PFH500F-12-xxx-R

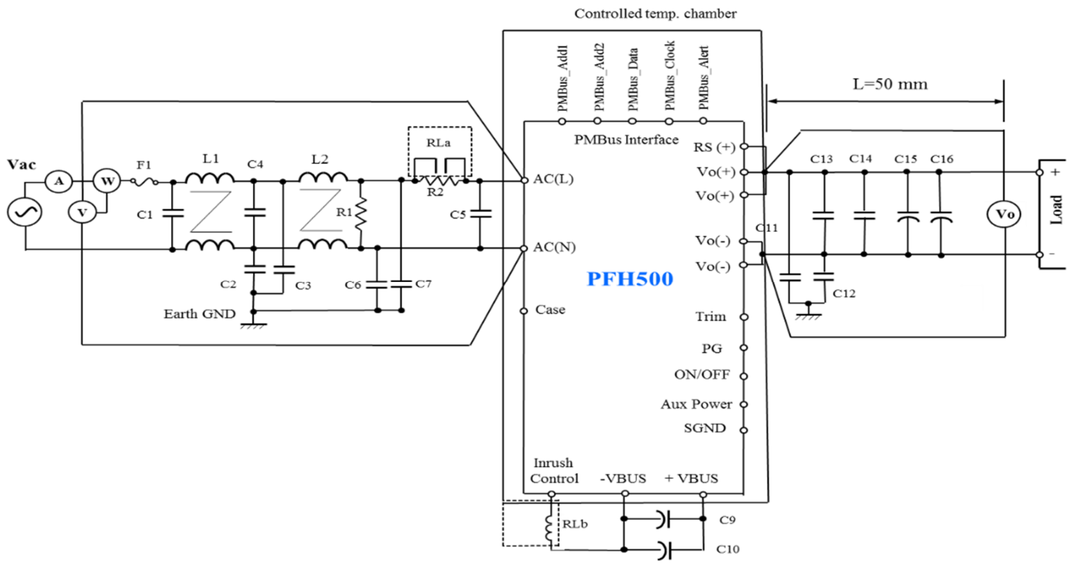
Evaluation Report

Contents

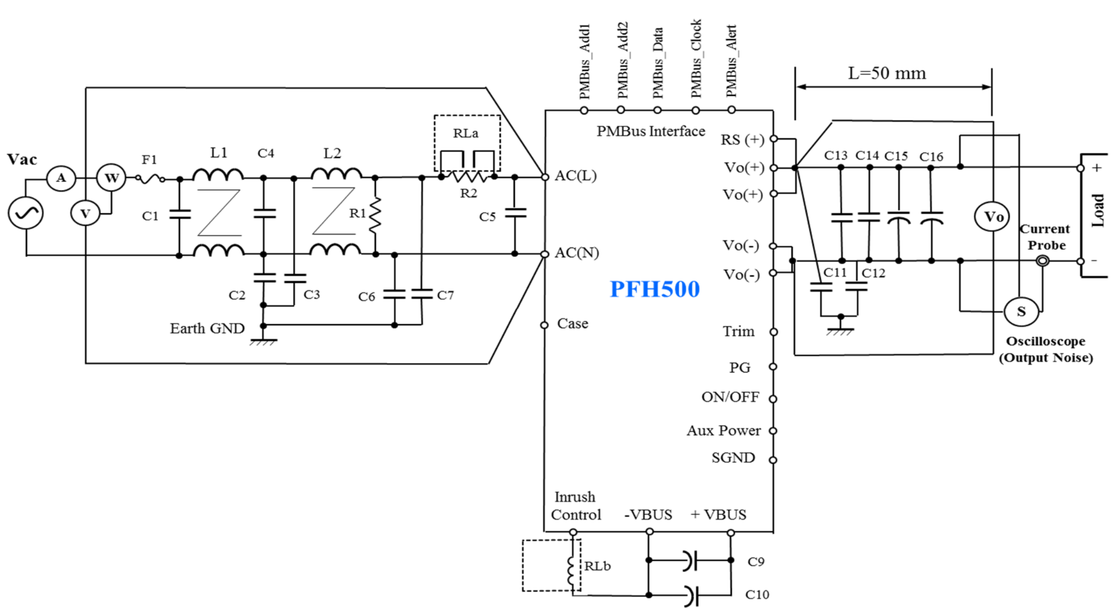
1. EVALUATION METHOD

1.1 Test / Measurement Circuits

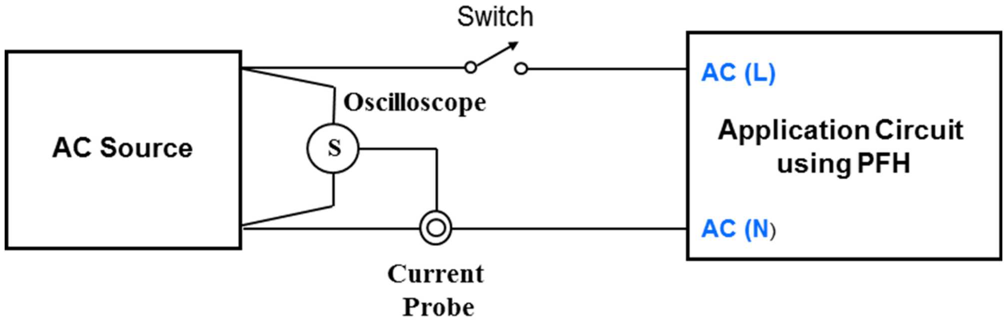
1.1.1 Steady State Test Measurement Circuit



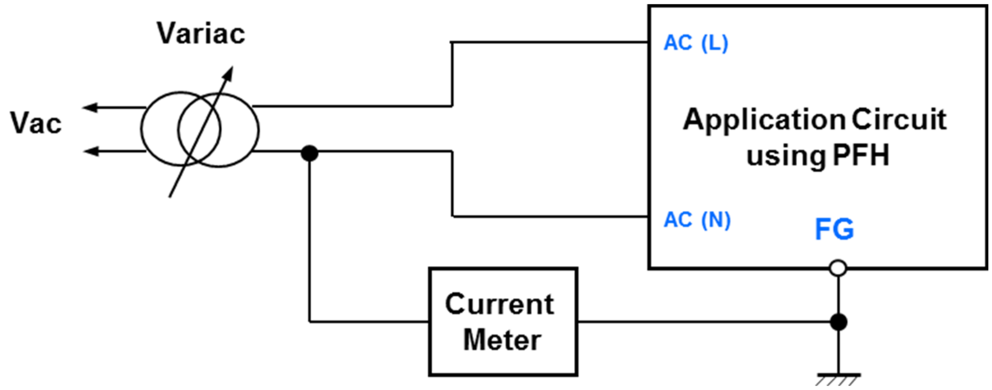
1.1.2 Dynamic, Protection and Output Ripple and Noise Measurement Circuit



1.1.3 Inrush Current Measurement Circuit

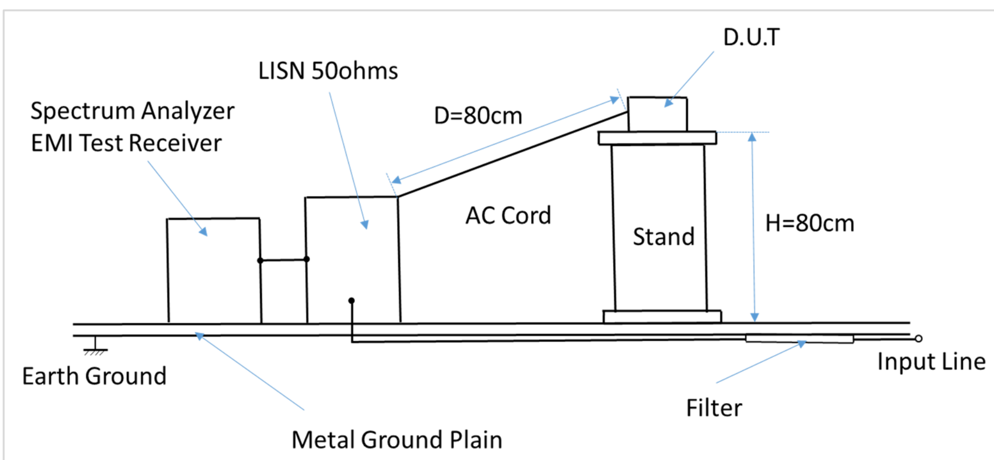


1.1.4 Leakage Current Measurement Circuit

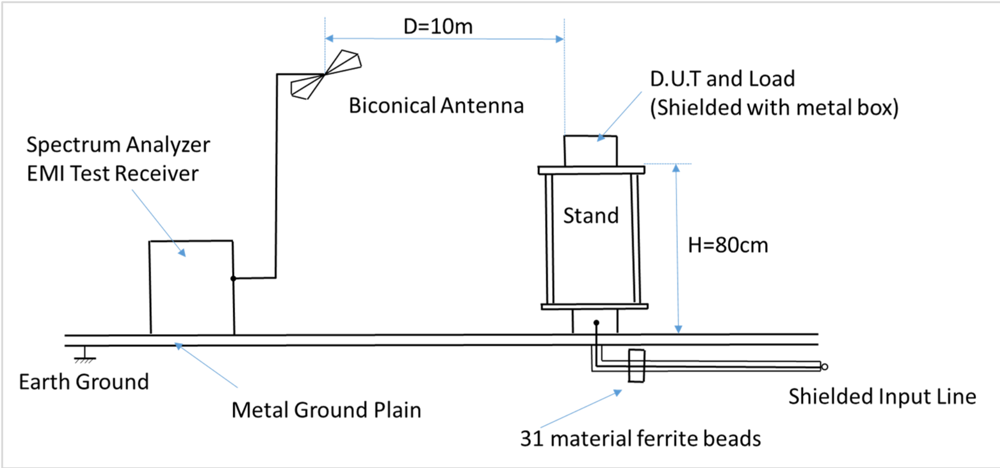


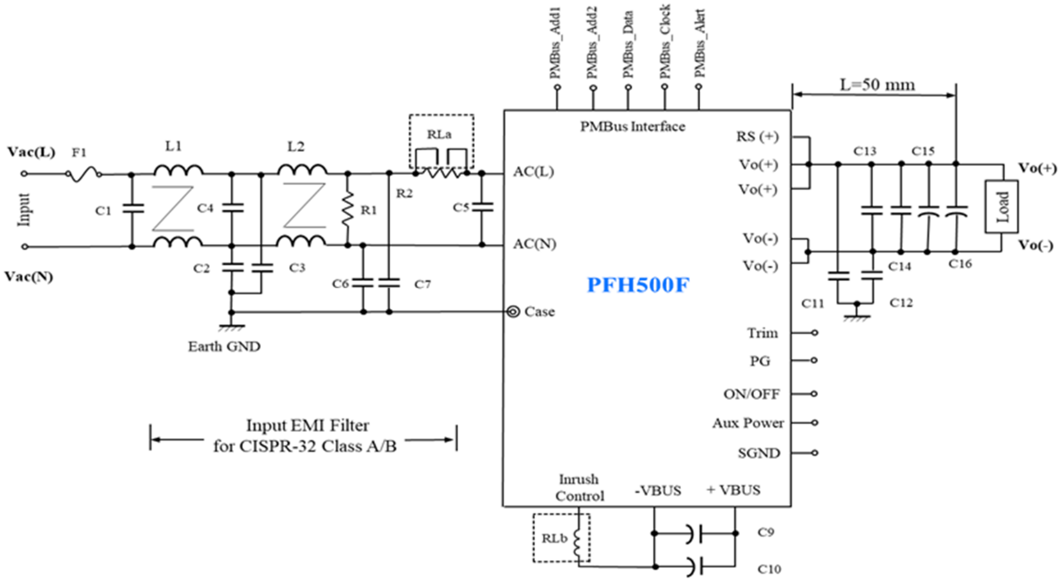
1.1.5 Electro-Magnetic Interference Test Set-Up

1.1.5.1 Conducted EMI



1.1.5.2 Radiated EMI





Circuit Code	Description	Circuit Code	Description
C1, C4	1µF Film Capacitor	C5	2.2µF Film Capacitor
C2, C3	3300pF Ceramic Capacitor	C6, C7 (2)	400pF Ceramic Capacitor
L1, L2	6.3mH	R2	22 Ohms
R1	470kOhms	C13	0.1µF Ceramic Capacitor
C15, C16 (1)	470µF Electrolytic Capacitor	C14	40uF Ceramic Capacitor
C11, C12	470pF Ceramic Capacitor	C9, C10	470µF Electrolytic Capacitor
RLa,RLb	1 Form A relay with 10A, 277VAC, power rating: 12VDC, 16.7mA, 200mW, High Sensitivity	F1	10A, 250V, Fast Blow

(1): Higher Capacitance Value (~2X total cap value recommended) for Ta ≤ -20 °C operation.
(2): 2pcs 150pF and 1 pc 100pF.

List of Equipment

	EQUIPMENT USED	MANUFACTURER	MODEL NO.
1	OSCILLOSCOPE	LECROY	WaveSurfer 454
2	OSCILLOSCOPE	LECROY	WaveRunner 6050
3	DIGITAL MULTIMETER	KEITHLEY	2110
4	DIGITAL MULTIMETER	KEITHLEY	2110
5	DIFFERENTIAL AMPLIFIER	LECROY	DA1855A
6	DIFFERENTIAL AMPLIFIER	LECROY	DA1855A
7	SHUNT RESISTER	EMPRO SHUNT	HA20-100
8	TEMP CHAMBER	TENNEY JUNIOR ENVIRONMENTAL	TJR
9	DIFFERENTIAL PROBE	LECROY	A101
10	DIFFERENTIAL PROBE	LECROY	DXG100A
11	DIGITAL POWER METER	YOKOGAWA	WT310
12	SURGE TESTER	THERMO SCIENTIFIC	EMCPRO PLUS
13	DC ELECTRONIC LOAD	CHROMA	63201
14	FREQUENCY ANALYZER	AP INSTRUMENT	300
15	AC POWER SOURCE	CHROMA	6530
16	INJECTION ISOLATOR	RIDLEY ENGINEERING	0.1Hz TO 30MHz
17	WAVEFORM GENERATOR	AGILENT	33120A
18	DC ELECTRONIC LOAD	CHROMA	6334
19	AC CONTROL	SORENSEN	DCS150-20
20	THERMOSTREAM	TEEMPTRONIC CORPORATION	ATS-810-M-4
21	CURRENT PROBE	LECROY	AP015
22	CURRENT PROBE	LECROY	CP150

2. CHARACTERISTIC

2.1 Steady State Data (Refer to Section 1.1.1 For Test Setup)

2.1.1 Regulation – Line, Load and Temperature

a. Low Line Regulation - Line and Load **Conditions:** **T_a = 25 °C**

IO \ VIN	100VAC	115VAC	120VAC	130VAC	Line Regulation	
10%	11.9873	11.987	11.9867	11.9864	0.0009	0.01%
50%	11.9824	11.9825	11.9821	11.9818	0.0007	0.01%
100%	11.9792	11.9778	11.9782	11.9776	0.0016	0.01%
Load Regulation	0.0081	0.0092	0.0085	0.0088		
	0.07%	0.08%	0.07%	0.07%		

b. Low Line Regulation – No Load **Conditions:** **Ta = 25 °C**

IO \ VIN	100VAC	115VAC	120VAC	130VAC	Line Regulation	
0%	12.01	12.0095	12.0089	12.0095	0.0011	0.01%

c. Temperature Regulation **Conditions:** **V_{IN} = 115 VAC**
I_O = 100%

T_a	-40 °C	+25 °C	+55 °C	Temperature Stability	
V_O	12.0069	11.9778	11.9506	0.0563	0.47%

d. High Line Regulation - Line and Load **Conditions:** **T_a = 25 °C**

I_O \ V_{IN}	180VAC	220VAC	230VAC	265VAC	Line Regulation	
10%	11.9865	11.9864	11.9868	11.9861	0.0007	0.01%
50%	11.9816	11.9813	11.983	11.9825	0.0017	0.01%
100%	11.977	11.977	11.9789	11.9788	0.0019	0.02%
Load Regulation	0.0095	0.0094	0.0079	0.0073		
	0.08%	0.08%	0.07%	0.06%		

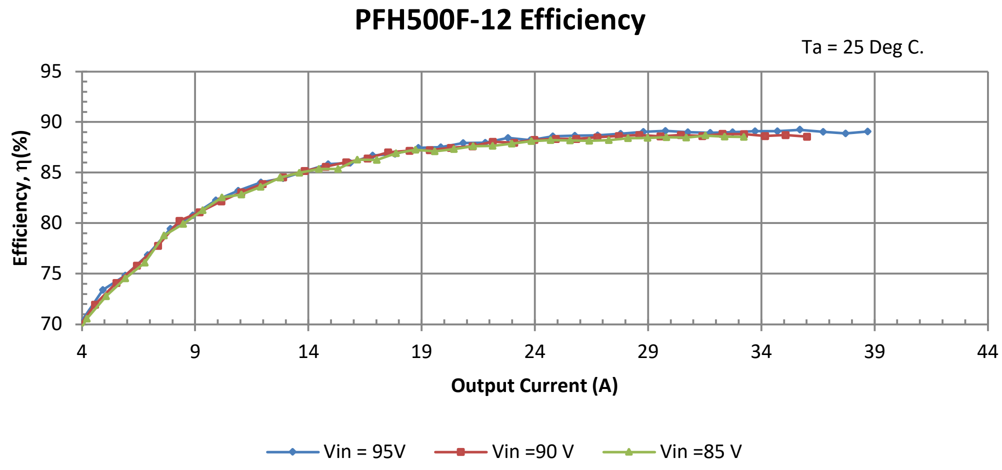
e. High Line Regulation – No Load

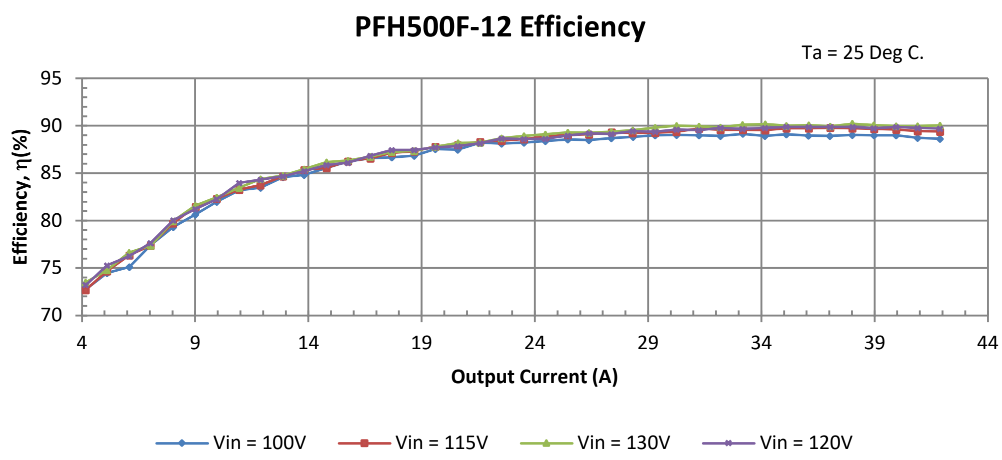
I_O \ V_{IN}	180VAC	220VAC	230VAC	265VAC	Line Regulation	
0%	12.0105	12.0101	12.0111	12.0126	0.0025	0.02%

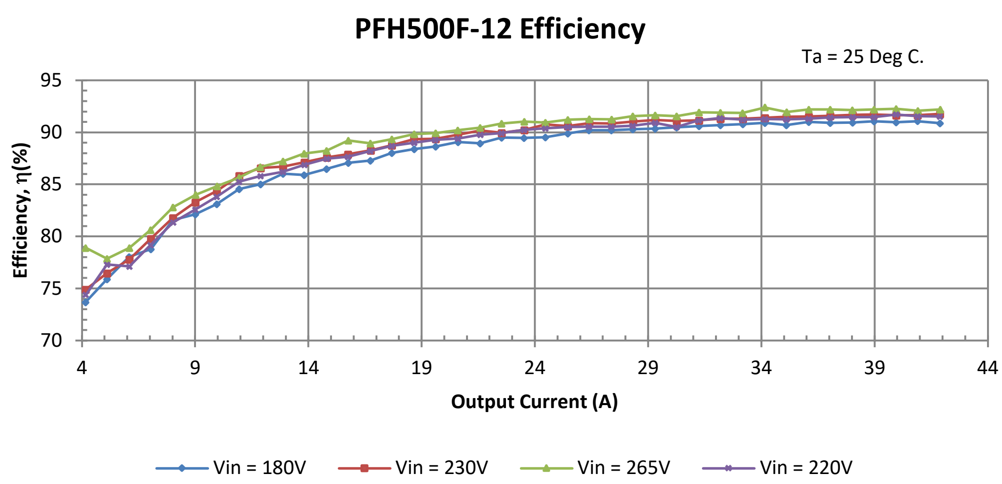
f. Temperature Regulation **Conditions:** **V_{IN} = 230 VAC**
I_O = 100%

T_a	-40 °C	+25 °C	+55 °C	Temperature Stability	
V_O	12.0071	11.977	11.9506	0.056	0.47%

2.1.2 Efficiency vs. Output Current

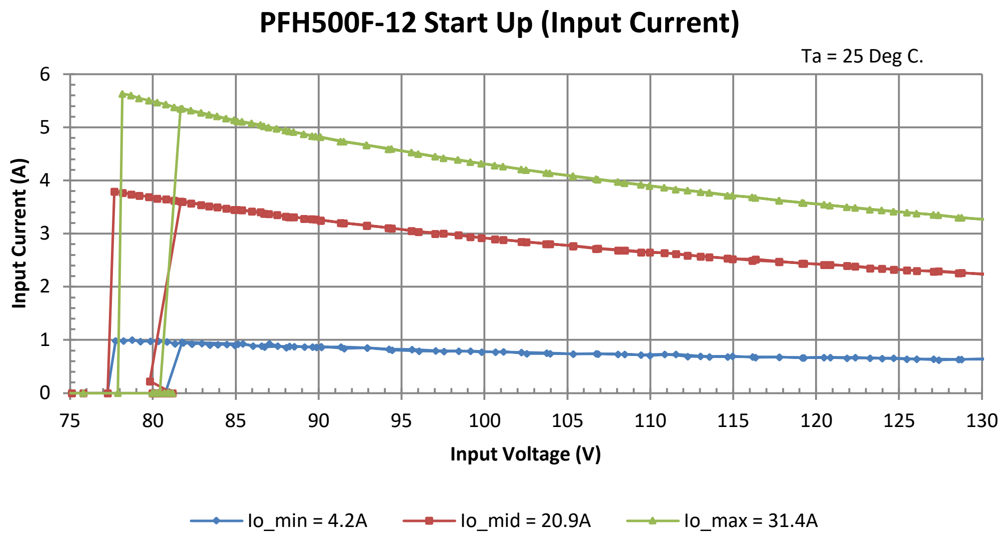




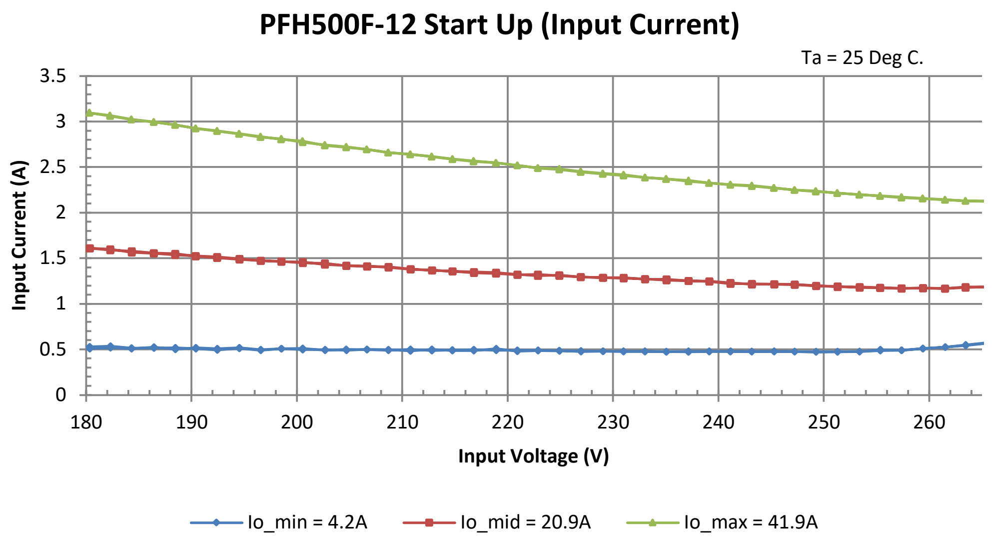


2.1.3 Input Current vs. Input Voltage

Low Line

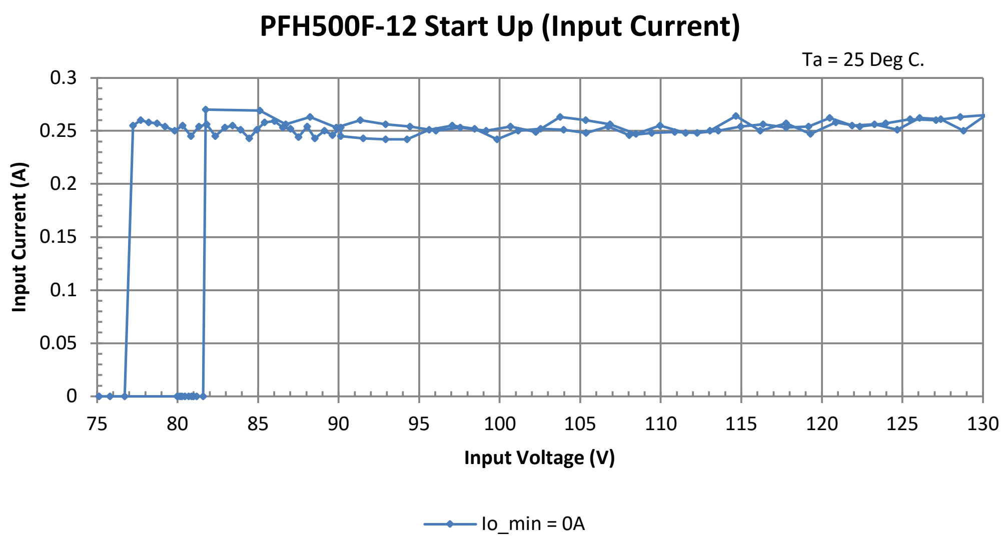


High Line

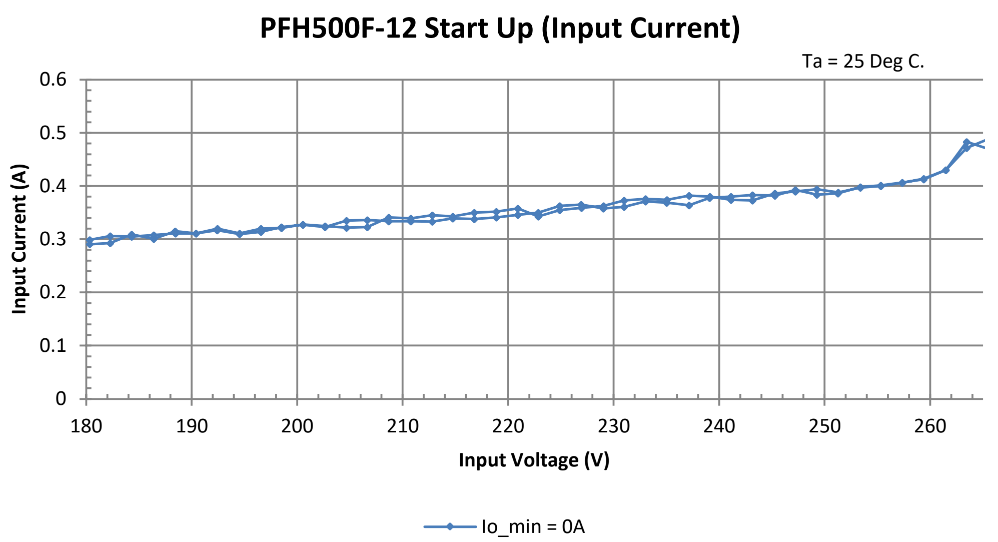


2.1.4 Input Current vs. Input Voltage (No Load)

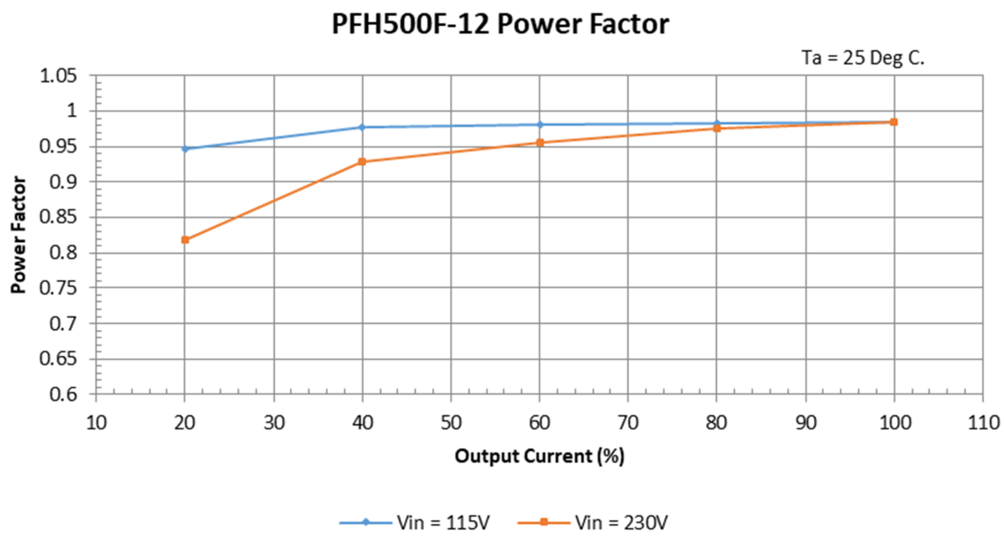
Low Line



High Line

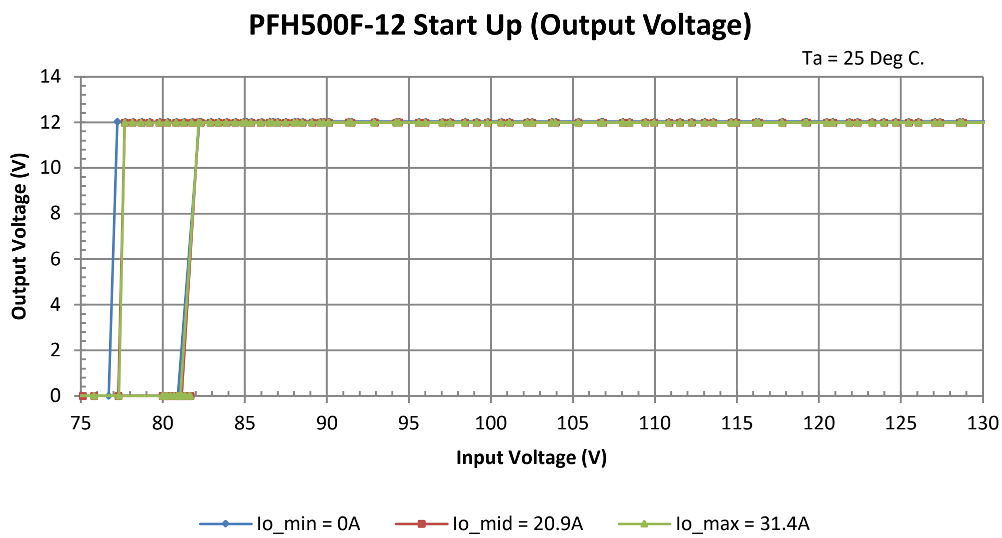


2.1.5 Power Factor (PF) vs. Output Current

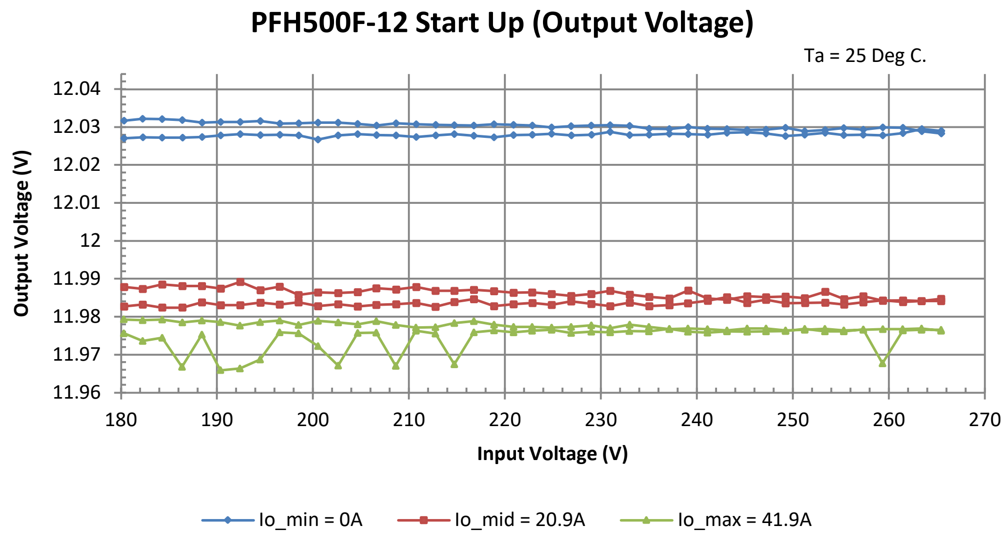


2.1.6 Output behavior with input line sweep

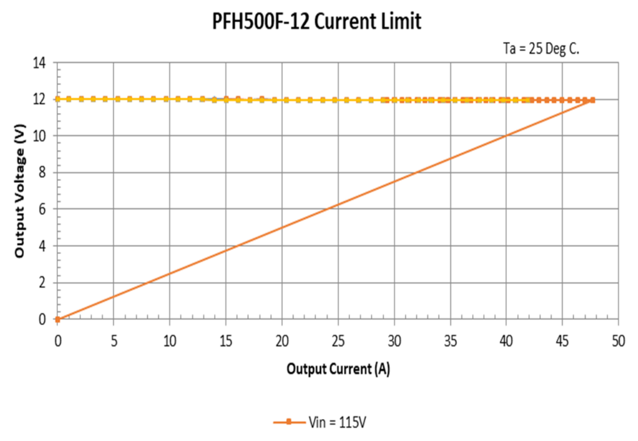
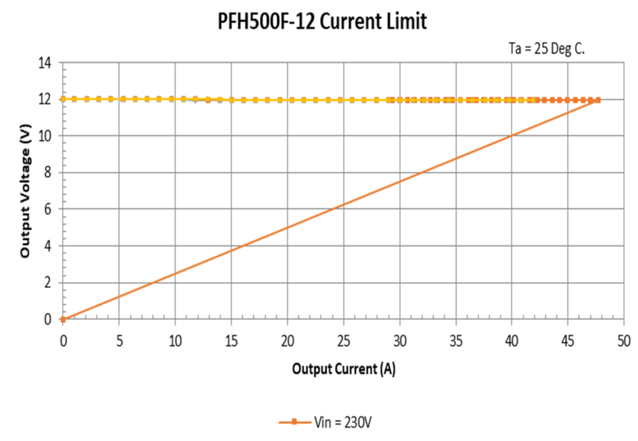
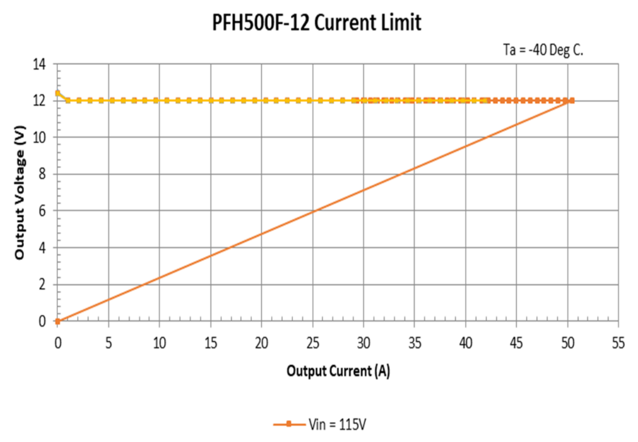
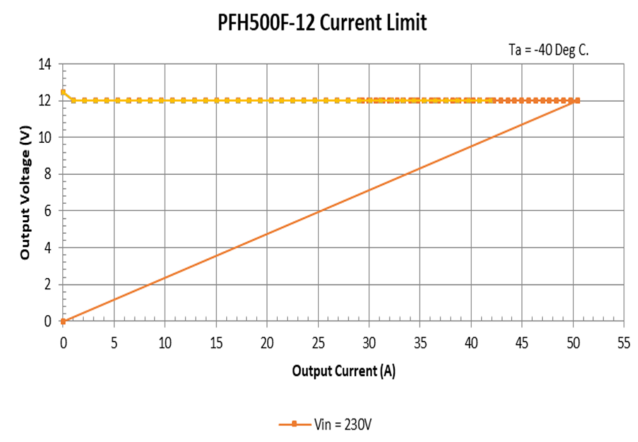
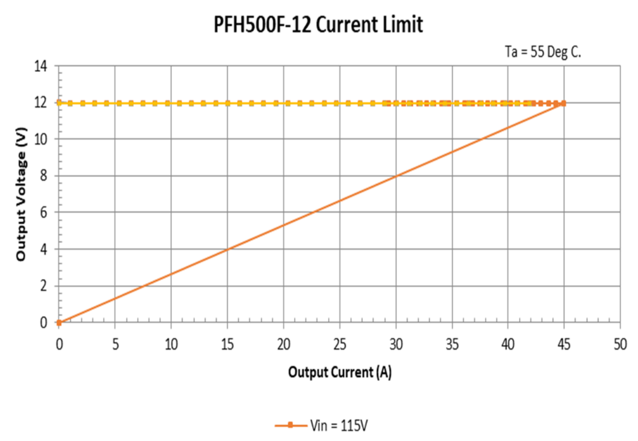
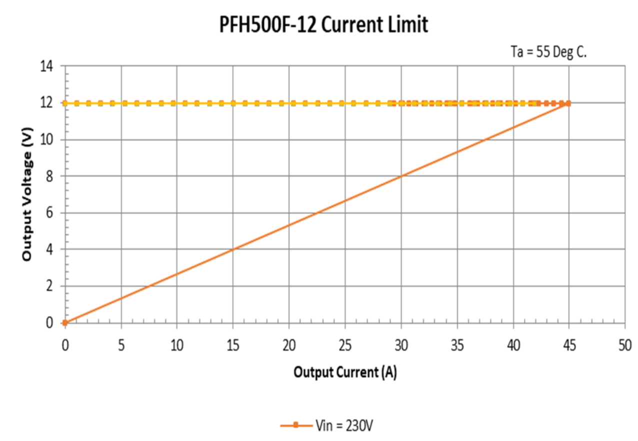
Low Line (Line Sweep from 0 → 135 →0 VAC)



High Line (Line Sweep from 180 → 265 → 180 VAC)



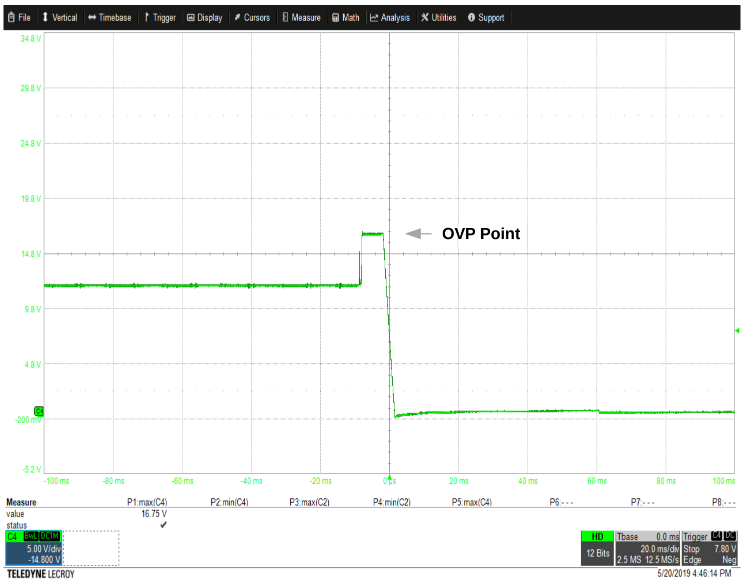
2.2 Over Current Protection (OCP) Characteristics (Refer to section 1.1.2 for Test Setup)

<table>
<tr><th>LOW LINE CONDITIONS</th><th>HIGH LINE CONDITIONS</th></tr>
<tr><td>
</td><td>
</td></tr>
<tr><td>
</td><td>
</td></tr>
<tr><td>
</td><td>
</td></tr>
</table>

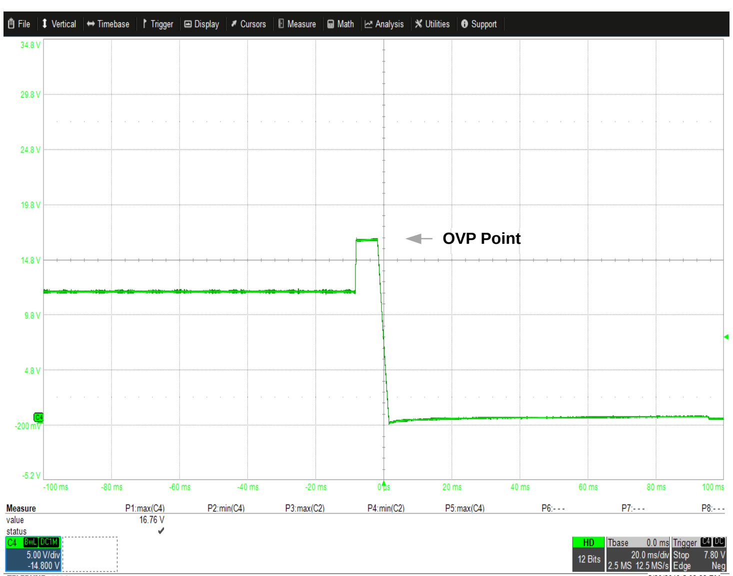
2.3 Over Voltage Protection (OVP) Characteristics (Refer to Section 1.1.2 for Test Setup)

Conditions:	I_O = 10%
	T_a = 25 °C

Vin =115V

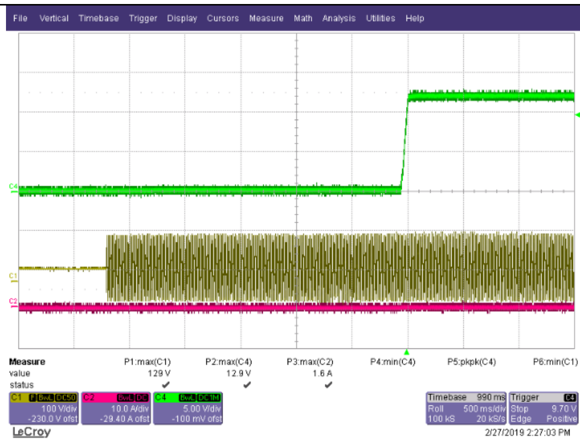


Vin=230V

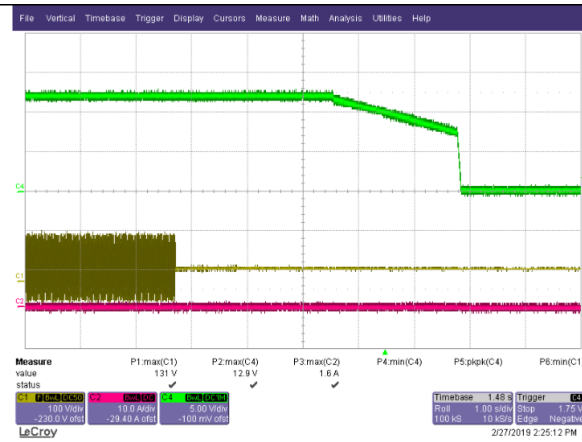


2.4 Output Rise and Fall Characteristic with AC Turn On / Turn-Off

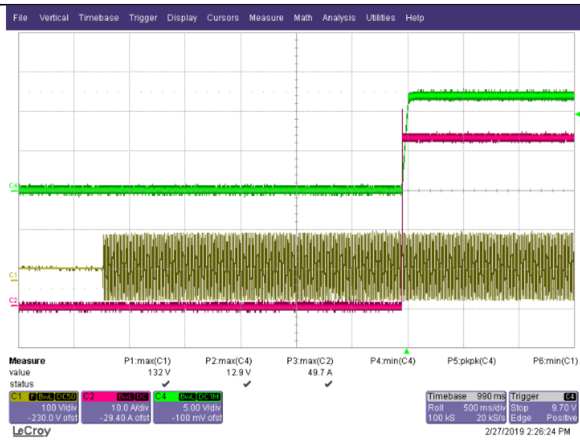
115 VAC No Load Start Up
CH1: Vin; CH2: I_O; CH4: Vo



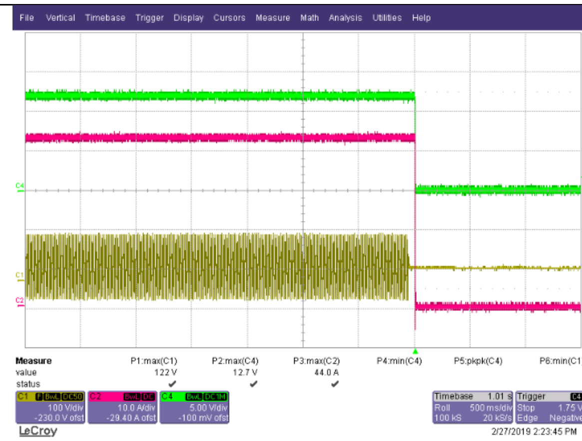
115 VAC No Load Shut Down
CH1: Vin; CH2: I_O; CH4: Vo



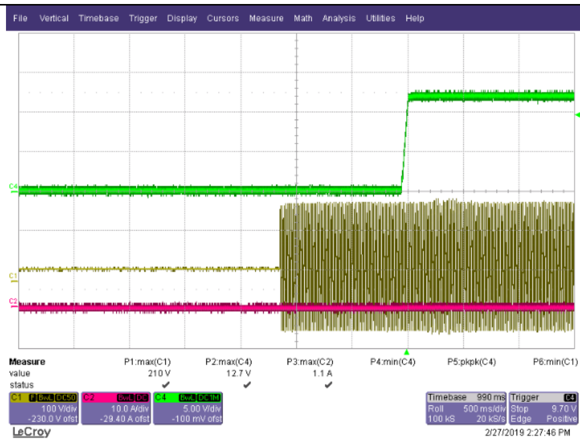
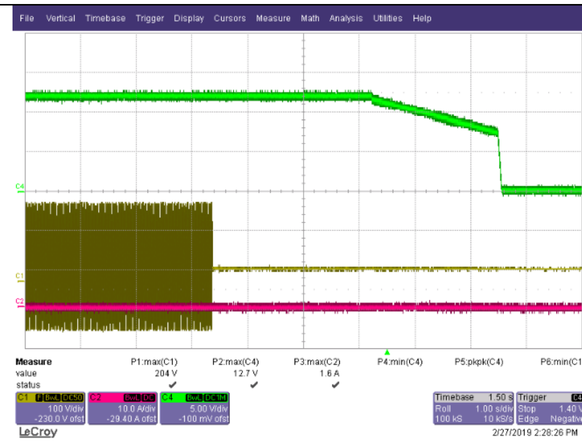
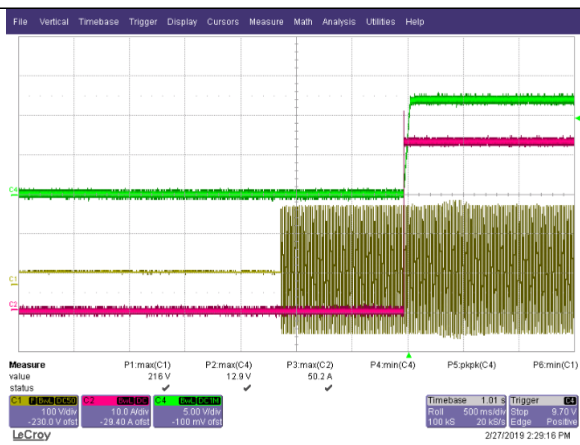
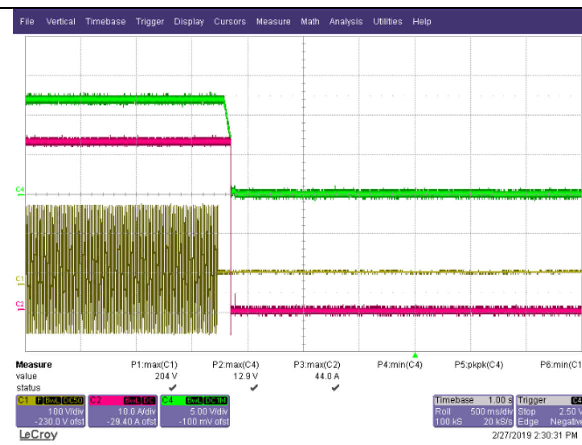
115 VAC Full Load Start Up
CH1: Vin; CH2: I_O; CH4: Vo



115 VAC Full Load Shut Down
CH1: Vin; CH2: I_O; CH4: Vo

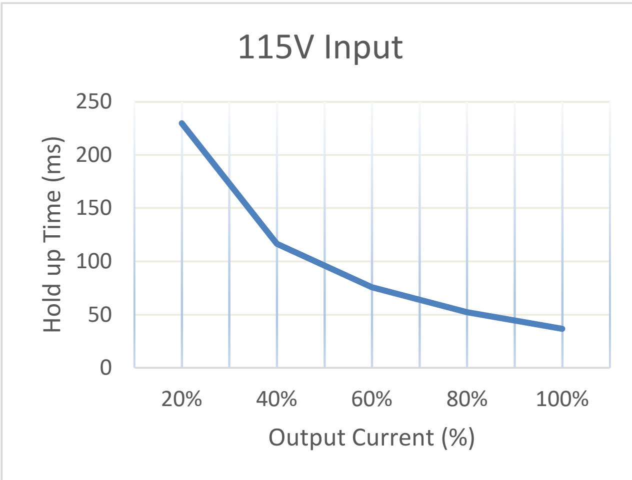


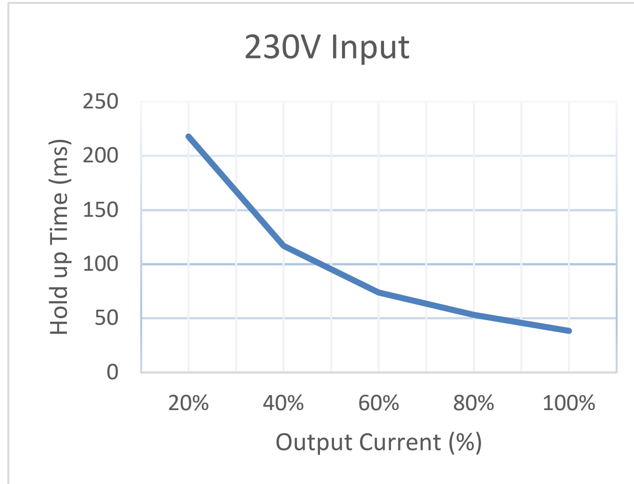
Output Rise and Fall Characteristic (continued)

230 VAC No Load Start Up CH1: Vin; CH2: I_O; CH4: Vo	230 VAC No Load Shut Down CH1: Vin; CH2: I_O; CH4: Vo
	
230 VAC Full Load Start Up CH1: Vin; CH2: I_O; CH4: Vo	230 VAC Full Load Shut Down CH1: Vin; CH2: I_O; CH4: Vo
	

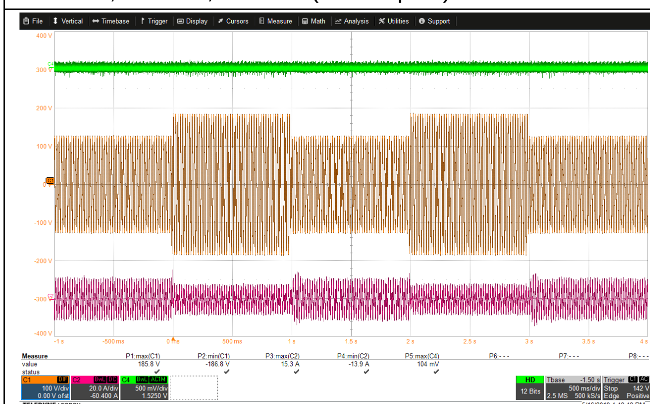
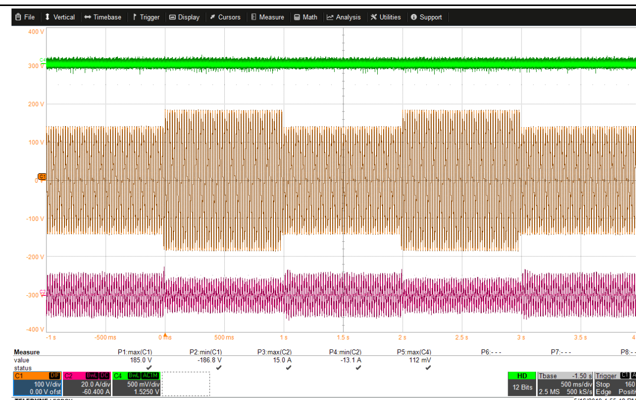
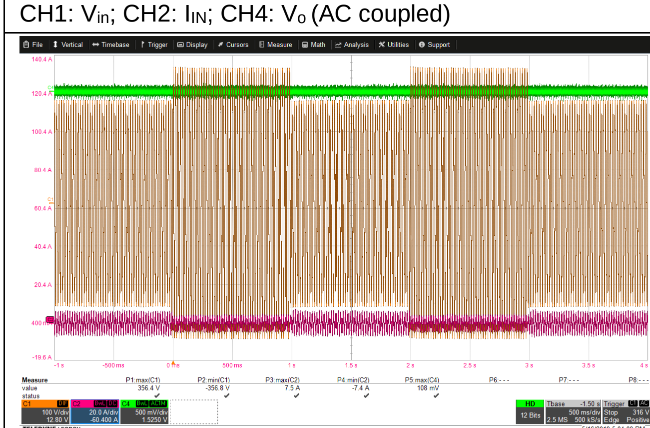
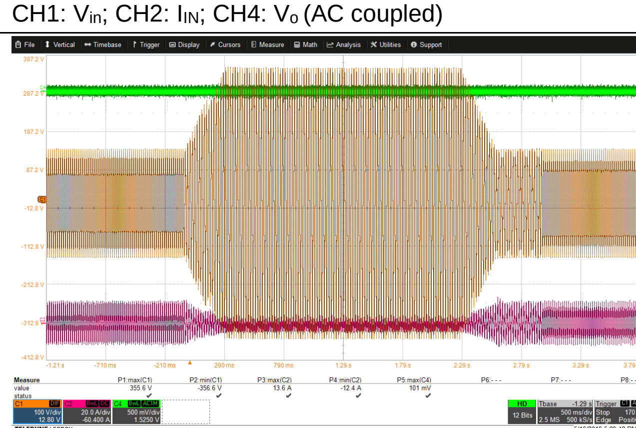
2.5 Hold Up Time Characteristic

V_{IN} = 115 VAC; V_O = 12 VDC C9=C10=470uF/450V, C15=C16=1500uF/25V	V_{IN} = 230 VAC; V_O = 12 VDC C9=C10=470uF/450V, C15=C16=1500uF/25V

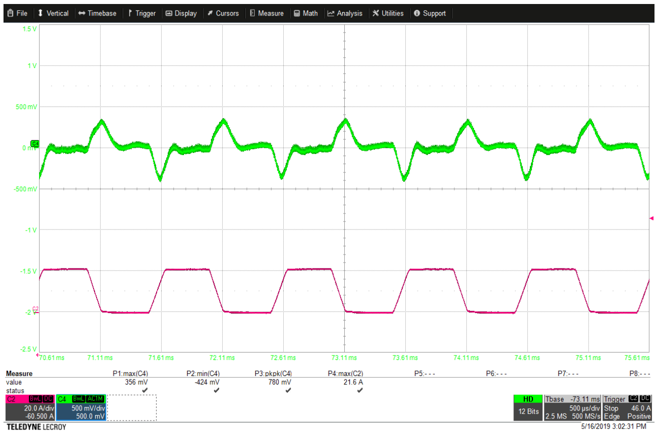
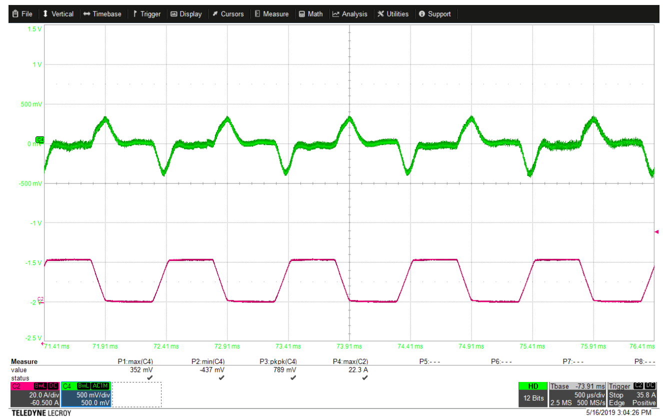
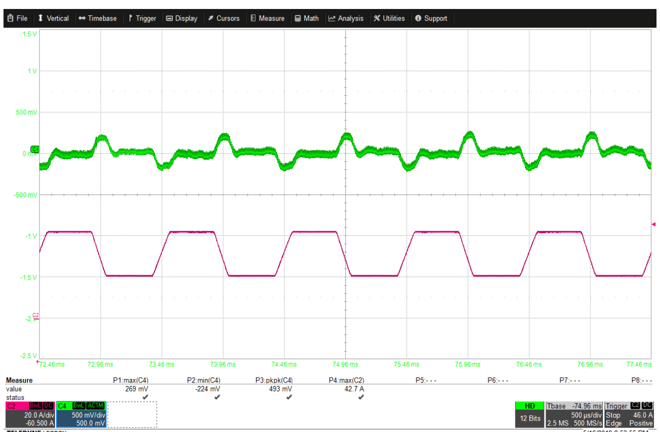
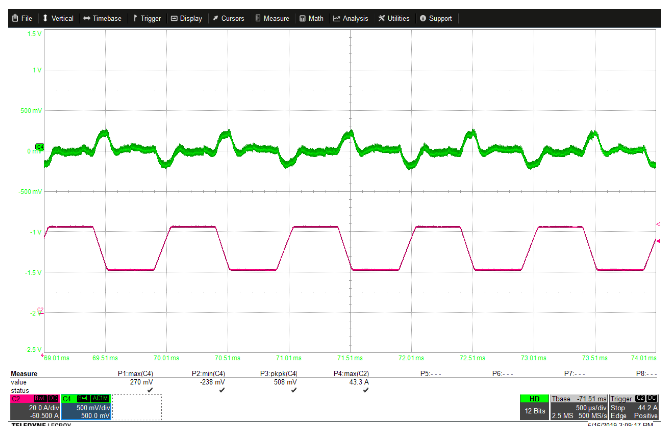




2.6 Dynamic Line Response

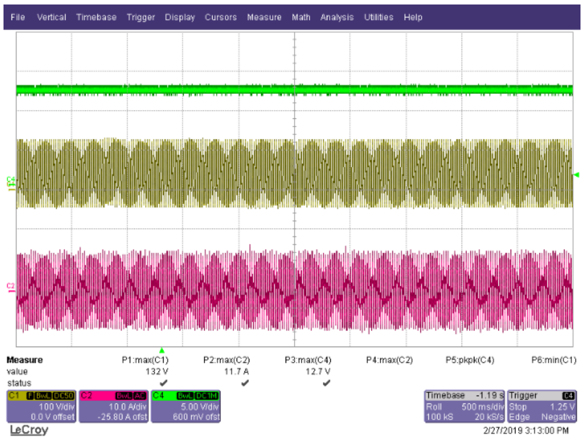
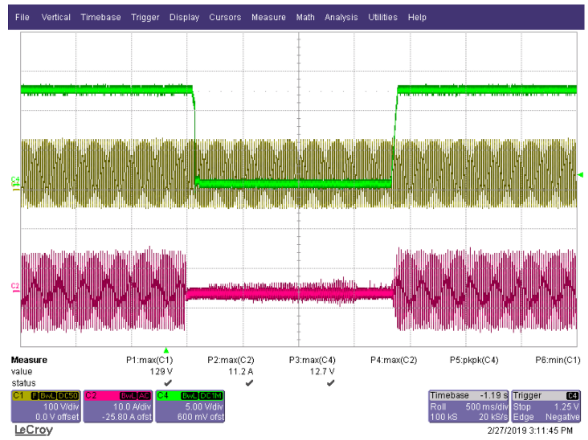
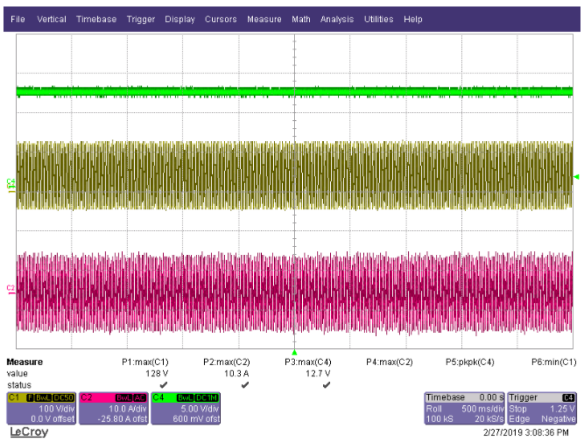
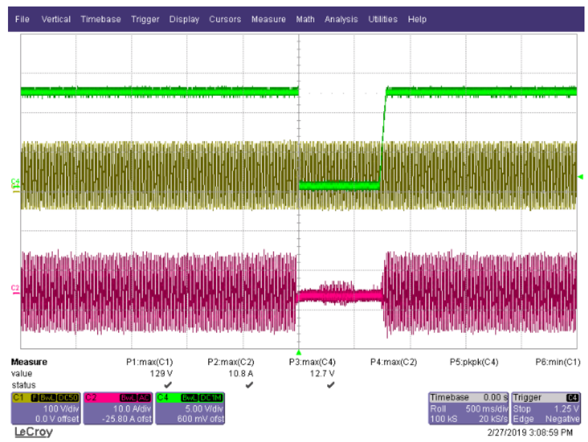
V_{IN} = 90 ↔ 130 VAC; I_O = 36.4 A CH1: V_{in}; CH2: I_{IN}; CH4: V_o (AC coupled)	V_{IN} = 100 ↔ 130 VAC; I_O = 42 A CH1: V_{in}; CH2: I_{IN}; CH4: V_o (AC coupled)
	
V_{IN} = 190 ↔ 250 VAC; I_O = 42 A CH1: V_{in}; CH2: I_{IN}; CH4: V_o (AC coupled)	V_{IN} = 110 ↔ 250 VAC; I_O = 42 A CH1: V_{in}; CH2: I_{IN}; CH4: V_o (AC coupled)
	

2.7 Dynamic Load Response

V_{IN} = 115 VAC; Load Step: 0% (0A) ↔ 50% (21A), 1KHz CH4: V_O (AC Couple); CH2: I_O; Slew rate: 0.1A/us	V_{IN} = 230 VAC; Load Step: 0% (0A) ↔ 50% (21A), 1KHz CH4: V_O (AC Couple); CH2: I_O; Slew rate: 0.1A/us
	
V_{IN} = 115 VAC; Load Step: 50% (21A) ↔ 100% (42A), 1kHz CH4: V_O (AC Couple); CH2: I_O; Slew rate: 0.1A/us	V_{IN} = 230 VAC; Load Step: 50% (21A) ↔ 100% (42A), 1kHz CH4: V_O (AC Couple); CH2: I_O; Slew rate: 0.1A/us
	

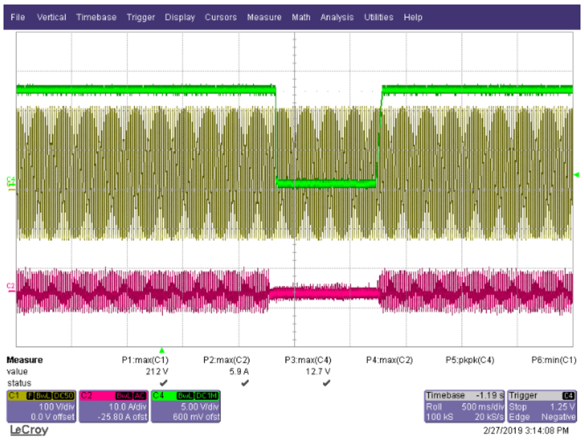
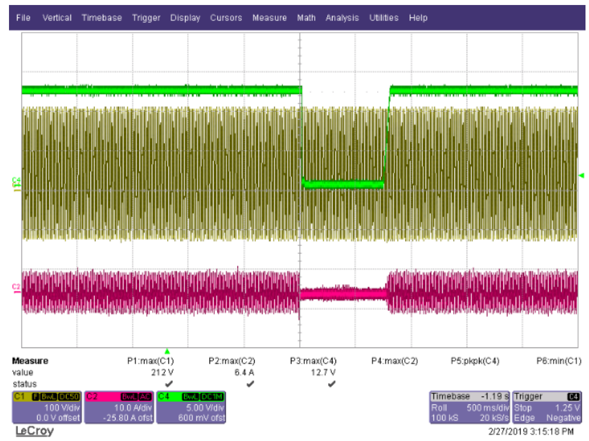
2.8 Brownout

T_a = 25 °C

V_{IN} = 115 VAC / 50Hz; I_O = 42 A; Brownout Time = 1ms CH1: V_{IN}; CH2: I_{IN}; CH4: Vo	V_{IN} = 115 VAC / 50Hz; I_O = 42 A; Brownout Time = 2ms CH1: V_{IN}; CH2: I_{IN}; CH4: Vo
	
V_{IN} = 115 VAC / 60Hz; I_O = 42 A; Brownout Time = 1ms CH1: V_{IN}; CH2: I_{IN}; CH4: Vo	V_{IN} = 115 VAC / 60Hz; I_O = 42 A; Brownout Time = 2ms CH1: V_{IN}; CH2: I_{IN}; CH4: Vo
	

Brownout (continued)

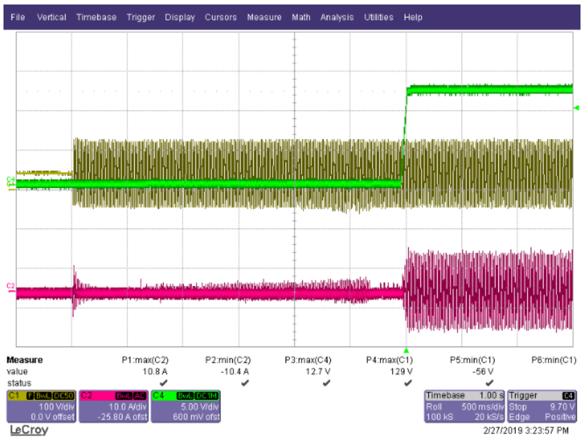
T_a = 25 °C

V_{IN} = 230 VAC / 50Hz; I_O = 42 A; Brownout Time = 1ms CH1: V_{IN}; CH2: I_{IN}; CH4: Vo	V_{IN} = 230 VAC / 60Hz; I_O = 42 A; Brownout Time = 1ms CH1: V_{IN}; CH2: I_{IN}; CH4: Vo
	

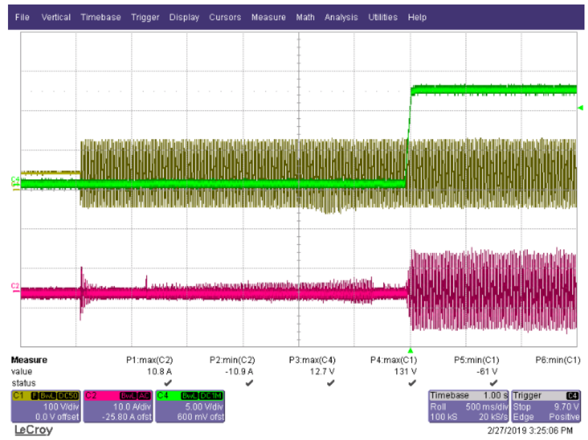
2.9 Inrush Current (Refer to Section 1.1.3 for Test Setup)

Condition:	I_O = 100%
	T_a = 25 °C
	C9=C10=470uF/450V

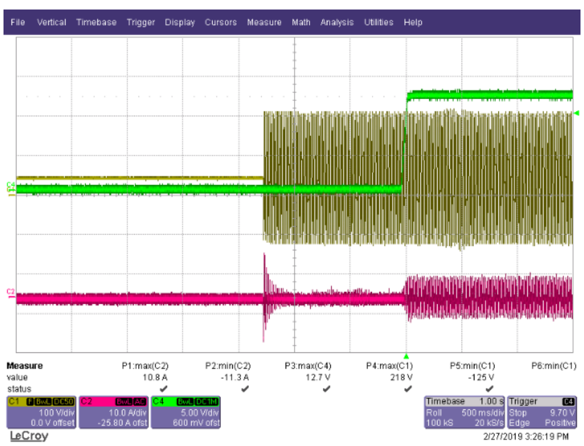
V_{IN} = 115 VAC; Ø = 0° (Switch On Phase Angle)
CH1: V_{IN}; CH2:I_{IN}; CH3: Vo



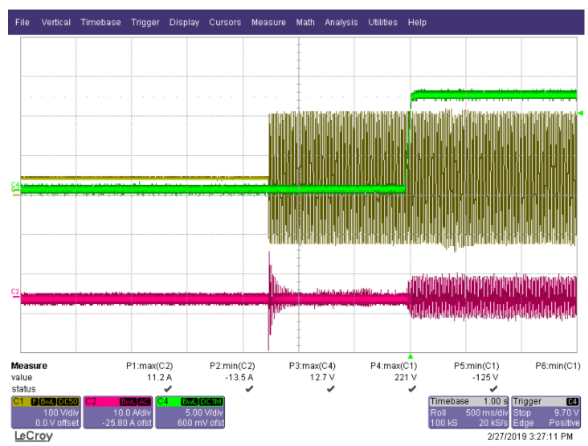
V_{IN} = 115 VAC; Ø = 90° (Switch On Phase Angle)
CH1: V_{IN}; CH2:I_{IN}; CH3: Vo



V_{IN} = 230 VAC; Ø = 0° (Switch On Phase Angle)
CH1: V_{IN}; CH2:I_{IN}; CH3: Vo



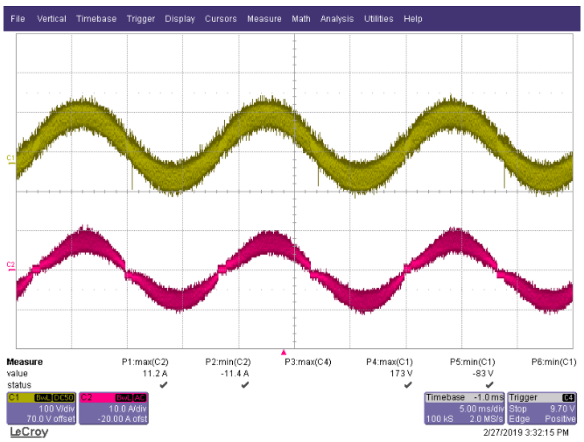
V_{IN} = 230 VAC; Ø = 90° (Switch On Phase Angle)
CH1: V_{IN}; CH2:I_{IN}; CH3: Vo

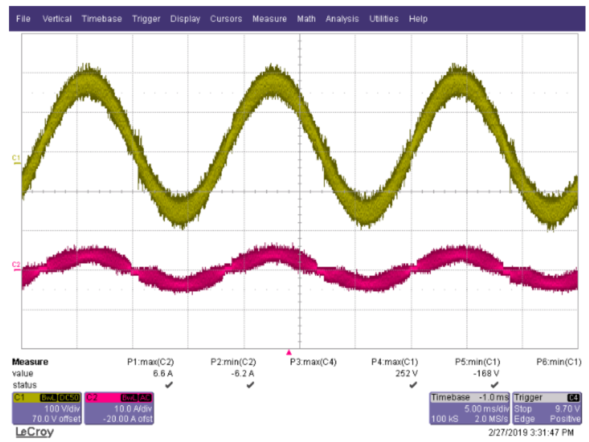


2.10 Input Current Waveform

Condition:	I_O = 100%
	T_a = 25 °C

V_{IN} = 115 VAC; I_O = 42A CH1: V_{IN}; CH2: I_{IN};	V_{IN} = 230 VAC; I_O = 42A CH1: V_{IN}; CH2: I_{IN};

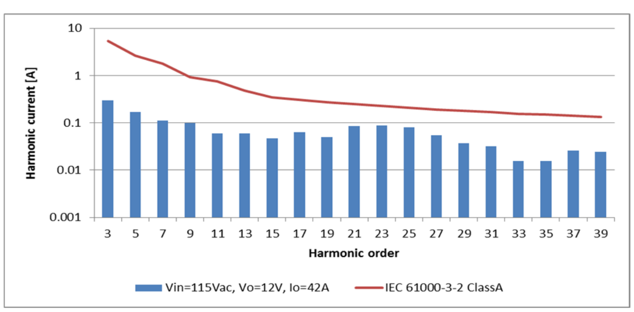


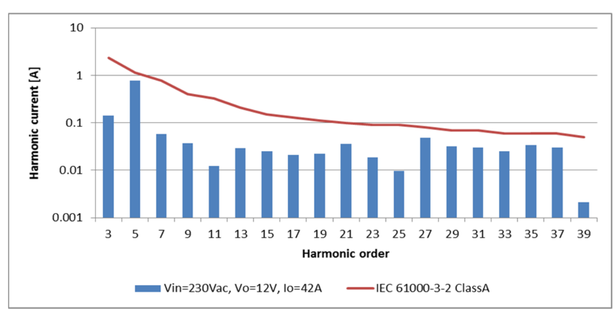


2.11 Input Current Harmonics

Condition:	I_O = 100%
	T_a = 25°C

V_{IN} = 115 VAC	V_{IN} = 230 VAC

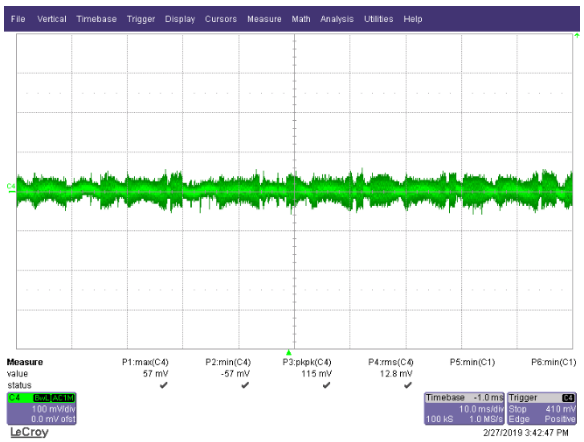




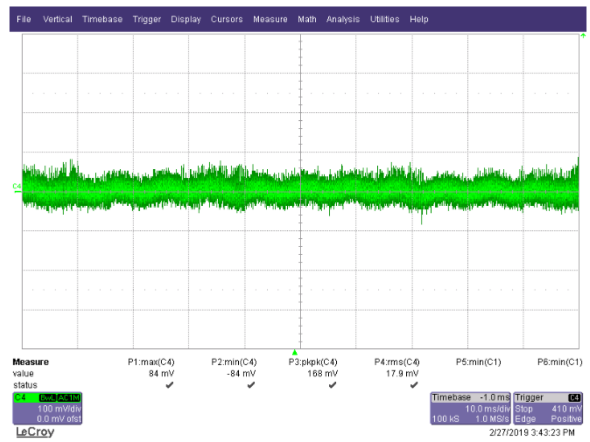
2.12 Output Ripple and Noise

T_a = 25 °C

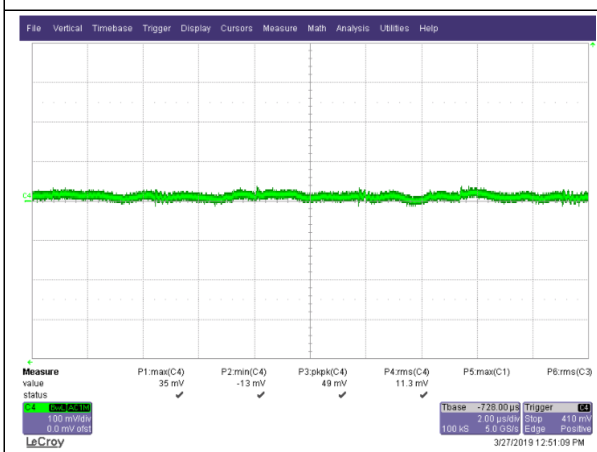
V_{IN} = 115 VAC; I_O = 0 A; V_O = 12 VDC
CH1: V_O / 10.0ms/div



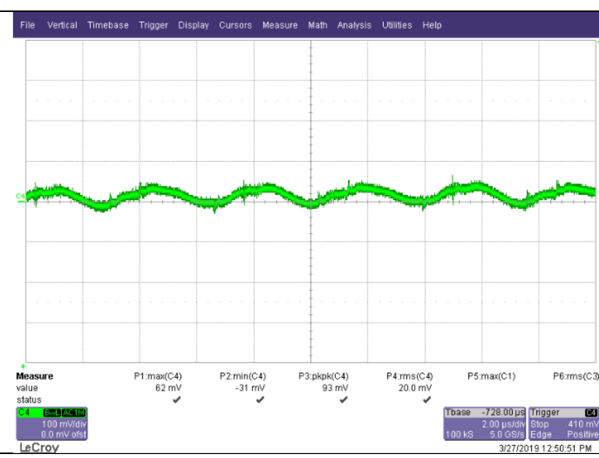
V_{IN} = 115 VAC; I_O = 42 A; V_O = 12 VDC
CH1: V_O / 10.0ms/div



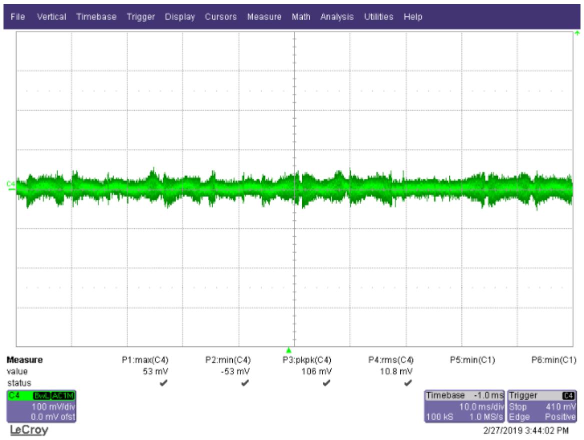
V_{IN} = 115 VAC; I_O = 0 A; V_O = 12 VDC
CH1: V_O / 2.0us/div



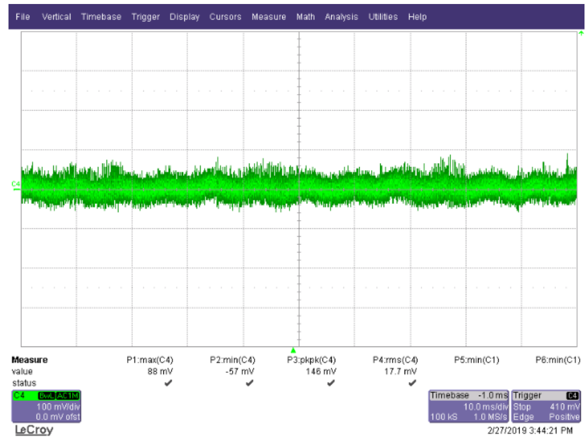
V_{IN} = 115 VAC; I_O = 42 A; V_O = 12 VDC
CH1: V_O / 2.0us/div



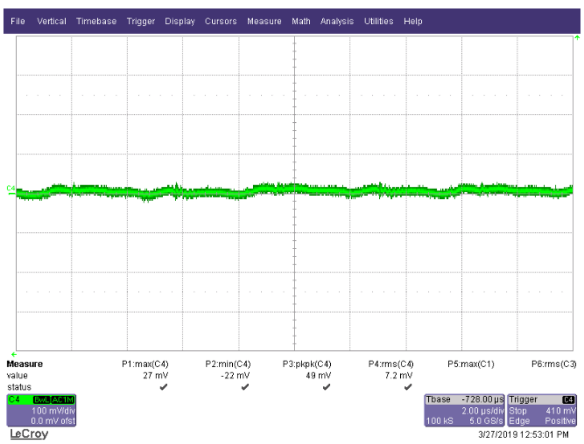
V_{IN} = 230 VAC; I_O = 0 A; V_O = 12 VDC
CH1: V_O / 10.0ms/div



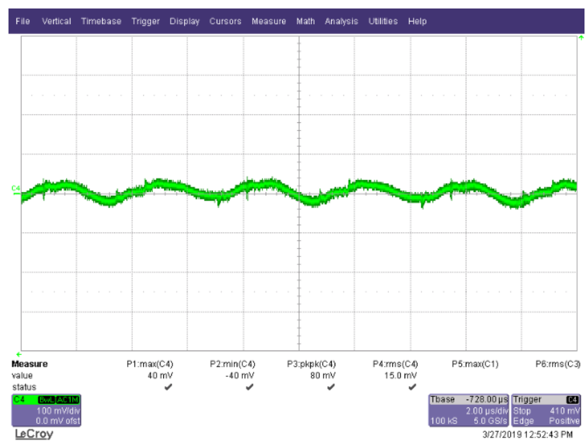
V_{IN} = 230 VAC; I_O = 42 A; V_O = 12 VDC
CH1: V_O / 10.0ms/div



V_{IN} = 230 VAC; I_O = 0 A; V_O = 12 VDC
CH1: V_O / 2.0us/div



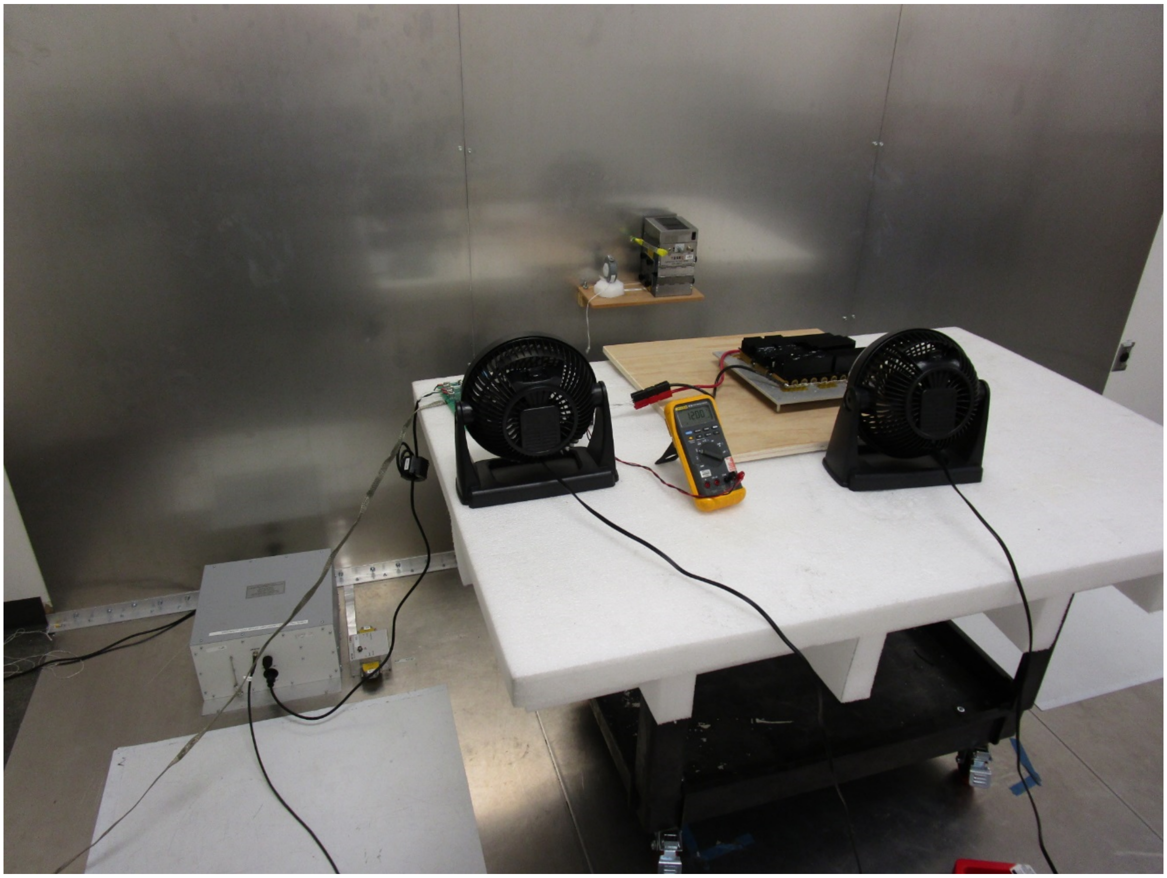
V_{IN} = 230 VAC; I_O = 42 A; V_O = 12 VDC
CH1: V_O / 2.0us/div



2.13 Electro-Magnetic Interference Characteristics

Certified Laboratory Test Location	Element Materials Technology Group Limited Plano, TX
Test Board	Test performed with the PFH500 module mounted on PFH05W-001-EVK-S0 Evaluation test Board (Rev 02)

Test Setup



Test Result

110V, Line

CONDUCTED EMISSIONS

element

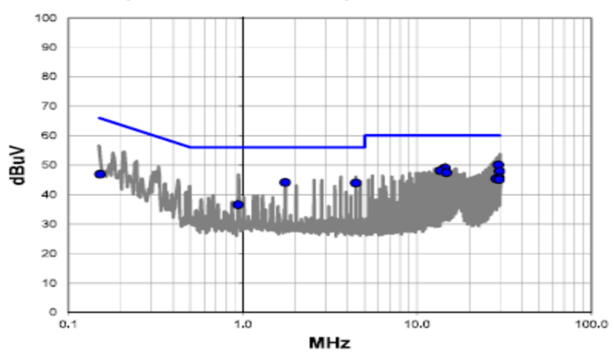
EmiR5 2019.05.20 PSA-ESCI 2019.05.10

Work Order:	TDKL0024	**Date:**	6-Aug-2019		
Project:	None	**Temperature:**	22.1 °C		
Job Site:	TX01	**Humidity:**	56.1% RH		
Serial Number:		**Barometric Pres.:**	1016 mbar	**Tested by:**	Willie Love
EUT:	PFH-500F-12V-100R Module				
Configuration:	1				
Customer:	TDK-Lambda Americas Inc.				
Attendees:	Shuhui Mi and Michael				
EUT Power:	110VAC/60Hz				
Operating Mode:	38 amp Load				
Deviations:					
Comments:	Heatsink is tied to earth ground				

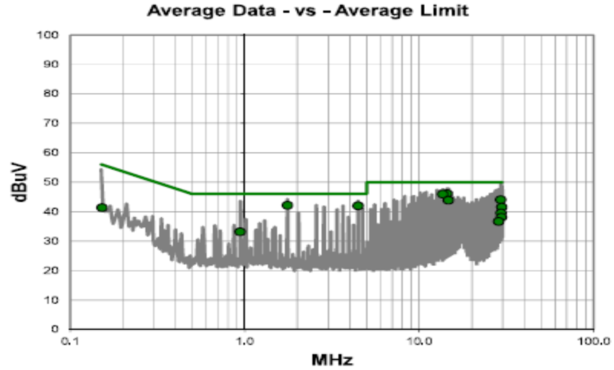
Test Specifications	**Class B**	**Test Method**
EN 55032:2012/AC:2013		CISPR 32:2015

Run #	37	**Line:**	High Line	**Ext. Attenuation:**	0	**Results**	Pass

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
29.362	28.1	21.9	50.0	60.0	-10.0
14.472	28.2	20.7	48.9	60.0	-11.1
1.758	23.9	20.2	44.1	56.0	-11.9
13.658	27.3	20.7	48.0	60.0	-12.0
29.772	26.0	21.9	47.9	60.0	-12.1
4.460	23.7	20.2	43.9	56.0	-12.1
14.741	26.7	20.7	47.4	60.0	-12.6
29.495	23.9	21.9	45.8	60.0	-14.2
28.543	23.5	21.8	45.3	60.0	-14.7
29.628	23.2	21.9	45.1	60.0	-14.9
0.153	26.6	20.3	46.9	65.9	-19.0
0.941	16.3	20.2	36.5	56.0	-19.5

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
1.758	21.9	20.2	42.1	46.0	-3.9
14.472	25.4	20.7	46.1	50.0	-3.9
4.460	21.7	20.2	41.9	46.0	-4.1
13.658	25.2	20.7	45.9	50.0	-4.1
29.362	22.1	21.9	44.0	50.0	-6.0
14.741	23.1	20.7	43.8	50.0	-6.2
29.772	19.6	21.9	41.5	50.0	-8.5
29.495	17.6	21.9	39.5	50.0	-10.5
29.628	16.2	21.9	38.1	50.0	-11.9
0.941	12.9	20.2	33.1	46.0	-12.9
28.543	14.8	21.8	36.6	50.0	-13.4
0.153	21.0	20.3	41.3	55.9	-14.6

110V Neutral

CONDUCTED EMISSIONS

element

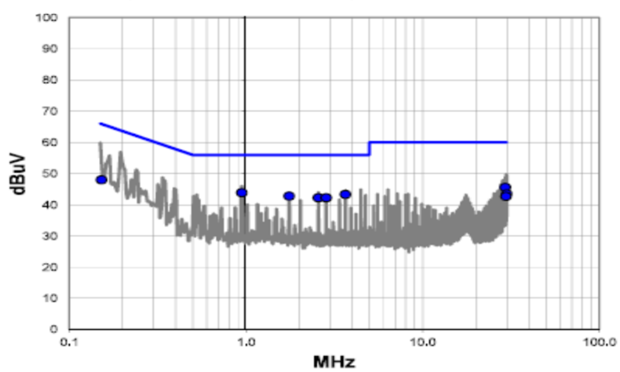
EmiR5 2019.05.20 PSA-ESCI 2019.05.10

Work Order:	TDKL0024	**Date:**	6-Aug-2019
Project:	None	**Temperature:**	22.1 °C
Job Site:	TX01	**Humidity:**	56.1% RH
Serial Number:		**Barometric Pres.:**	1016 mbar
Tested by:	Willie Love		
EUT:	PFH-500F-12V-100R Module		
Configuration:	1		
Customer:	TDK-Lambda Americas Inc.		
Attendees:	Shuhui Mi and Michael		
EUT Power:	110VAC/60Hz		
Operating Mode:	38 amp Load		
Deviations:			
Comments:	Heatsink is tied to earth ground		

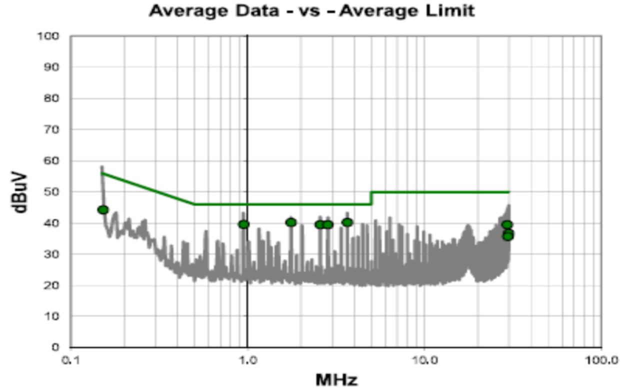
Test Specifications	**Class B**	**Test Method**
EN 55032:2012/AC:2013		CISPR 32:2015

Run #	36	**Line:**	Neutral	**Ext. Attenuation:**	0	**Results**	Pass

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.948	23.7	20.2	43.9	56.0	-12.1
3.656	23.2	20.2	43.4	56.0	-12.6
1.759	22.6	20.2	42.8	56.0	-13.2
2.573	22.1	20.2	42.3	56.0	-13.7
2.843	22.2	20.1	42.3	56.0	-13.7
29.374	23.7	21.9	45.6	60.0	-14.4
29.931	21.6	21.9	43.5	60.0	-16.5
29.658	20.8	21.9	42.7	60.0	-17.3
0.153	27.7	20.3	48.0	65.9	-17.9

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
3.656	20.0	20.2	40.2	46.0	-5.8
1.759	20.0	20.2	40.2	46.0	-5.8
0.948	19.4	20.2	39.6	46.0	-6.4
2.573	19.3	20.2	39.5	46.0	-6.5
2.843	19.4	20.1	39.5	46.0	-6.5
29.374	17.6	21.9	39.5	50.0	-10.5
0.153	24.0	20.3	44.3	55.9	-11.6
29.931	14.8	21.9	36.7	50.0	-13.3
29.658	13.8	21.9	35.7	50.0	-14.3

230V Line

CONDUCTED EMISSIONS

element

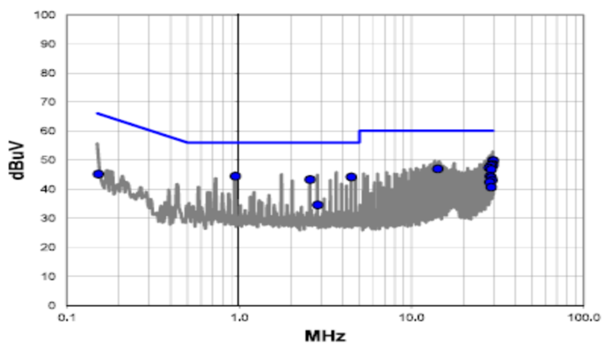
EmiR5 2019.05.20 PSA-ESCI 2019.05.10

Work Order:	TDKL0024	**Date:**	6-Aug-2019		
Project:	None	**Temperature:**	22.1 °C		
Job Site:	TX01	**Humidity:**	56.1% RH		
Serial Number:		**Barometric Pres.:**	1016 mbar	**Tested by:**	Willie Love
EUT:	PFH-500F-12V-100R Module				
Configuration:	1				
Customer:	TDK-Lambda Americas Inc.				
Attendees:	Shuhui Mi and Michael				
EUT Power:	230VAC/50Hz				
Operating Mode:	38 amp Load				
Deviations:					
Comments:	Heatsink is tied to earth ground				

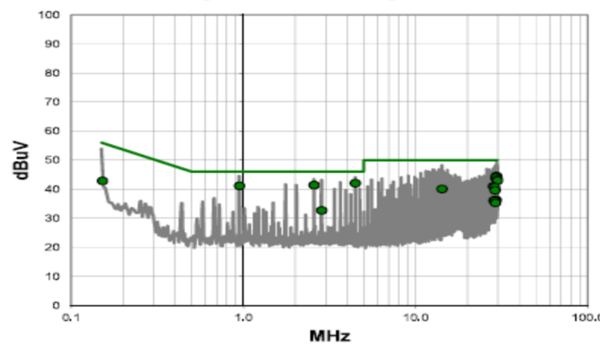
Test Specifications	**Class B**	**Test Method**
EN 55032:2012/AC:2013		CISPR 32:2015

Run #	34	**Line:**	High Line	**Ext. Attenuation:**	0	**Results**	Pass

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
29.669	27.9	21.9	49.8	60.0	-10.2
29.942	27.8	21.9	49.7	60.0	-10.3
29.537	26.7	21.9	48.6	60.0	-11.4
0.949	24.2	20.2	44.4	56.0	-11.6
29.268	26.4	21.9	48.3	60.0	-11.7
4.472	24.0	20.2	44.2	56.0	-11.8
29.795	26.3	21.9	48.2	60.0	-11.8
28.852	26.3	21.8	48.1	60.0	-11.9
2.575	23.1	20.2	43.3	56.0	-12.7
28.315	25.5	21.8	47.3	60.0	-12.7
14.224	26.3	20.7	47.0	60.0	-13.0
28.986	24.9	21.9	46.8	60.0	-13.2
28.712	22.6	21.8	44.4	60.0	-15.6
29.119	22.1	21.9	44.0	60.0	-16.0
29.385	21.1	21.9	43.0	60.0	-17.0
28.571	20.6	21.8	42.4	60.0	-17.6
29.099	18.8	21.9	40.7	60.0	-19.3
0.153	24.9	20.3	45.2	65.9	-20.7
2.852	14.5	20.1	34.6	56.0	-21.4

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
4.472	21.8	20.2	42.0	46.0	-4.0
2.575	21.2	20.2	41.4	46.0	-4.6
0.949	20.9	20.2	41.1	46.0	-4.9
29.537	22.6	21.9	44.5	50.0	-5.5
29.669	22.2	21.9	44.1	50.0	-5.9
29.268	22.0	21.9	43.9	50.0	-6.1
29.795	21.3	21.9	43.2	50.0	-6.8
29.942	21.0	21.9	42.9	50.0	-7.1
28.315	19.1	21.8	40.9	50.0	-9.1
28.852	18.9	21.8	40.7	50.0	-9.3
14.224	19.3	20.7	40.0	50.0	-10.0
28.986	17.7	21.9	39.6	50.0	-10.4
0.153	22.5	20.3	42.8	55.9	-13.1
2.852	12.6	20.1	32.7	46.0	-13.3
29.385	14.4	21.9	36.3	50.0	-13.7
29.119	14.4	21.9	36.3	50.0	-13.7
28.571	14.3	21.8	36.1	50.0	-13.9
28.712	14.1	21.8	35.9	50.0	-14.1
29.099	13.4	21.9	35.3	50.0	-14.7

230V, Neutral

CONDUCTED EMISSIONS

element

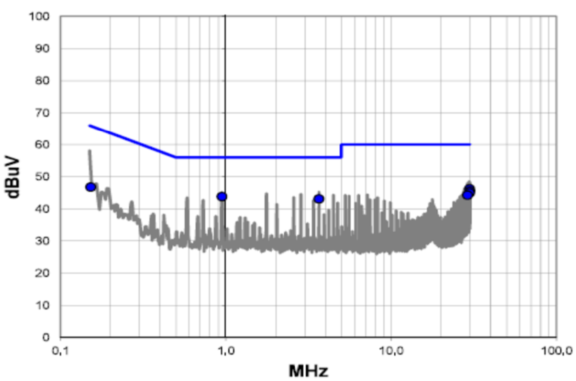
EmiR5 2019.05.20 PSA-ESCI 2019.05.10

Work Order:	TDKL0024	**Date:**	6-Aug-2019		
Project:	None	**Temperature:**	22.1 °C		
Job Site:	TX01	**Humidity:**	56.1% RH		
Serial Number:		**Barometric Pres.:**	1016 mbar	**Tested by:**	Willie Love
EUT:	PFH-500F-12V-100R Module				
Configuration:	1				
Customer:	TDK-Lambda Americas Inc.				
Attendees:	Shuhui Mi and Michael				
EUT Power:	230VAC/50Hz				
Operating Mode:	38 amp Load				
Deviations:					
Comments:	Heatsink is tied to earth ground				

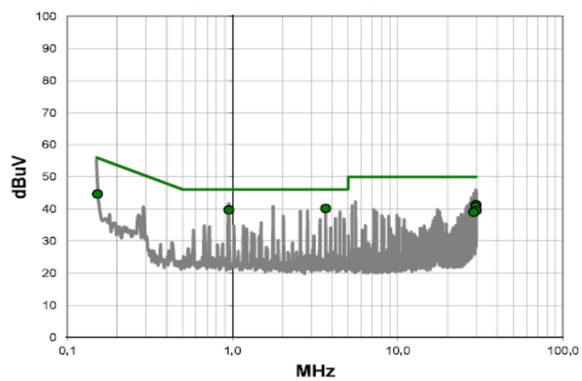
Test Specifications	**Class B**	**Test Method**
EN 55032:2012/AC:2013		CISPR 32:2015

Run #	35	**Line:**	Neutral	**Ext. Attenuation:**	0	**Results**	Pass

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.948	23.6	20.2	43.8	56.0	-12.2
3.657	22.9	20.2	43.1	56.0	-12.9
29.675	24.3	21.9	46.2	60.0	-13.8
29.933	23.6	21.9	45.5	60.0	-14.5
29.801	23.1	21.9	45.0	60.0	-15.0
28.860	22.5	21.8	44.3	60.0	-15.7
0.153	26.5	20.3	46.8	65.9	-19.1

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
3.657	19.9	20.2	40.1	46.0	-5.9
0.948	19.5	20.2	39.7	46.0	-6.3
29.801	19.4	21.9	41.3	50.0	-8.7
29.675	18.8	21.9	40.7	50.0	-9.3
29.933	17.6	21.9	39.5	50.0	-10.5
28.860	17.2	21.8	39.0	50.0	-11.0
0.153	24.3	20.3	44.6	55.9	-11.3

2.14 Leakage Current (Refer to Section 1.1.4 for Test Setup)

Condition:	V_{IN} = 265 VAC
	I_O = 0% (0 A)
$I_{LEAKAGE}$ LIMIT:	1 mA
Measured $I_{LEAKAGE}$:	0.62 mA
	PASS

3. TERMINOLOGIES

V_{IN}	Input Voltage
I_{IN}	Input Current
T_a	Ambient Temperature
F	Frequency
V_O	Output Voltage
I_O	Output Current
T_{BP}	Baseplate Temperature

TDK-Lambda France SAS
Tel: +33 1 60 12 71 65
tlf.fr.powersolutions@tdk.com
www.emea.lambda.tdk.com/fr

Italy Sales Office
Tel: +39 02 61 29 38 63
tlf.it.powersolutions@tdk.com
www.emea.lambda.tdk.com/it

Netherlands
tlf.nl.powersolutions@tdk.com
www.emea.lambda.tdk.com/nl

TDK-Lambda Germany GmbH
Tel: +49 7841 666 0
tlg.powersolutions@tdk.com
www.emea.lambda.tdk.com/de

Austria Sales Office
Tel: +43 2256 655 84
tlg.at.powersolutions@tdk.com
www.emea.lambda.tdk.com/at

Switzerland Sales Office
Tel: +41 44 850 53 53
tlg.ch.powersolutions@tdk.com
www.emea.lambda.tdk.com/ch

Nordic Sales Office
Tel: +45 8853 8086
tlg.dk.powersolutions@tdk.com
www.emea.lambda.tdk.com/dk

TDK-Lambda UK Ltd.
Tel: +44 (0) 12 71 85 66 66
tlu.powersolutions@tdk.com
www.emea.lambda.tdk.com/uk

TDK-Lambda Ltd.
Tel: +9 723 902 4333
tli.powersolutions@tdk.com
www.emea.lambda.tdk.com/il-en

TDK-Lambda Americas
Tel: +1 800-LAMBDA-4 or 1-800-526-2324
tla.powersolutions@tdk.com
www.us.lambda.tdk.com

TDK Electronics do Brasil Ltda
Tel: +55 11 3289-9599
sales.br@tdk-electronics.tdk.com
www.tdk-electronics.tdk.com/en

TDK-Lambda Corporation
Tel: +81-3-6778-1113
www.jp.lambda.tdk.com

TDK-Lambda (China) Electronics Co. Ltd.
Tel: +86 21 6485-0777
tlc.powersolutions@tdk.com
www.lambda.tdk.com.cn

TDK-Lambda Singapore Pte Ltd.
Tel: +65 6251 7211
tls.marketing@tdk.com
www.sg.lambda.tdk.com

TDK India Private Limited, Power Supply Division
Tel: +91 80 4039-0660
mathew.philip@tdk.com
www.sg.lambda.tdk.com

For Additional Information, please visit
https://product.tdk.com/en/power/