



Test Report: UHP-750-24

750W Slim Type with PFC Switching Supply

■ DESIGN VERIFY TEST

Output Function Test

Input Function Test

Protection Function Test

Control Function Test

Component Stress Test

■ SAFETY & E.M.C. TEST

Safety Test

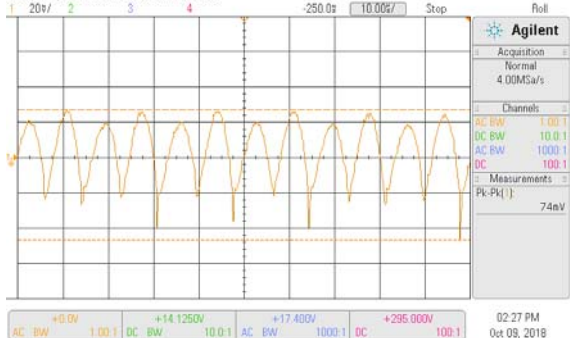
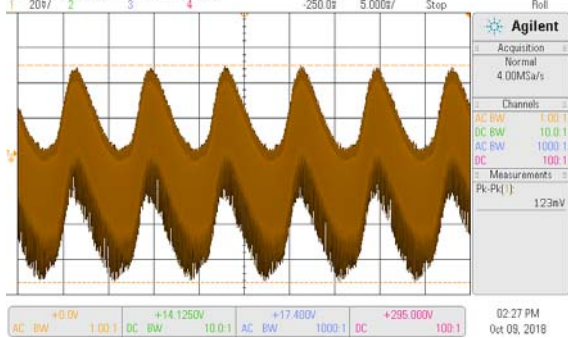
E.M.C. Test

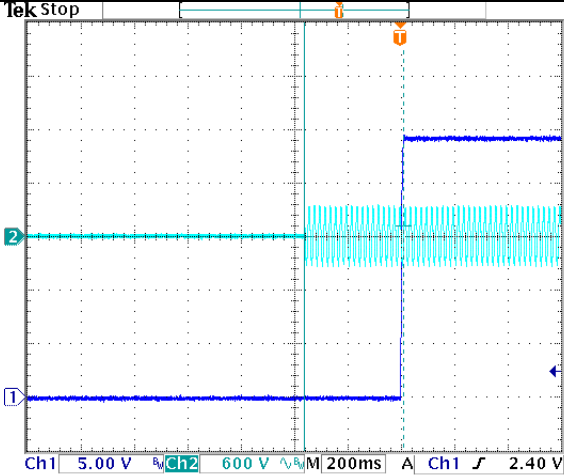
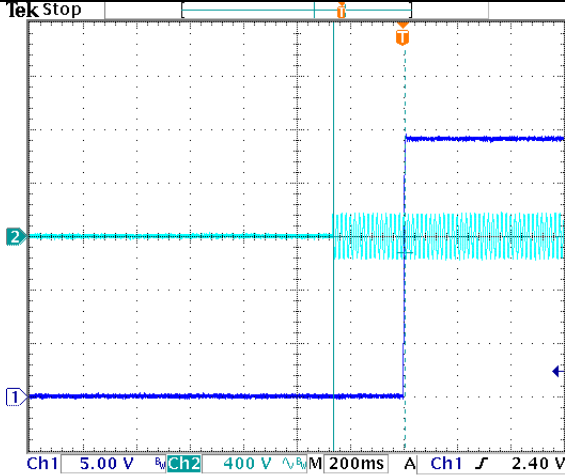
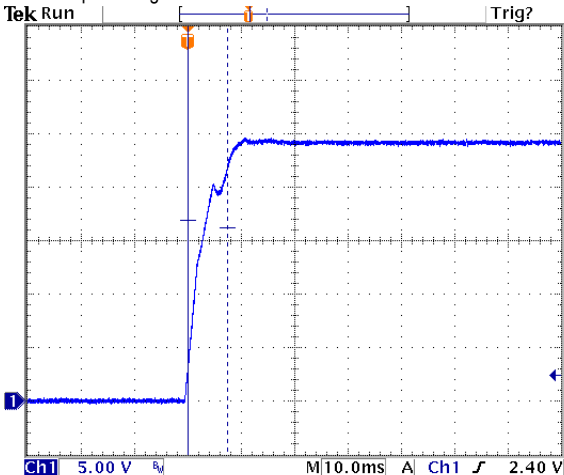
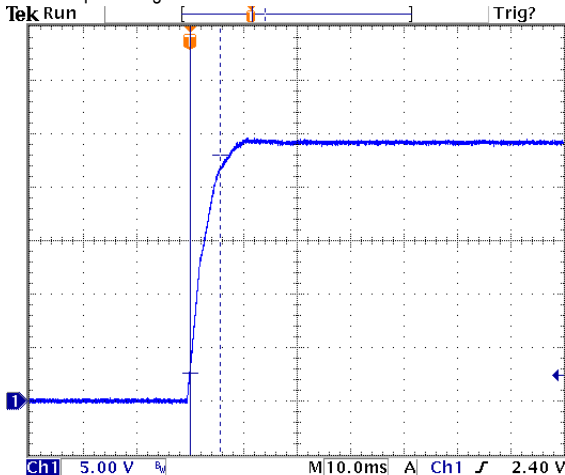
■ RELIABILITY TEST

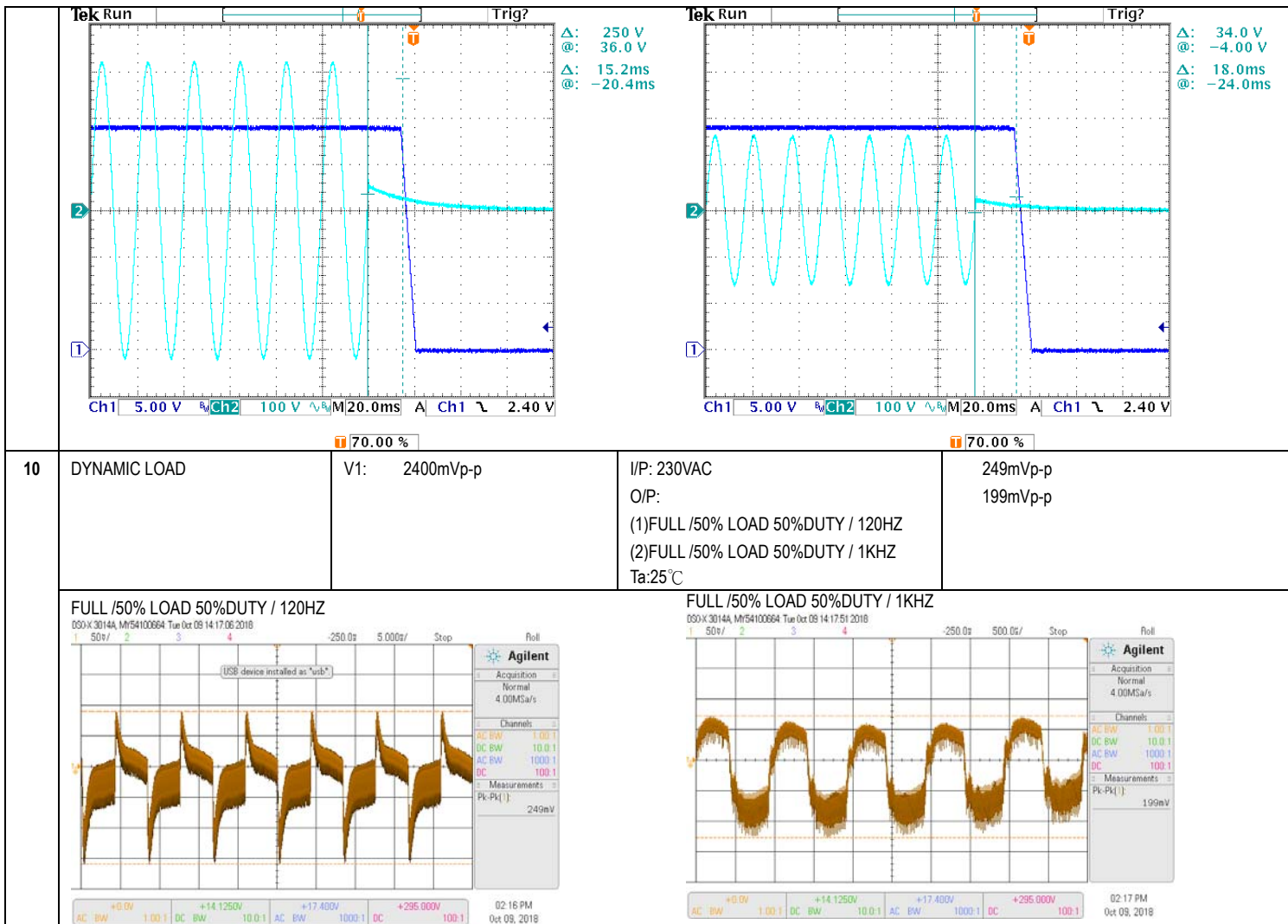
ENVIRONMENT TEST

DESIGN VERIFY TEST

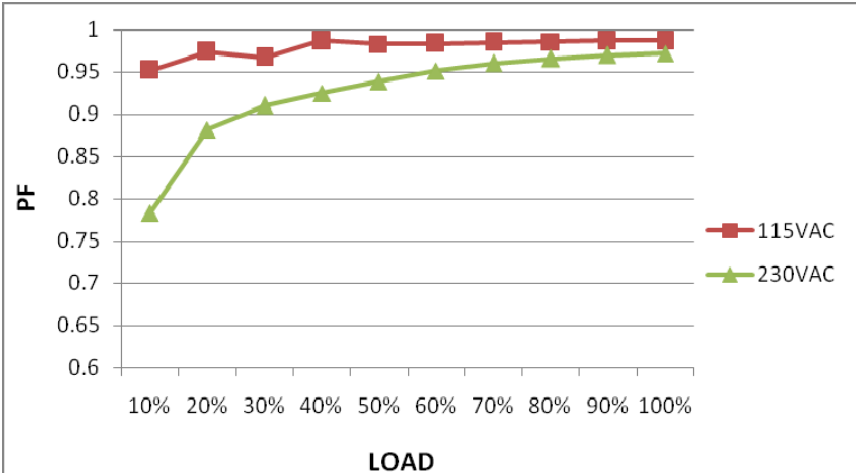
OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OUTPUT VOLTAGE ADJUST RANGE	CH1: 24V~ 28.8V	I/P : 230 VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25°C	22.46V~29.5V/230VAC 22.66V~29.61V/115VAC
2	OUTPUT VOLTAGE(Max) TOLERANCE	V1: 1%~ -1%	I/P: 90VAC /264VAC O/P:FULL/ MIN. LOAD Ta:25°C	V1: 0.125%~ -0.04%
3	LINE REGULATION (Max)	V1: 0.5%~ -0.5%	I/P: 180VAC~ 264VAC O/P:FULL LOAD Ta:25°C	V1: 0%~ -0.04 %
4	LOAD REGULATION(Max)	V1: 0.5%~ -0.5%	I/P: 230VAC O/P:FULL ~MIN LOAD Ta:25°C	V1: 0%~ -0.04%
5	OVER/UNDERSHOOT TEST	< $\pm 5\%$	I/P: 230VAC O/P:FULL LOAD Ta:25°C	< $\pm 5\%$
6	RIPPLE & NOISE(Max)	V1: 200mVp-p	I/P:230VAC O/P:FULL LOAD Ta:25°C	V1: 123mVp-p
high frequency :  low frequency : 				
7	SET UP TIME(Max)	230VAC/1000ms 115VAC/1000ms	I/P : 230 VAC O/P : FULL LOAD I/P : 115 VAC O/P : 75% LOAD Ta : 25°C	230VAC/ 372ms 115VAC/ 268ms
INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage			INPUT=115VAC/60HZ @ 75% LOAD CH1 : Output Voltage CH2 : AC Input Voltage	

					
8	RISE TIME (Max)	230VAC/50ms 115VAC/50ms	I/P : 230 VAC O/P : FULL LOAD I/P : 115 VAC O/P : 75% LOAD Ta : 25°C	230VAC/ 7.4ms 115VAC/ 5.6ms	
		INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage 		INPUT=115VAC/60HZ @ 75% LOAD CH1 : Output Voltage 	
9	HOLD UP TIME (Typ.)	230VAC/12ms 115VAC/12ms	I/P : 230 VAC O/P : FULL LOAD I/P : 115 VAC O/P : 75% LOAD Ta : 25°C	230VAC/ 15.2ms 115VAC/ 18ms	
		INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage		INPUT=115VAC/60HZ @ 75% LOAD CH1 : Output Voltage CH2 : AC Input Voltage	



INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT																																	
1	INPUT VOLTAGE RANGE	90VAC~264VAC	I/P:TESTING O/P:FULL LOAD Ta:25℃	80V~264V																																	
			I/P: LOW-LINE-3V=87 V HIGH-LINE+15%=300 V O/P:FULL LOAD (PLEASE CHECK DERATING CURVE) ON: 30 Sec OFF: 30 Sec 10MIN (POWER ON/OFF NO DAMAGE)	TEST:OK																																	
2	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE	I/P:90 VAC ~264 VAC O/P:FULL~MIN LOAD Ta:25℃	TEST:OK																																	
3	INPUT CURRENT (Typ.)	230V/ 3.8 A 115V/ 7.5 A	I/P : 230 VAC O/P : FULL LOAD I/P : 115 VAC O/P : 75% LOAD Ta : 25℃	I =3.47A/ 230VAC I =5.12A/ 115VAC																																	
4	LEAKAGE CURRENT	< 0.75mA / 240 VAC	I/P : 240 VAC O/P : Min LOAD Ta : 25℃	L-FG : 0.34mA N-FG : 0.34mA																																	
5	POWER FACTOR (Typ.)	0.95/ 230VAC 0.99/115VAC	I/P : 230 VAC O/P : FULL LOAD I/P : 115 VAC O/P : FULL LOAD Ta : 25℃	PF=0.972/230VAC PF=0.991/115VAC																																	
P.F vs LOAD																																					
<table><caption>Approximate data points from P.F vs LOAD graph</caption><thead><tr><th>LOAD (%)</th><th>115VAC PF</th><th>230VAC PF</th></tr></thead><tbody><tr><td>10%</td><td>0.95</td><td>0.78</td></tr><tr><td>20%</td><td>0.97</td><td>0.88</td></tr><tr><td>30%</td><td>0.96</td><td>0.91</td></tr><tr><td>40%</td><td>0.98</td><td>0.93</td></tr><tr><td>50%</td><td>0.97</td><td>0.94</td></tr><tr><td>60%</td><td>0.97</td><td>0.95</td></tr><tr><td>70%</td><td>0.98</td><td>0.96</td></tr><tr><td>80%</td><td>0.98</td><td>0.97</td></tr><tr><td>90%</td><td>0.98</td><td>0.97</td></tr><tr><td>100%</td><td>0.98</td><td>0.98</td></tr></tbody></table>					LOAD (%)	115VAC PF	230VAC PF	10%	0.95	0.78	20%	0.97	0.88	30%	0.96	0.91	40%	0.98	0.93	50%	0.97	0.94	60%	0.97	0.95	70%	0.98	0.96	80%	0.98	0.97	90%	0.98	0.97	100%	0.98	0.98
LOAD (%)	115VAC PF	230VAC PF																																			
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80%	0.98	0.97																																			
90%	0.98	0.97																																			
100%	0.98	0.98																																			
6	EFFICIENCY(Typ.)	95%	I/P:230 VAC O/P:FULL LOAD Ta:25℃	95.32%																																	
	EFFICIENCY vs LOAD																																				

7	INRUSH CURRENT(Typ.)	230V/40A 115V/20A COLD START	I/P : 230 VAC O/P : FULL LOAD I/P : 115 VAC O/P : 75% LOAD Ta : 25°C	I =24.3A/ 230VAC I =11.1A/ 115VAC T50= 1850us/230V
INPUT=230VAC/50HZ @ FULL LOAD CH2 : AC Input Voltage CH4 : Input current INPUT=115VAC/ 60HZ @ 75% LOAD CH2 : AC Input Voltage CH4 : Input current				
8	NO LOAD CONSUMPTION	---	I/P : 115VAC I/P : 230VAC O/P : NO LOAD Ta : 25°C	5.94 W/115VAC 5.12 W/230VAC

PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER LOAD PROTECTION	105%~ 125% Protection type : Hiccup mode, recovers automatically after fault condition is removed	I/P: 264VAC I/P: 230VAC I/P: 180VAC O/P: TESTING Ta:25°C	112.4%/ 264VAC 112.4%/ 230VAC 112.4%/180VAC PROTECTION TYPE : Hiccup mode, recovers automatically after fault condition is removed
2	OVER VOLTAGE PROTECTION	29V~33V Protection type :Shut down O/P voltage,re-power on to recover	I/P: 264VAC I/P: 230VAC I/P: 90VAC O/P: MIN LOAD Ta:25°C	31.07V/ 264VAC 30.56V/ 230VAC 30.93V/ 90VAC PROTECTION TYPE : Shut down O/P voltage,re-power on to recover

3	OVER TEMPERATURE PROTECTION	Protection type : Shut down O/P voltage, recovers automatically after temperature goes down	I/P: 264VAC I/P: 90VAC O/P: FULL LOAD	O.T.P. Active Protection type : Shut down O/P voltage, recovers automatically after temperature goes down
4	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE Protection type : Hiccup mode, recovers automatically after fault condition is removed	I/P: 264VAC I/P: 90VAC O/P: FULL LOAD Ta: 25°C	NO DAMAGE PROTECTION TYPE : Hiccup mode, recovers automatically after fault condition is removed

CONTROL FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	DC OK CONTACT RATINGS	30VDC/1A RESISTIVE LOAD	I/P: 230VAC O/P: FULL LOAD Ta: 25°C	TEST : OK

COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	PWM Transistor (D to S) or (C to E) Peak Voltage	Q900 Rated 31A/ 650 V	I/P: High-Line +3V = 300V AC ON/OFF VDS: O/P: (1) Full Load (2) Output Short (3) Dynamic Load Full Load/ Min. Load 90%Duty/1KHz (4) Dynamic Load Full Load/ Min. Load 90%Duty/3KHz (5) Dynamic Load Full Load/ Min. Load 90%Duty/5KHz (6) Dynamic Load 100% Load/ Min. Load 50%Duty/120Hz (7) 0% → 400% Load. Ta: 25°C	VDS: (1) 444V (2) 488V (3) 452V (4) 448V (5) 452V (6) 440V (7) 460V
2	P.F.C Transistor (D to S) or (C to E) Peak Voltage	Q1 Rated 31A/ 650 V	I/P: High-Line +3V = 300 V AC ON/OFF O/P: (1) Full Load (2) Output Short (3) Dynamic Load Full Load/ Min. Load 90%Duty/1KHz (4) Dynamic Load Full Load/ Min. Load 90%Duty/3KHz (5) Dynamic Load Full Load/ Min. Load 90%Duty/5KHz (6) Dynamic Load 100% Load/ Min. Load 50%Duty/120Hz (7) 0% → 400% Load. Ta: 25°C	VDS: (1) 468V (2) 468V (3) 472V (4) 472V (5) 472V (6) 468V (7) 424V
3	P.F.C DIODE	D8 Rated 15 A/ 600 V	I/P: High-Line +3V = 300 V AC ON/OFF O/P: (1) Full Load (2) Output Short (3) Dynamic Load Full Load/ Min. Load 90%Duty/5KHz	(1) 452V (2) 452V (3) 456V (4) 436V

			(4)Dynamic Load 100% Load/ Min. Load 50%Duty/120Hz Ta:25℃	
4	Diode Peak Voltage	Q100 Rated 74A/ 80 V Q102 Rated 74A/ 80 V	I/P:High-Line +3V =300 V AC ON/OFF O/P: (1)Full Load (2)Output Short (3)Dynamic Load Full Load/ Min. Load 90%Duty/1KHz (4)Dynamic Load Full Load/ Min. Load 90%Duty/3KHz (5)Dynamic Load Full Load/ Min. Load 90%Duty/5KHz (6)Dynamic Load 100% Load/ Min. Load 50%Duty/120Hz (7)0%→400% Load. (8).NO LOAD Ta:25℃	Q100: Q102: VDS: VDS: (1)54V (1)59.2V (2)54.4V (2)58.8V (3)53.6V (3)56.8V (4)53.2V (4)57.6V (5)53.2V (5)57.2V (6)54V (6)56.8V (7)53.2V (7)54.4V (8)53.2V (8)50.4V
5	Input Capacitor Voltage	C5 Rated: : 150μ/ 450 V Surge voltage:500V	I/P:High-Line +3V =300V O/P: (1)Full Load input on/off (2) Min load input on /Off (3)Full Load /Min load Change (4)Full load continue Ta:25℃	(1)449V (2)436V (3)449V (4)448V
6	Control IC Voltage Test	PFC IC U1 Rated 10.5V~ 20V PWM IC U2 Rated 8.85V~ 16 V O/P IC U101 Rated 5V~ 24V	I/P:High-Line +3V =300 V AC ON/OFF O/P(1)FULL LOAD (2) Output Short (3)O.L.P (4)O.V.P. (5)NO LOAD VRmin(LOW LINE) Ta:25℃	U1 U101 (1) 14.5V (1) 12.1V (2) 13.3V (2) 4.61V (3) 13.5V (3) 5.3V (4) 14.5V (4) 11.9V (5) 12.5V (5) 7.5V U2 (1) 14.7V (2) 13.7V (3) 13.7V (4) 14.9V (5) 9.5V

SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	WITHSTAND VOLTAGE	I/P-O/P: 3.75KVAC/min I/P-FG: 2KVAC/min O/P-FG:1.25KVAC/min	I/P-O/P: 4.125 KVAC/min I/P-FG: 2.4 KVAC/min O/P-FG:1.5KVAC/min Ta:25℃	I/P-O/P:5.41mA I/P-FG:4.98mA O/P-FG:4.33mA NO DAMAGE
2	ISOLATION RESISTANCE	I/P-O/P:500VDC>100MΩ I/P-FG: 500VDC>100MΩ O/P-FG:500VDC>100MΩ	I/P-O/P: 500 VDC I/P-FG: 500 VDC O/P-FG: 500 VDC Ta:25℃	I/P-O/P: >30GΩ I/P-FG: >30GΩ O/P-FG: >30GΩ NO DAMAGE
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40A / 2min Ta:25℃	18mΩ

E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	HARMONIC	EN61000-3-2 CLASS A	I/P:230VAC/50HZ O/P:FULL LOAD Ta:25°C	PASS
2	CONDUCTION	EN55032 CLASS B	I/P : 230 VAC (50HZ) O/P : FULL/50% LOAD Ta : 25°C	PASS Test by certified Lab
3	RADIATION	EN55032 CLASS B	I/P : 230 VAC (50HZ) O/P : FULL LOAD Ta : 25°C	PASS Test by certified Lab
4	E.S.D	EN61000-4-2 <u>INDUSTRY</u> AIR: 8KV / Contact: 4KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A
5	E.F.T	EN61000-4-4 <u>INDUSTRY</u> INPUT : 2KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A
6	SURGE	IEC61000-4-5 <u>INDUSTRY</u> L-N : 2KV L,N-PE : 4KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A
7	Test by certified Lab & Test Report Prepare. Any contradictions of the test results, please refer to the latest EMC test report.			

■ RELIABILITY TEST

ENVIRONMENT TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	TEMPERATURE RISE TEST	MODEL : UHP-750-24 (Operate with additional aluminum plate) 1. ROOM AMBIENT BURN-IN : 1.5 HRS I/P : 230VAC O/P : FULL LOAD Ta=25°C 2. HIGH AMBIENT BURN-IN : 1.5 HRS I/P : 230VAC O/P : FULL LOAD Ta= 50 °C		

			NO	Position	ROOM AMBIENT Ta=25℃	HIGH AMBIENT Ta= 50℃
			1	BD2	67.6℃	85.8℃
			2	BD1	67.6℃	86.9℃
			3	LF1	52.9℃	71.5℃
			4	LF2	59.2℃	77.4℃
			5	LF3	58.5℃	77.2℃
			6	C2	53.5℃	72.0℃
			7	C10	68.4℃	86.6℃
			8	R5	72.3℃	90.9℃
			9	L1	81.4℃	99.3℃
			10	L2	83.2℃	101.6℃
			11	Q1	62.3℃	81.0℃
			12	Q2	64.9℃	83.6℃
			13	Q900	77.2℃	97.8℃
			14	Q901	80.3℃	101.2℃
			15	C426	66.6℃	86.1℃
			16	T1-1	85.8℃	110.3℃
			17	T1-2	91.4℃	112.9℃
			18	T2-1	84.6℃	109.1℃
			19	T2-2	88.7℃	109.9℃
			20	C120	63.8℃	85.8℃
			21	C118	66.2℃	87.9℃
			22	C116	66.6℃	87.7℃
			23	C126	52.6℃	74.7℃
			24	R131	57.4℃	78.4℃
			25	C251	68.3℃	89.4℃
			26	RY11	55.3℃	78.6℃
			27	TSW1	65.8℃	85.0℃
			28	C5	62.4℃	80.6℃
			29	RY1	62.4℃	79.9℃
			30	C920	65.7℃	85.1℃
			31	U1	57.4℃	76.3℃
			32	D8	62.9℃	82.5℃
			33	U101	70.6℃	91.8℃
			34	Q101	64.4℃	86.0℃
			35	Q103	62.9℃	84.0℃
			36	Q200	73.9℃	95.2℃
			37	Q202	64.6℃	86.1℃
			38	C17	66.3℃	85.6℃
			39	C410	76.8℃	96.2℃
2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)	I/P : 230 VAC O/P : 110% LOAD Ta : 25℃		TEST : OK	
3	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 264VAC/180VAC O/P : 100 % LOAD Ta= -35 ℃		TEST : OK	
4	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 50 ℃ NO DAMAGE	I/P : 272 VAC O/P : FULL LOAD Ta= 50 ℃ HUMIDITY= 95 %R.H		TEST : OK	
5	TEMPERATURE COEFFICIENT	± 0.03 %/℃(0~50℃)	I/P : 230 VAC O/P : FULL LOAD		± 0 %/℃(0~50℃)	

6	STORAGE TEMPERATURE TEST	1. Thermal shock Temperature : -45°C ~ +90°C 2. Temperature change rate : 25°C / MIN 3. Dwell time low and high temperature : 30 MIN/EACH 4. Total test cycle : 10 CYCLE 5. Input/Output condition : STATIC	OK
7	THERMAL SHOCK TEST	1. Thermal shock Temperature : -35°C ~ +50°C 2. Temperature change rate : 25°C / MIN 3. Dwell time low and high temperature : 30 MIN/EACH 4. Total test cycle : 16 CYCLE 5. Input/Output condition : 15cycle:230V/ FULL LOAD AC ON 3sec/AC OFF 1sec TEST 1cycle:230V/ FULL LOAD Burn In Test	OK
8	VIBRATION TEST	1 Carton & 1 Set (1) Waveform : Sine Wave (2) Frequency : 10~500Hz (3) Sweep Time : 12min/sweep cycle (4) Acceleration : 5G (5) Test Time : 60min in each axis (X.Y.Z) (6) Ta : 25°C	TEST : OK
9	CAPACITOR LIFE CYCLE	SUPPOSE C120 IS THE MOST CRITICAL COMPONENT (1) I/P : 230VAC O/P : FULL LOAD Ta= 25 °C LIFE TIME (2) I/P : 230VAC O/P : FULL LOAD Ta= 50 °C LIFE TIME (3) I/P : 230VAC O/P : 75% LOAD Ta= 50 °C LIFE TIME (4) I/P : 230VAC O/P : 50% LOAD Ta= 50 °C LIFE TIME	(1) 207728HRS (2) 46146HRS (3) 107128HRS (4) 176818HRS
10	MTBF	Conducted by Parts Stress Analysis Prediction 279.97K hrs min. Telcordia SR-332 (Bellcore) ; 104.86K hrs min. MIL-HDBK-217F (25°C)	
11	Ongoing reliability test	I/P : 230VAC O/P : FULL LOAD TA=50 °C Demonstration Mean Time Between Failure : 30,000 hours	

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	DANIEL GAO	SANFORD SU	VINCENT TSENG

2018.4.30 GP-A50-F010