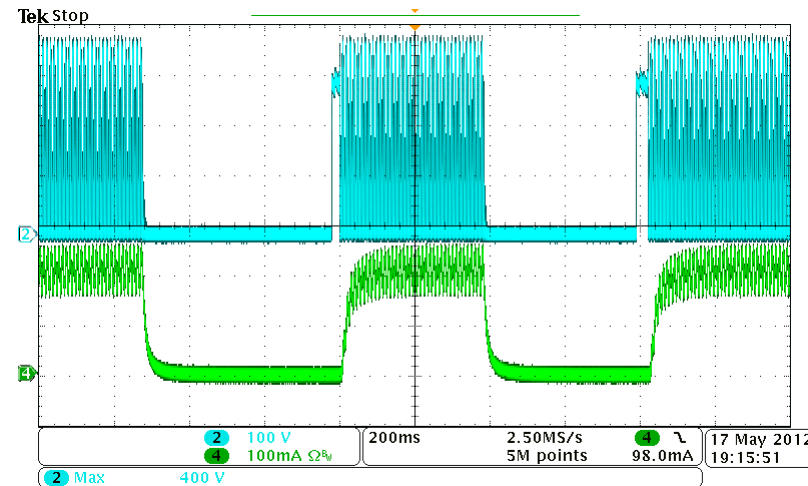
CH2(cyan):  $V_{diode}$  CH4(green):  $I_{out}$





# Start up continuously

$V_{in}=264V_{ac}$ ,  $V_{out}=77.4V$ ,  $I_{out}=207mA$

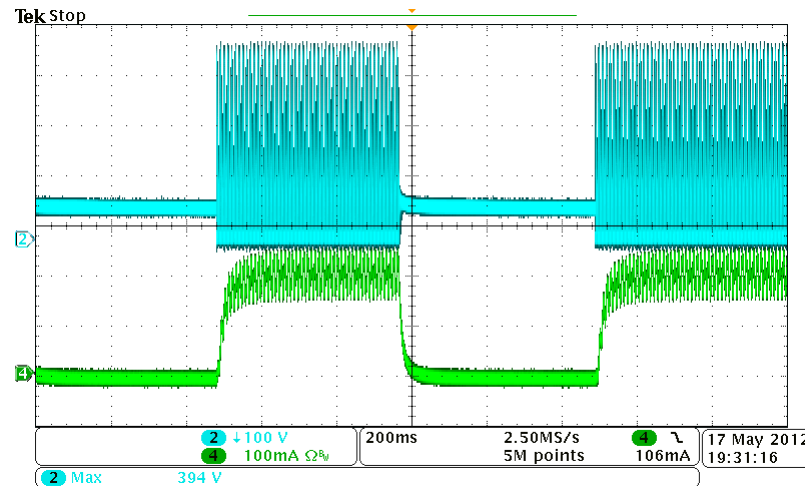


CH2(cyan): Vdrain CH4(green):Iout



# Start up continuously

$V_{in}=264V_{ac}$ ,  $V_{out}=77.4V$ ,  $I_{out}=207mA$

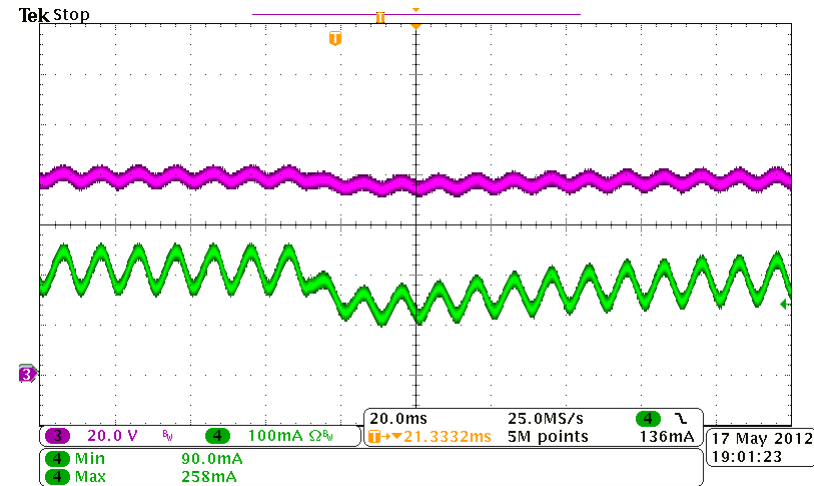
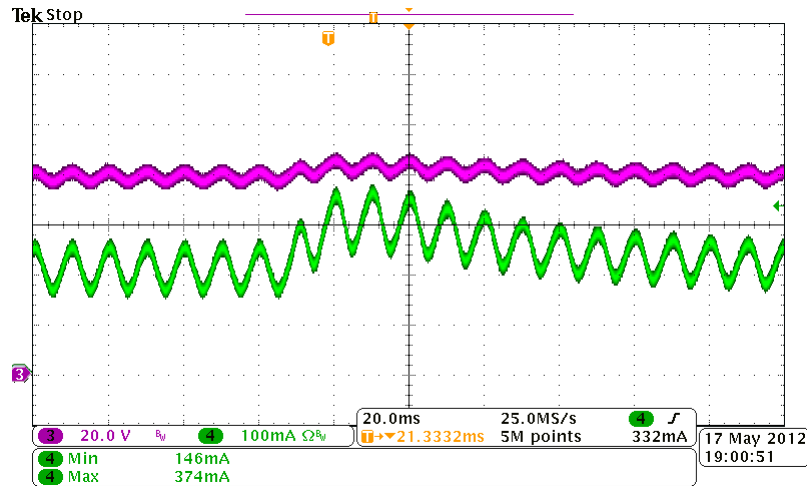


CH2(cyan): Vdiode CH4(green):Iout



# Line Transient

Vin=176Vac~264Vac



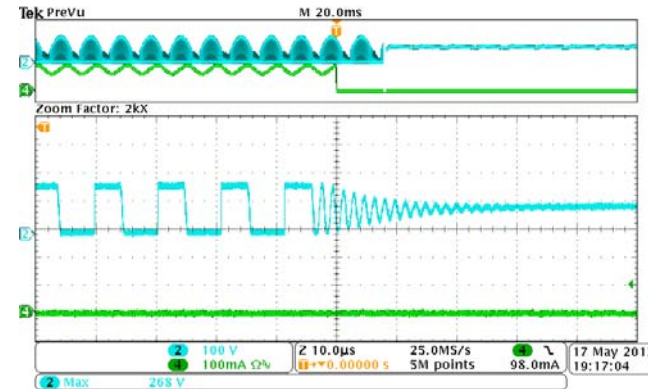
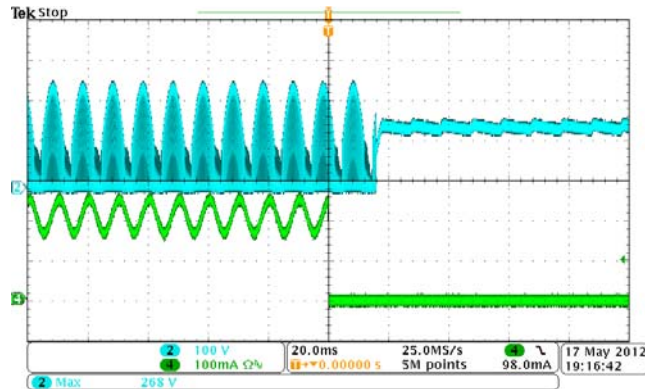
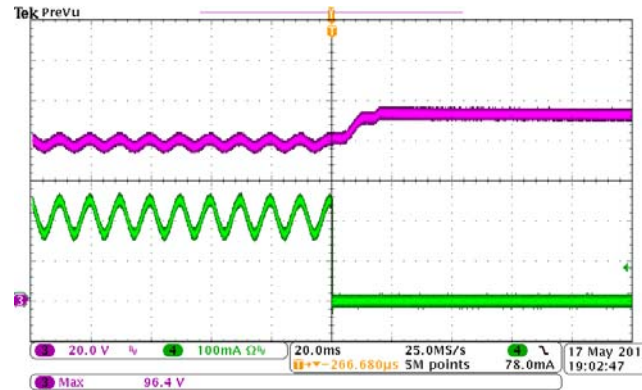
CH3(pink): Vout

CH4(green): Iout



# Open Loop Protection(OLP)

$V_{in}=176V_{ac}$ ,  $V_{out}=78.2V$ ,  $I_{out}=207mA$



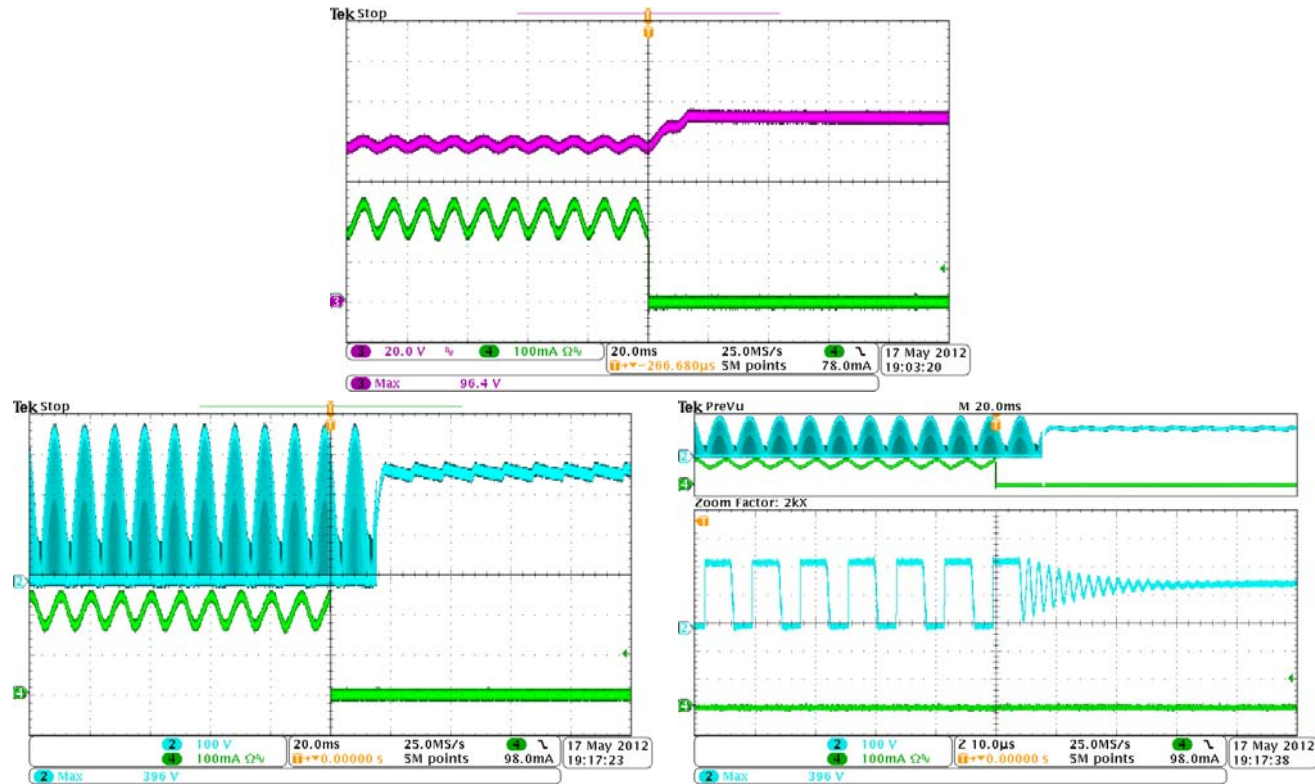
CH2(cyan): Vdrain

CH4(green): Iout



# Open Loop Protection(OLP)

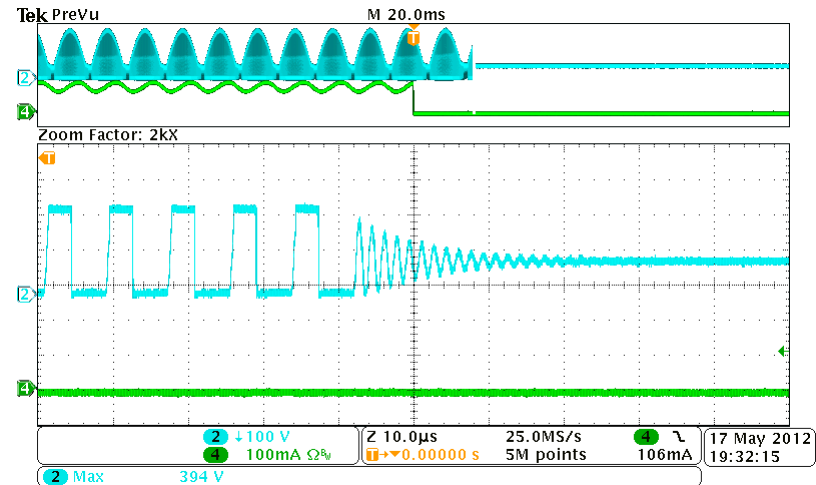
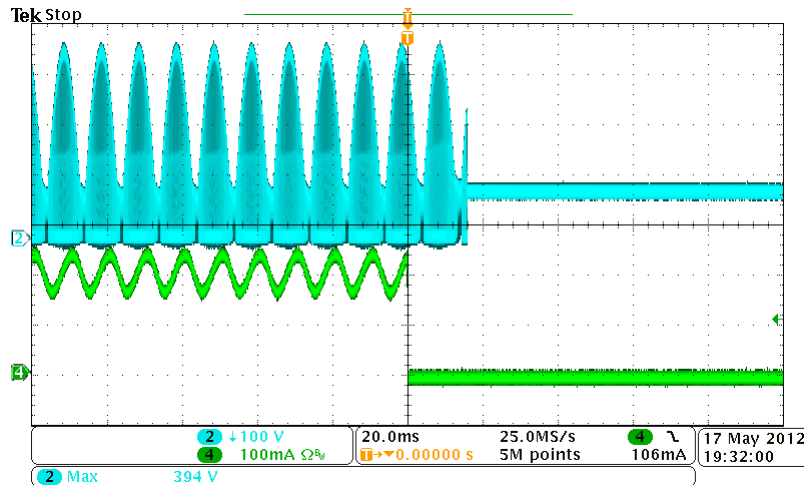
$V_{in}=264V_{ac}$ ,  $V_{out}=77.4V$ ,  $I_{out}=207mA$



CH2(cyan): Vdrain    CH4(green):Iout

# Open Loop Protection(OLP)

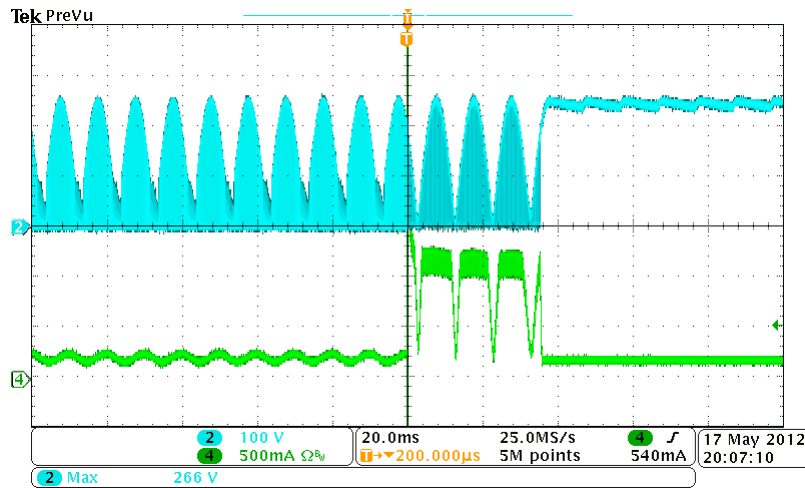
$V_{in}=264V_{ac}$ ,  $V_{out}=77.4V$ ,  $I_{out}=207mA$



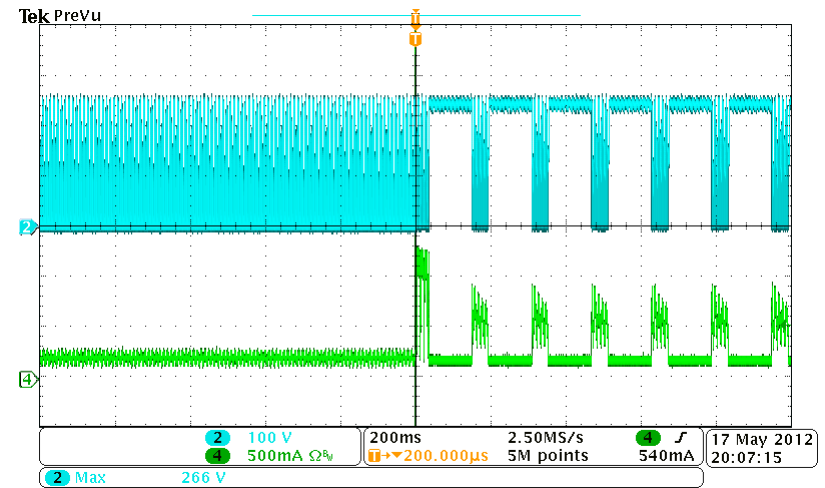
CH2(cyan): Vdiode    CH4(green):Iout

# Short Circuit Protection(SCP)

$V_{in}=176V_{ac}$ ,  $V_{out}=78.2V$ ,  $I_{out}=207mA$



CH2(cyan): Vdrain

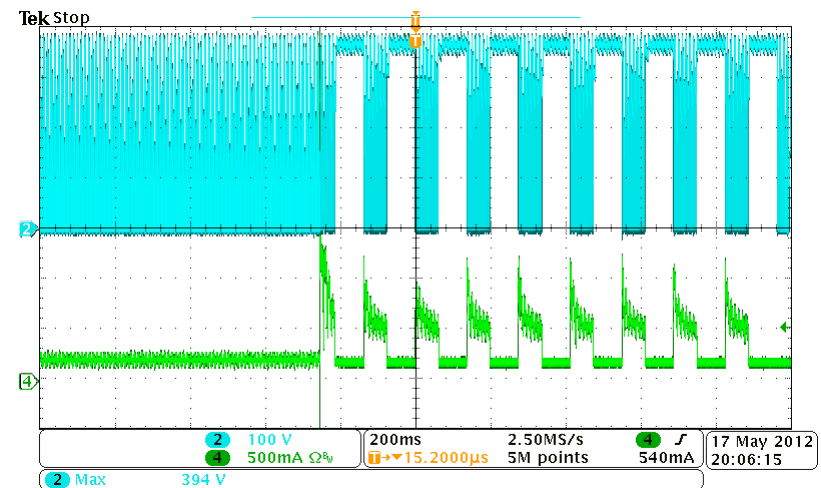
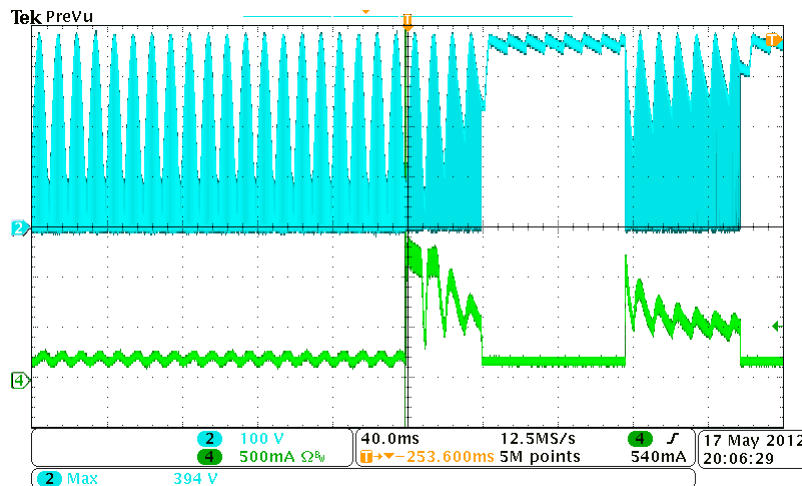


CH4(green): Iout



# Short Circuit Protection(SCP)

$V_{in}=264V_{ac}$ ,  $V_{out}=77.4V$ ,  $I_{out}=207mA$



CH2(cyan):  $V_{drain}$

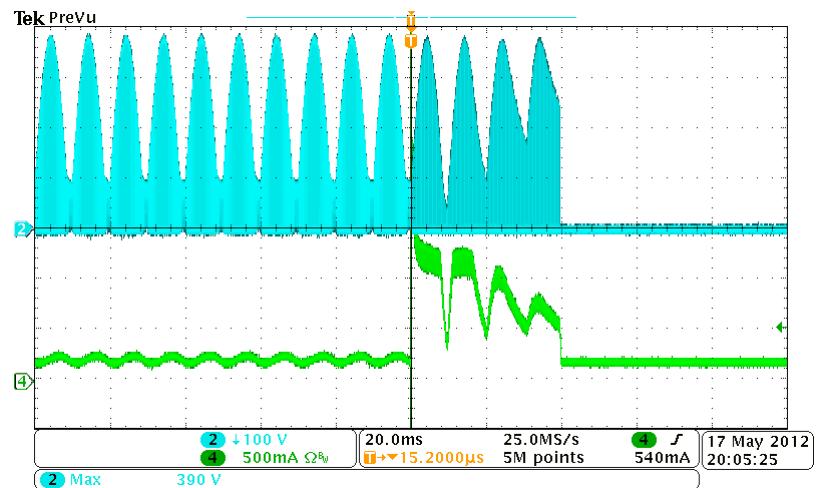
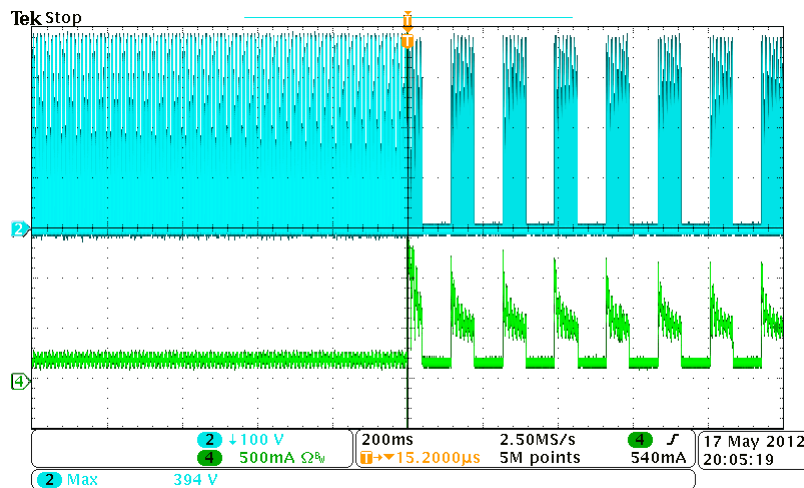
CH4(green):  $I_{out}$



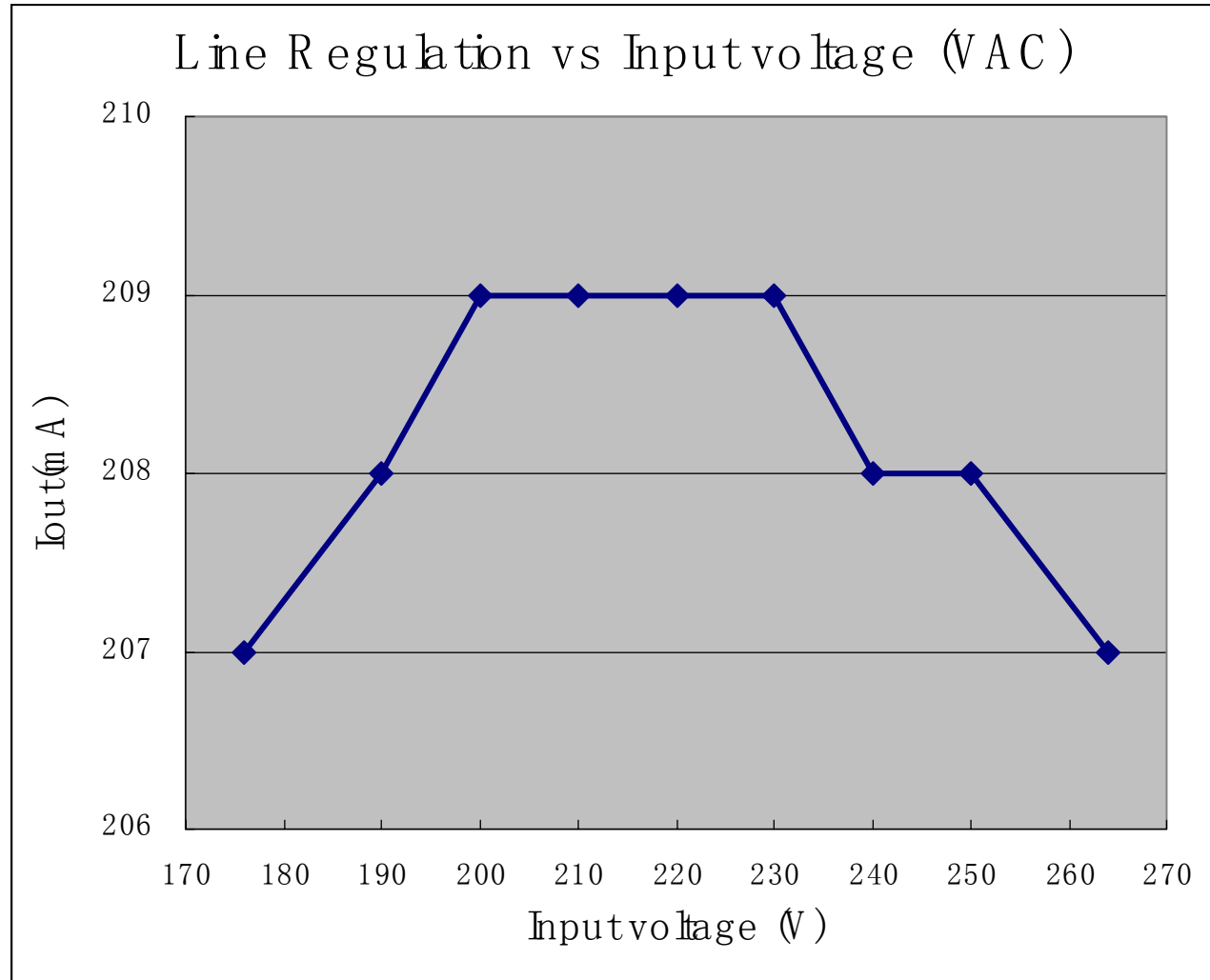


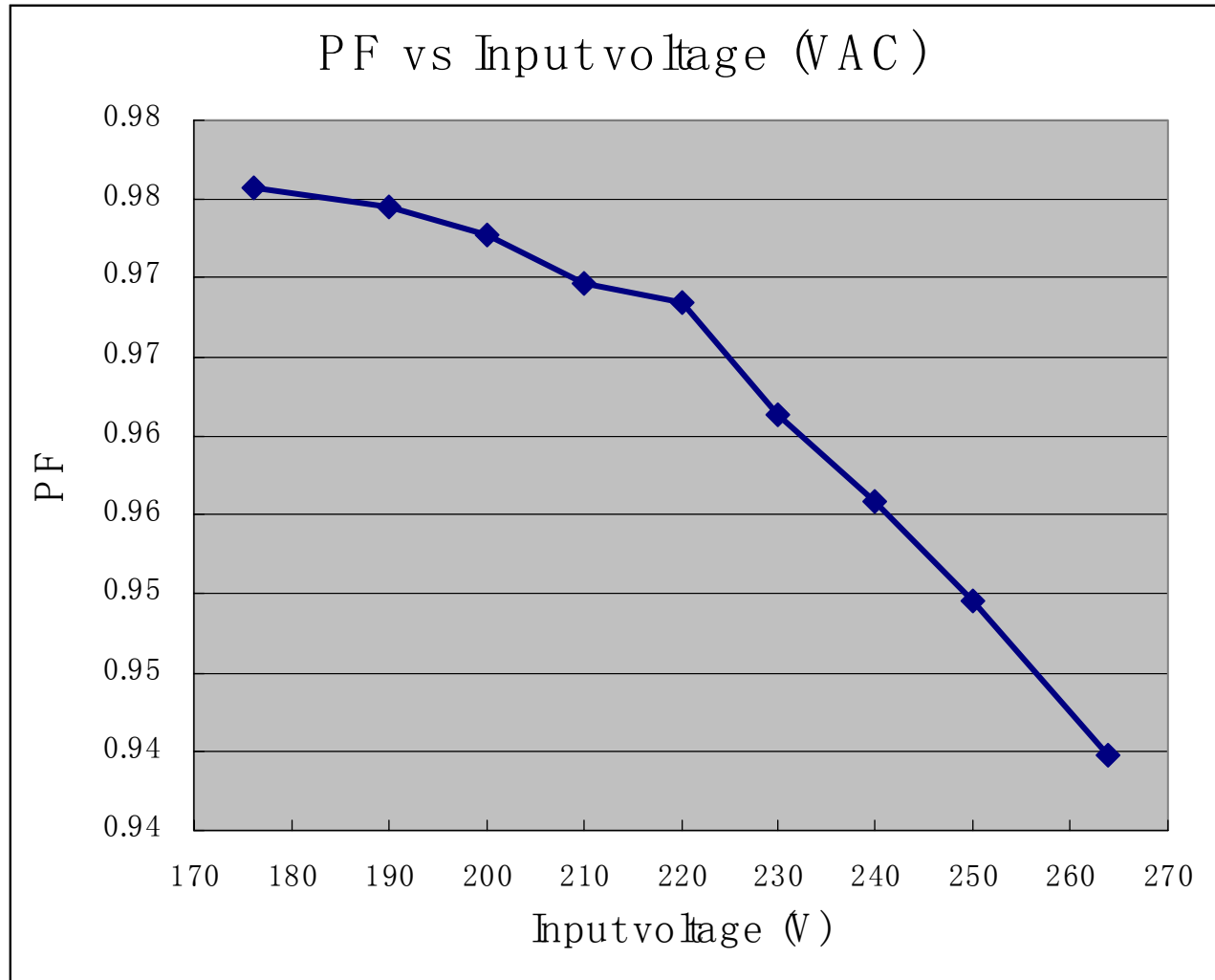
# Short Circuit Protection(SCP)

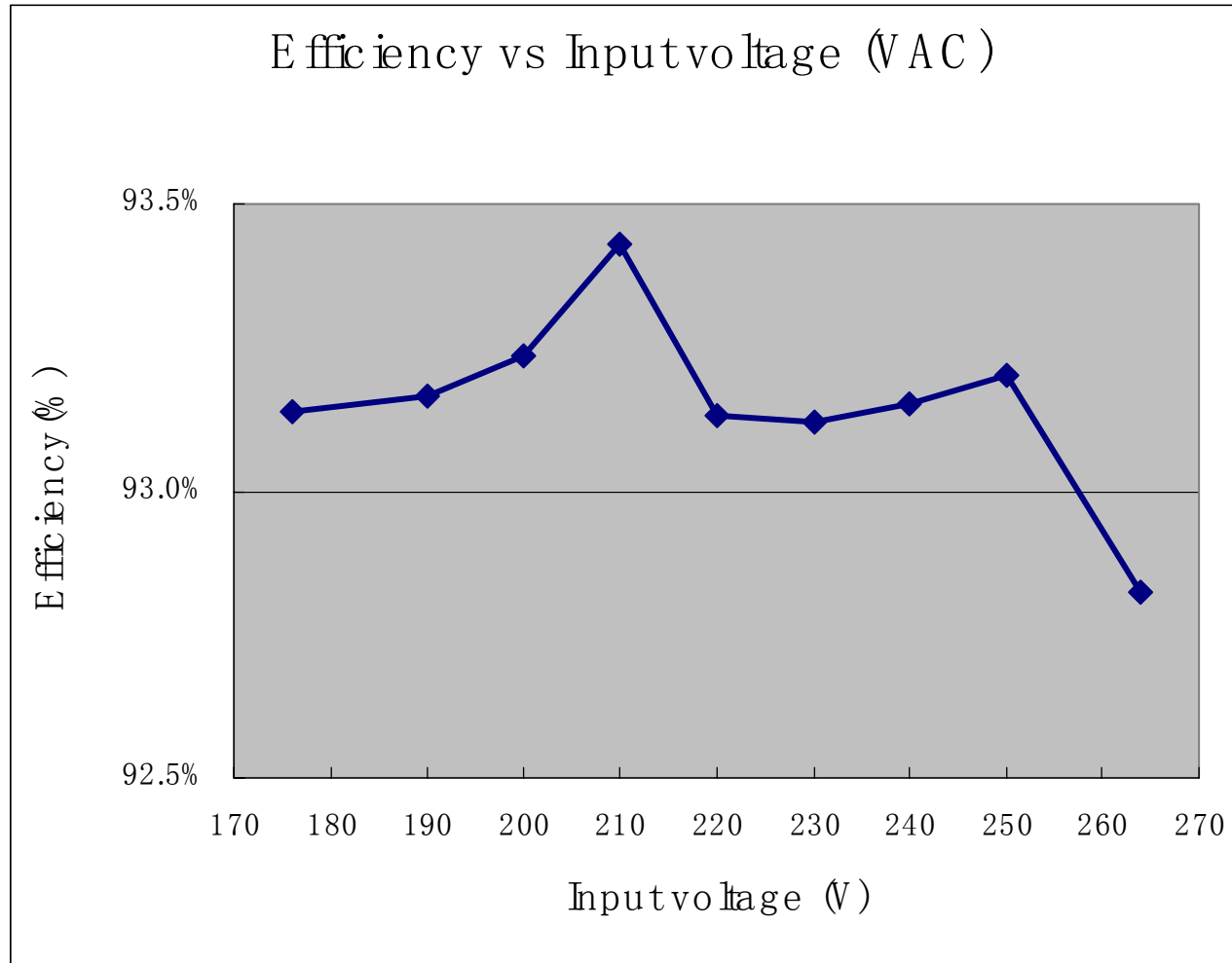
$V_{in}=264V_{ac}$ ,  $V_{out}=77.4V$ ,  $I_{out}=207mA$



CH2(cyan): Vdiode CH4(green):Iout





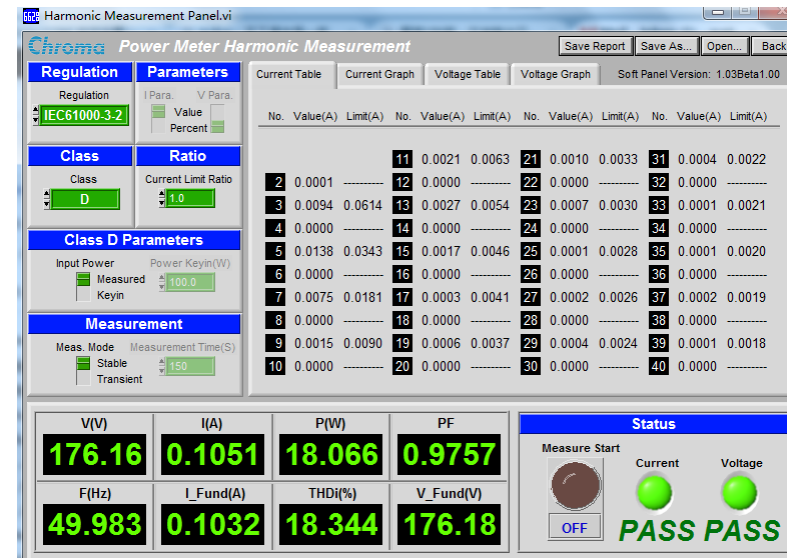
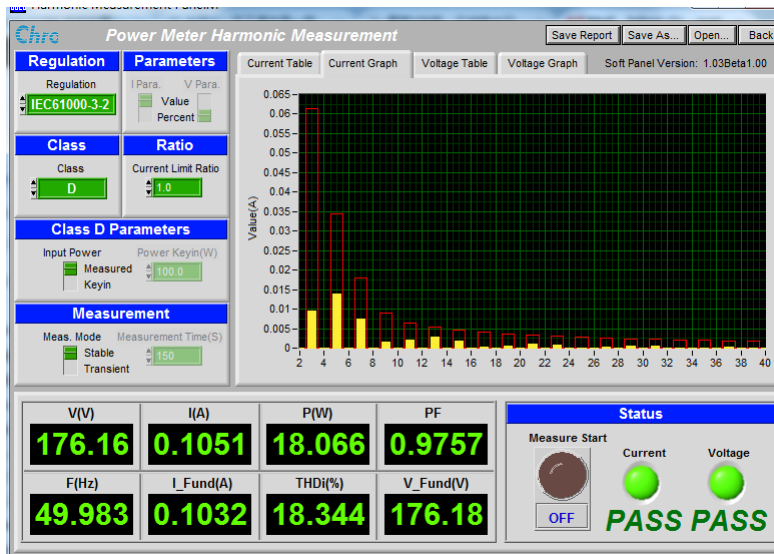




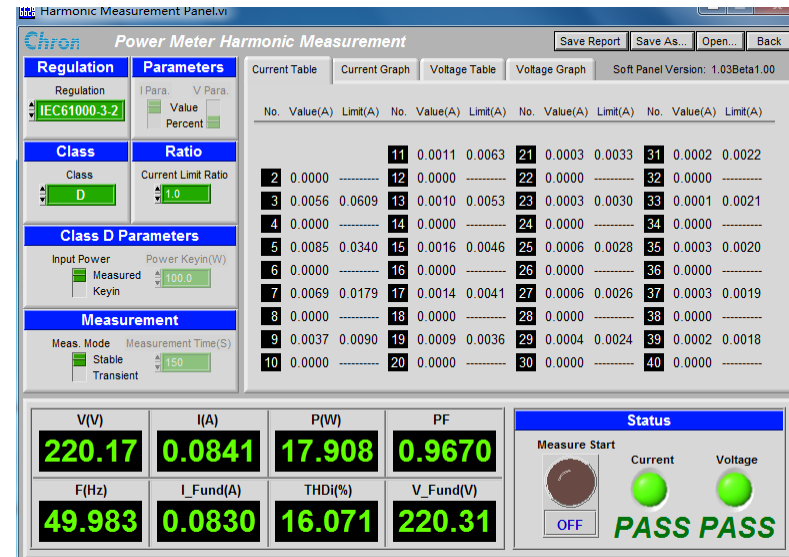
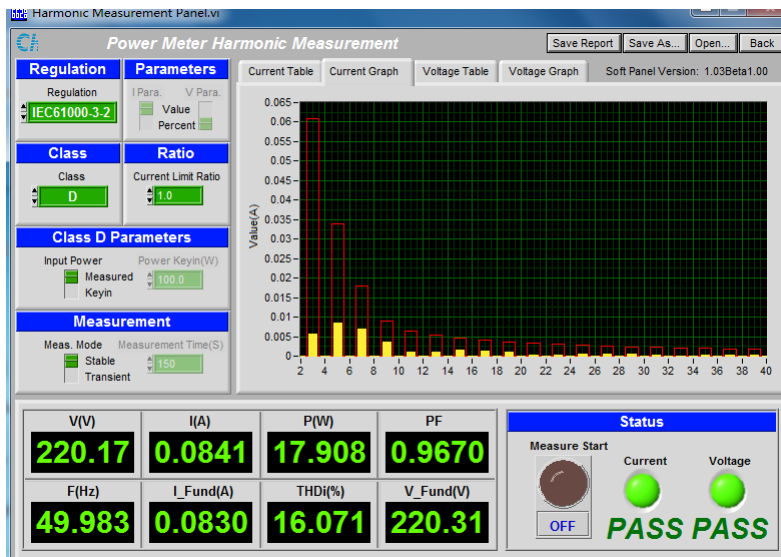
# Standby power

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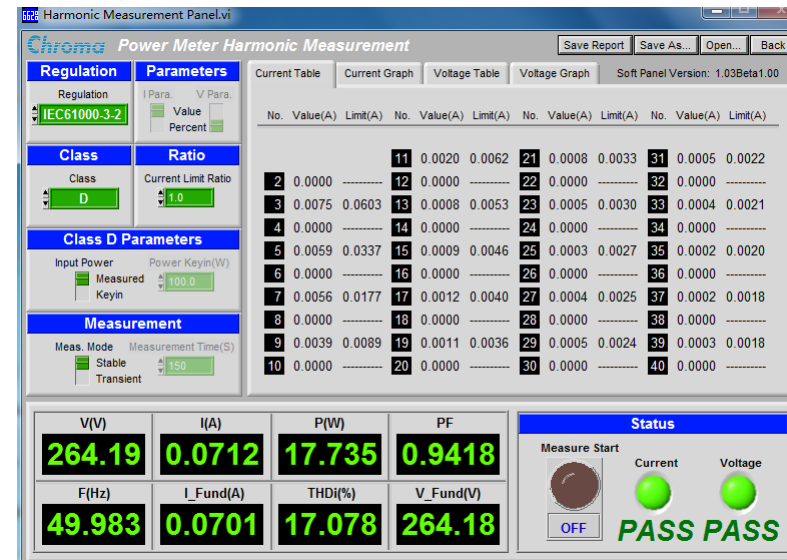
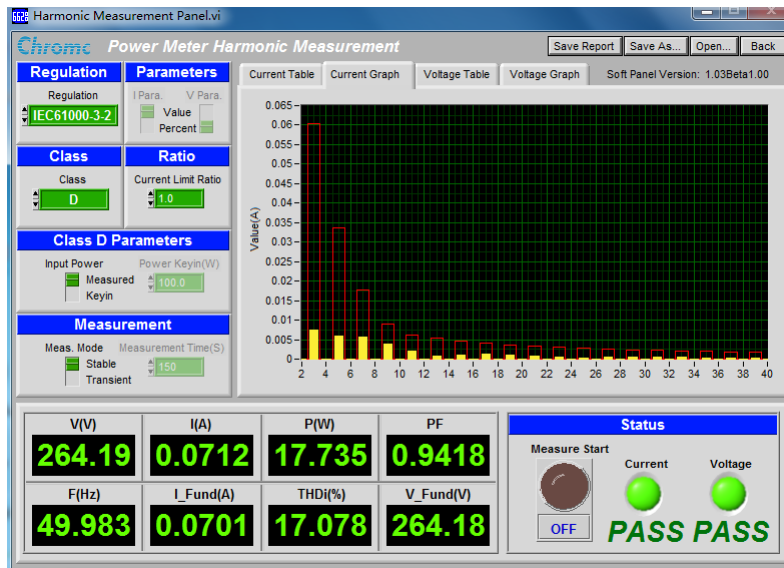
Null Load		Hard short	
Vin(vac)	Open loss	Vin(Vac)	Short loss
176	0.2147W	176	0.3742W
220	0.2655W	220	0.5611W
264	0.3090W	264	0.8286W



$$V_{IN} = 176V$$



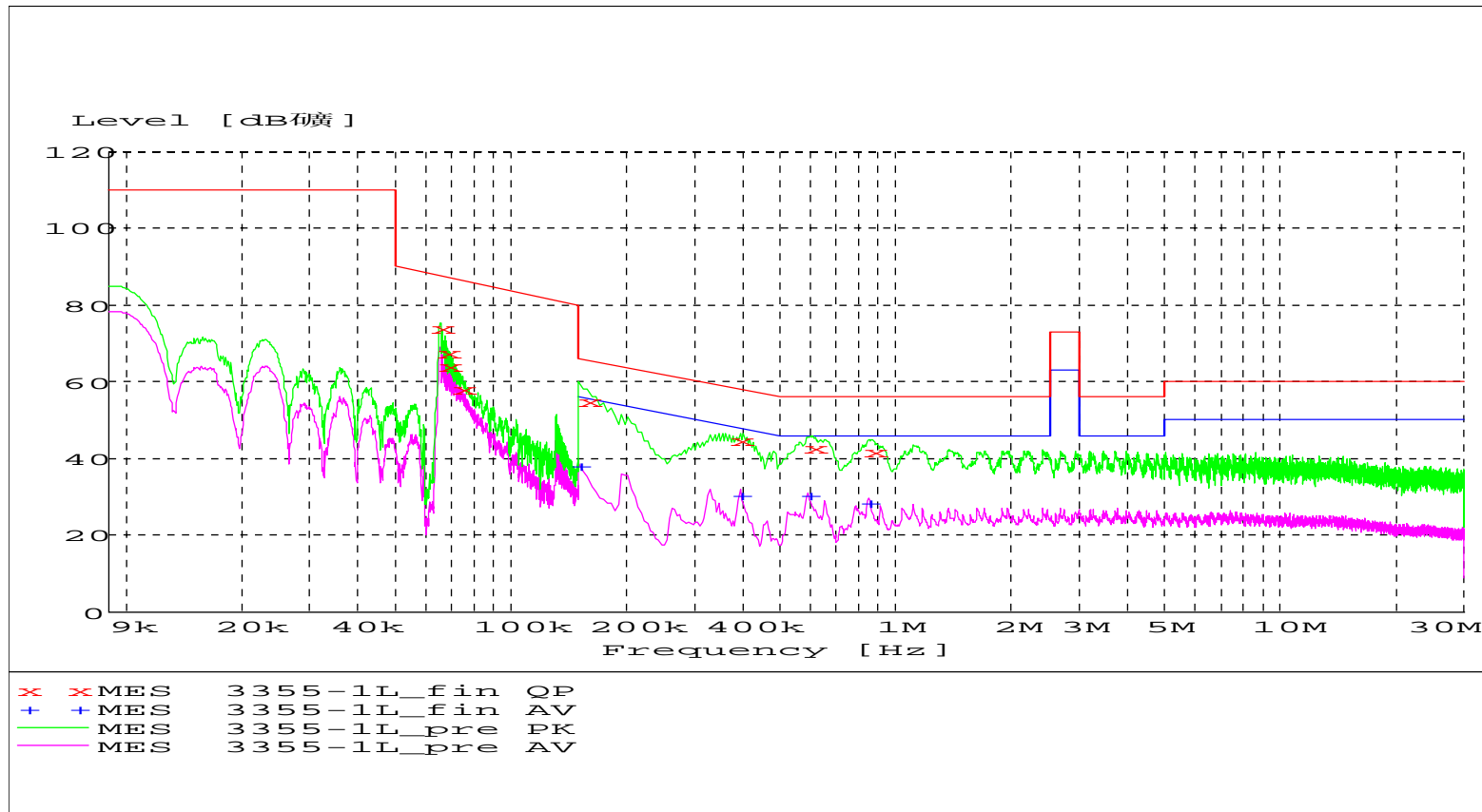
$$V_{IN}=220V$$



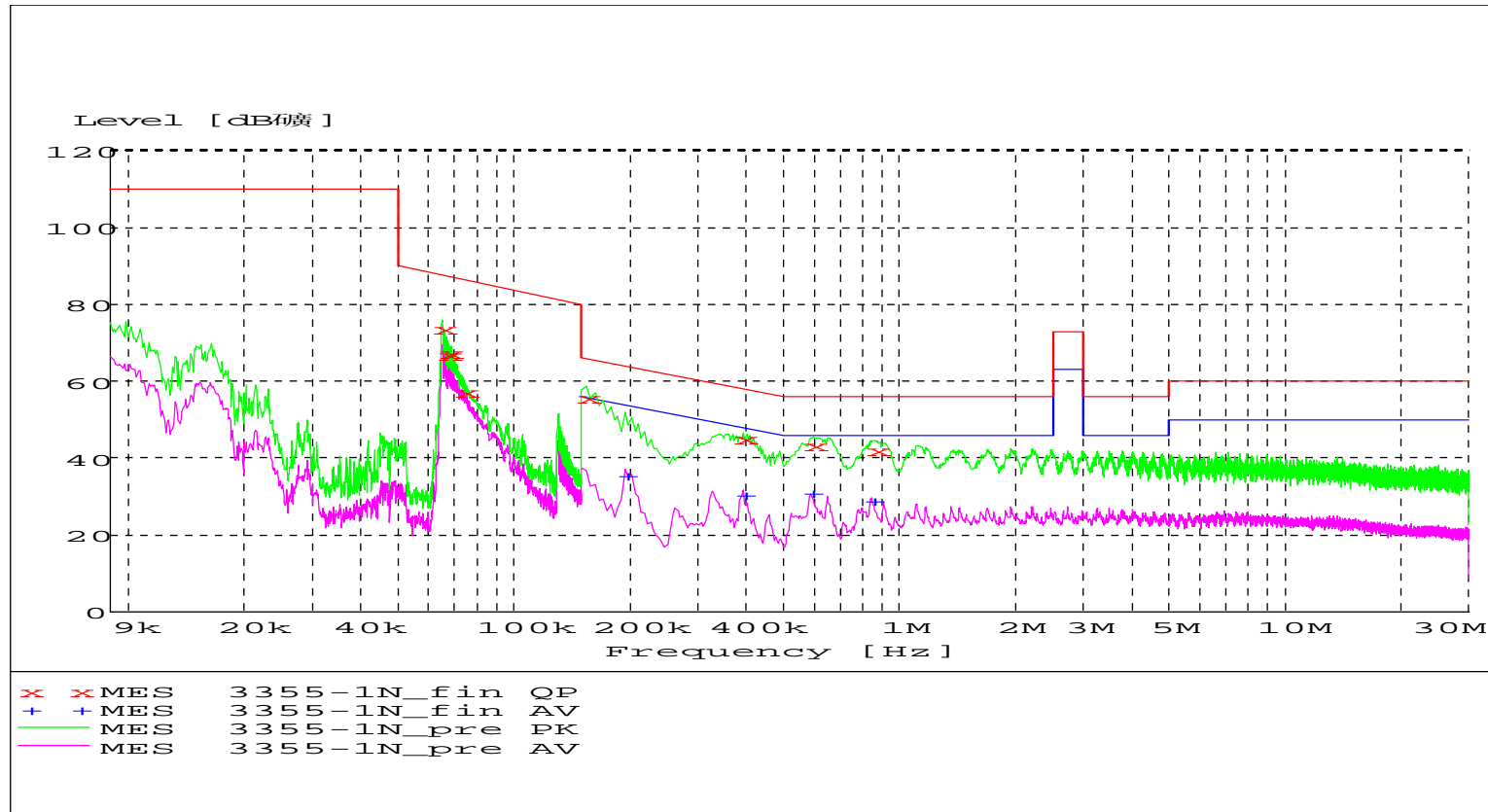
$$V_{IN}=264V$$



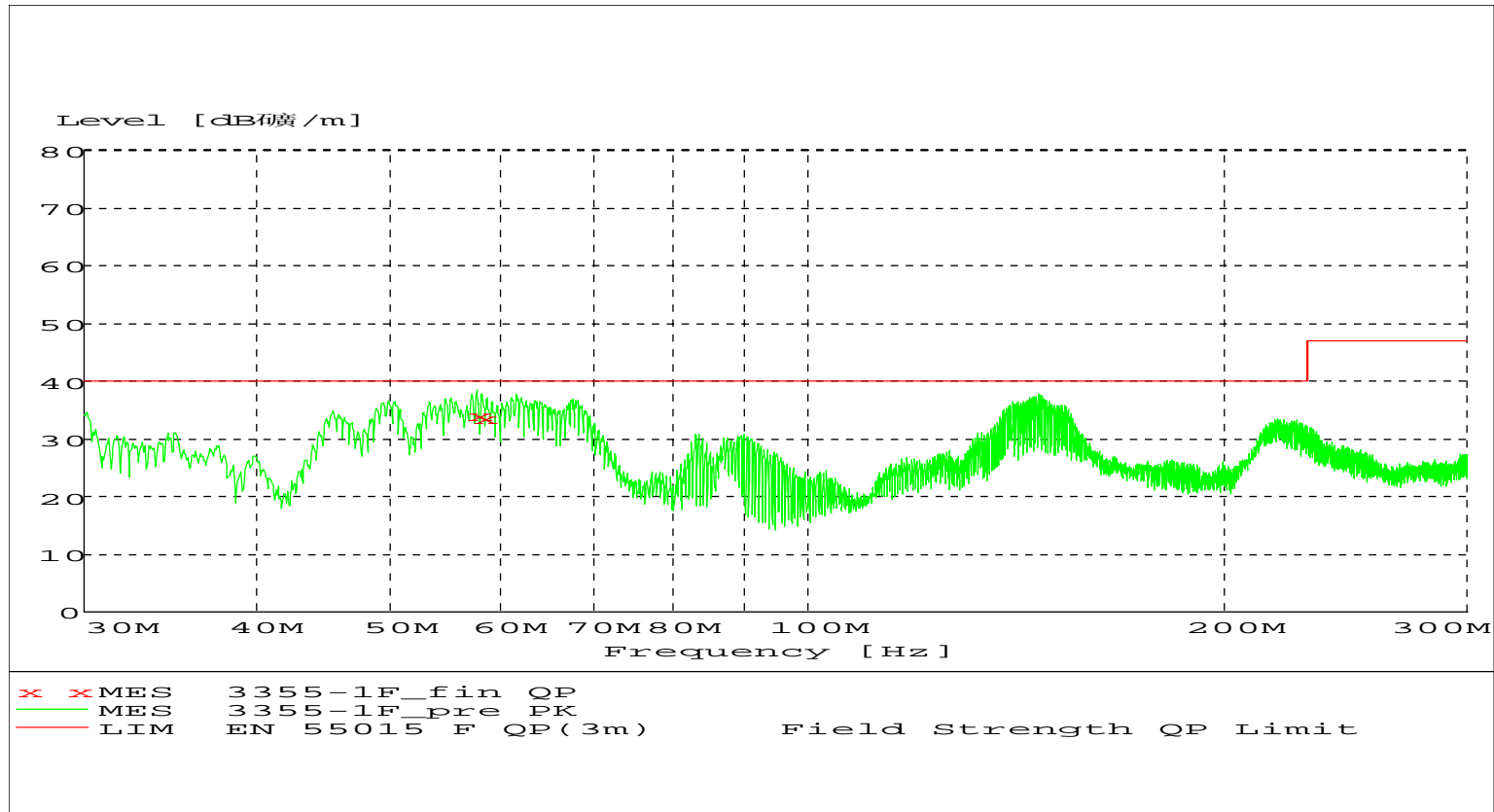
## L-cond



## N-cond



## RFI





**THE END!**