



TEST REPORT: GSM220A48

220W AC-DC Reliable Green Medical Adaptor

■ DESIGN VERIFY TEST

Output Function Test

Input Function Test

Protection Function Test

Component Stress Test

■ SAFETY & E.M.C. TEST

Safety Test

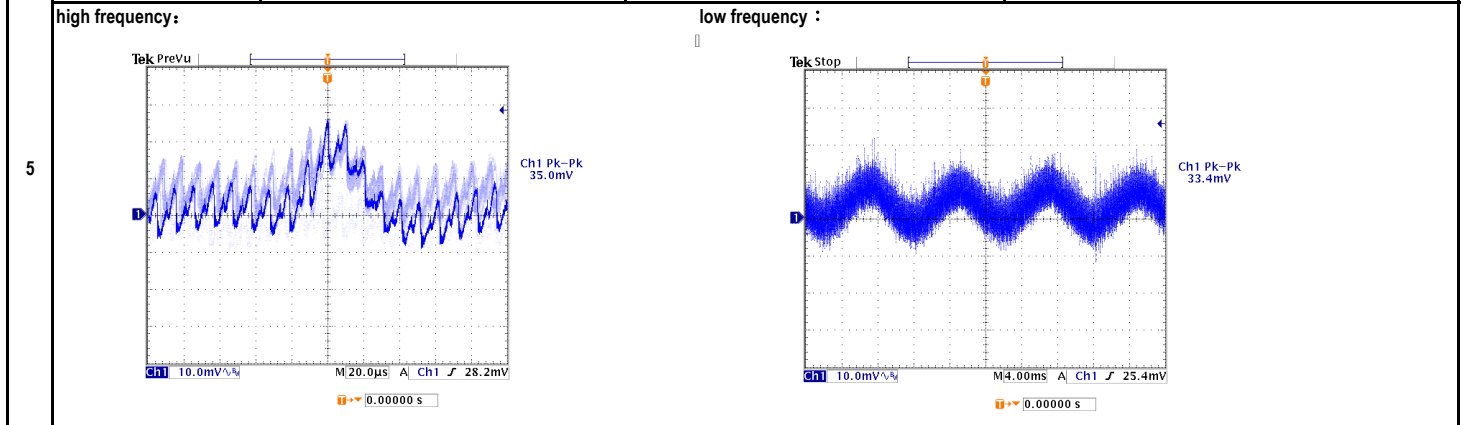
E.M.C. Test

■ RELIABILITY TEST

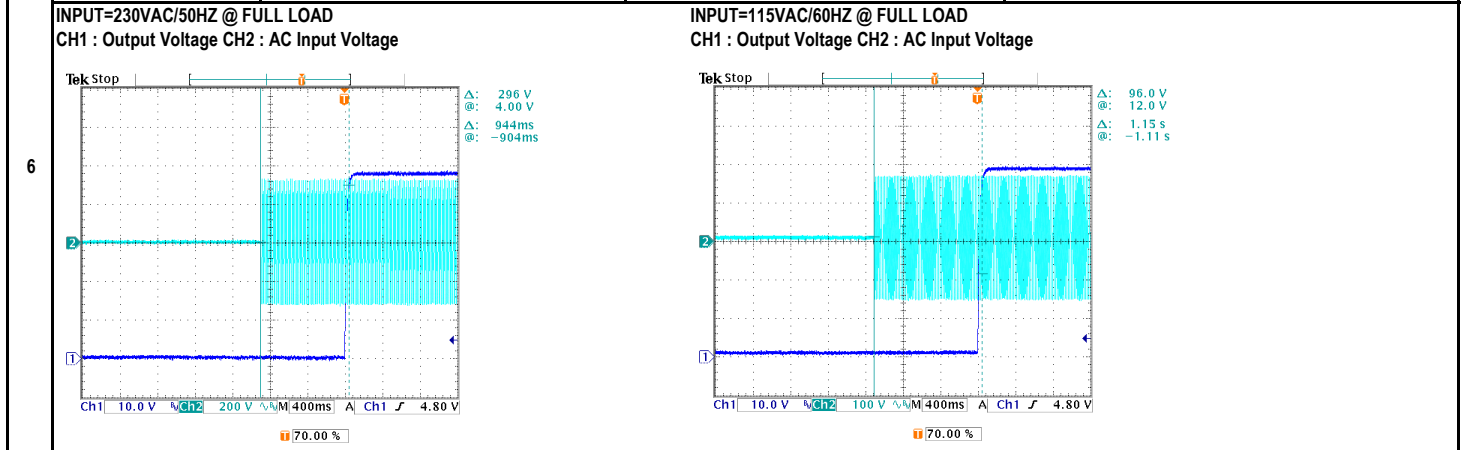
ENVIRONMENT TEST

DESIGN VERIFY TEST
OUTPUT FUNCTION

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OUTPUT VOLTAGE TOLERANCE (Max)	V1 : 2.0% ~ -2.0%	I/P : 95VAC / 264VAC O/P: FULL / MINLOAD TA= 25°C	V1: 0.46% ~ 0.15%
2	LINE REGULATION (MAX.)	V1 : 1.0% ~ -1.0%	I/P : 95VAC / 264VAC O/P: FULL LOAD TA : 25°C	V1: 0.02% ~ 0.00%
3	LOAD REGULATION (MAX.)	V1 : 2.0% ~ -2.0%	I/P : 230VAC O/P: MIN LOAD ~ FULL LOAD TA : 25°C	V1: 0.15% ~ -0.15%
4	OVER/UNDERSHOOT TEST	< ±5%	I/P : 230VAC O/P: FULL LOAD TA : 25°C	TEST< 2.1 %
	RIPPLE & NOISE(Max)	V1 : 150 mVp-p	I/P : 230VAC O/P: FULL LOAD TA : 25°C	V1 : 35 mVp-p

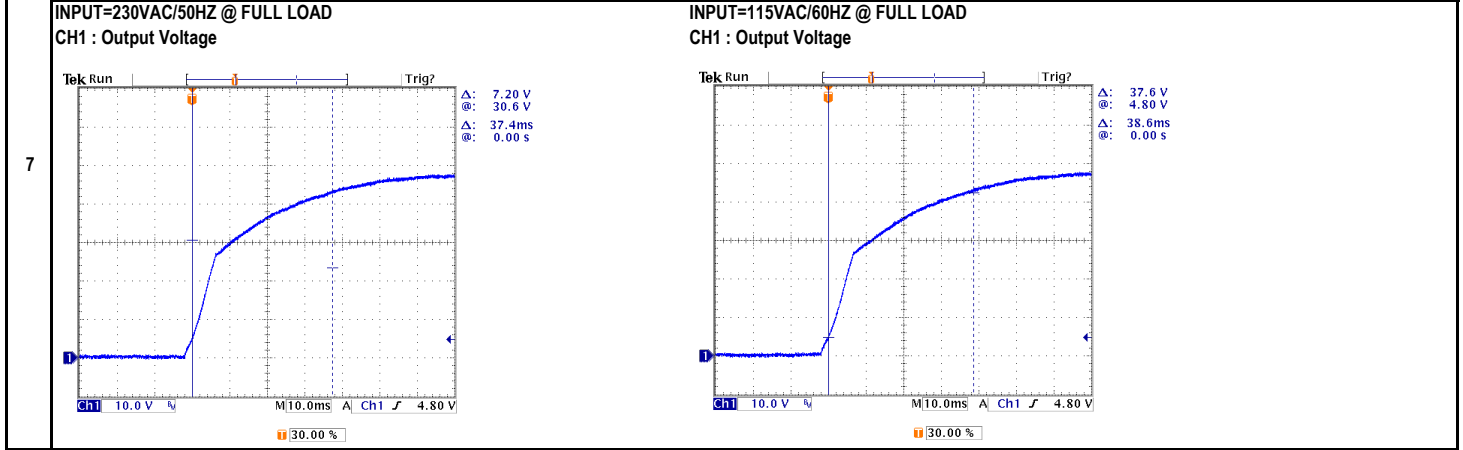


SET UP TIME (MAX.)	230VAC : 2000ms 115VAC : 2000ms	I/P : 230VAC I/P : 115VAC O/P: FULL LOAD TA : 25°C	230VAC : 944ms 115VAC : 1152ms
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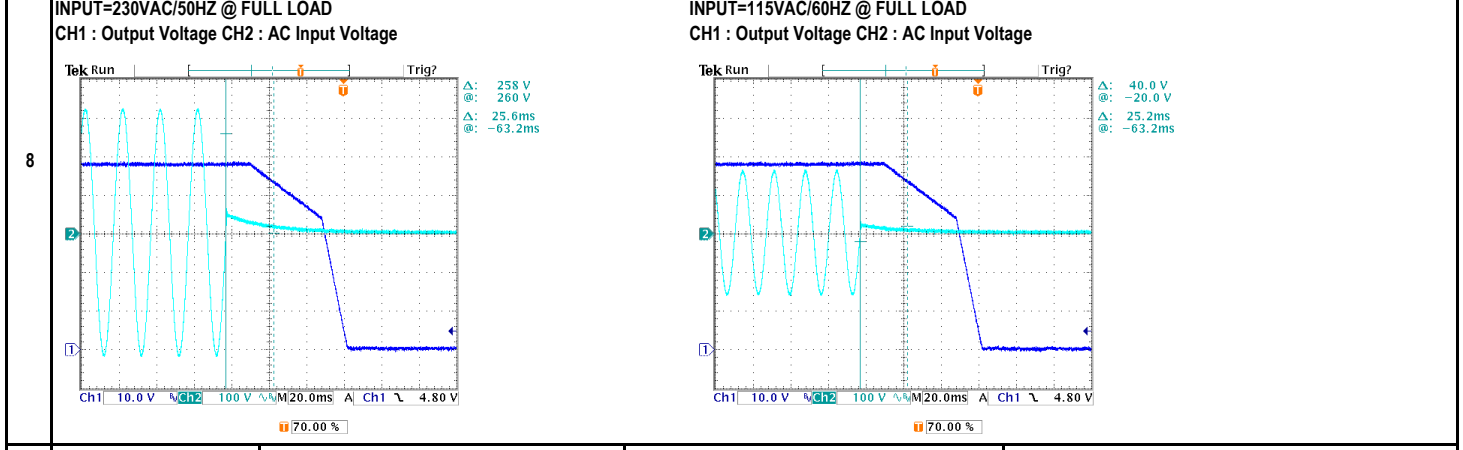




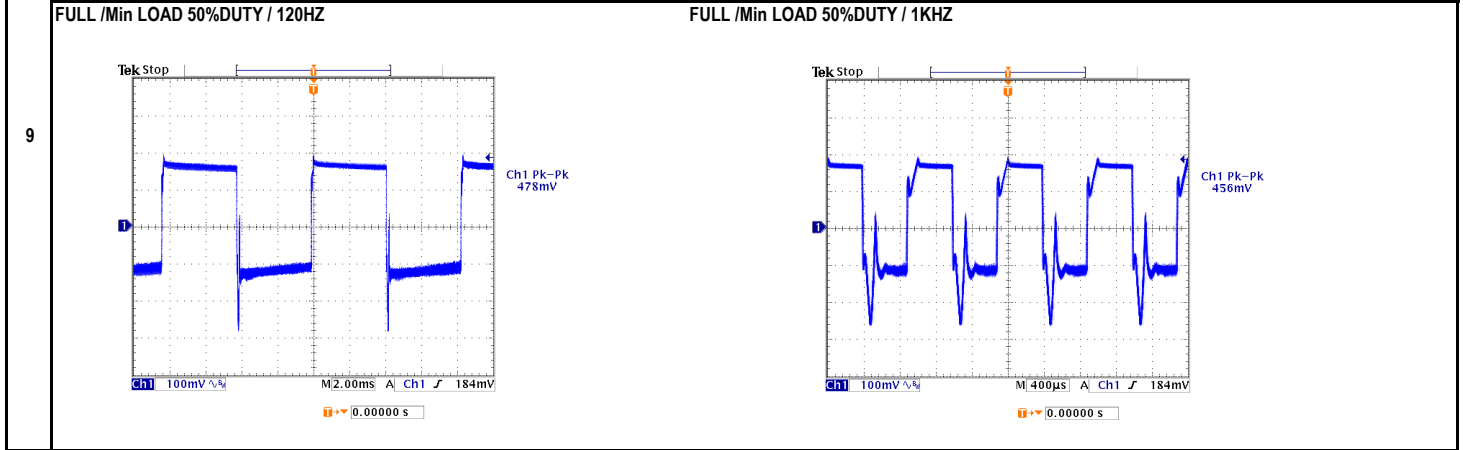
RISE TIME (MAX.)	230VAC	: 50ms	I/P : 230VAC	230VAC	: 37.4ms
	115VAC	: 50ms	I/P : 115VAC O/P: FULL LOAD TA : 25°C	115VAC	: 38.6ms



HOLD UP TIME (TYP.)	230VAC	: 20ms	I/P : 230VAC	230VAC	: 25.6ms
	115VAC	: 20ms	I/P : 115VAC O/P: FULL LOAD TA : 25°C	115VAC	: 25.2ms



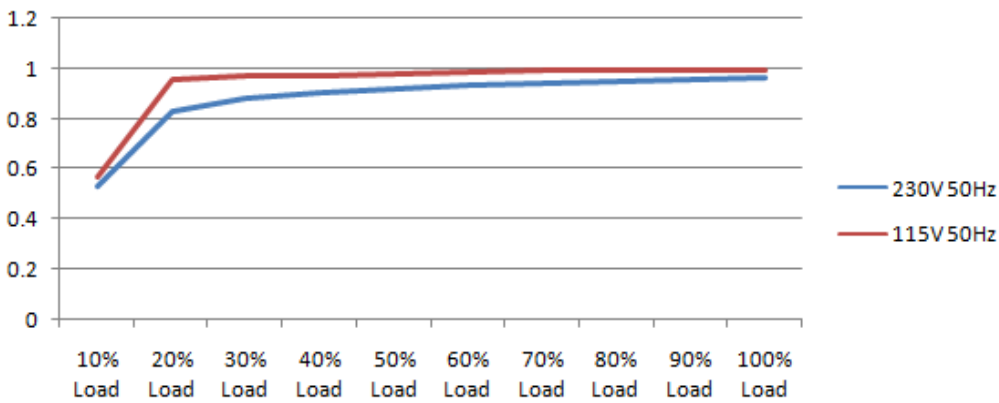
DYNAMIC LOAD	V1 : 4800 mVp-p	I/P : 230VAC O/P: (1)Full/Min load 50%duty/120HZ (2)Full/Min load 50%duty/1KHZ TA : 25°C	V1: (1). 478mv (2). 456mv	unit:mVp-p
	FULL /Min LOAD 50%DUTY / 120HZ		FULL /Min LOAD 50%DUTY / 1KHZ	



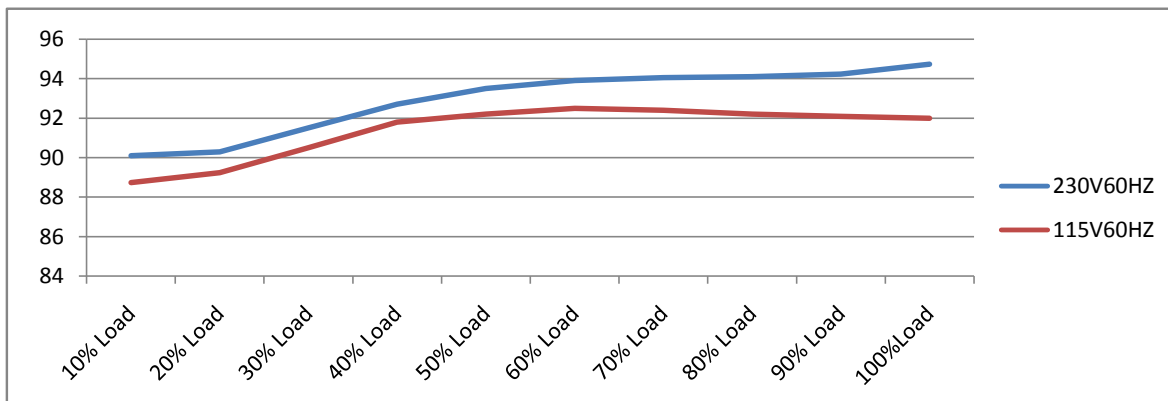


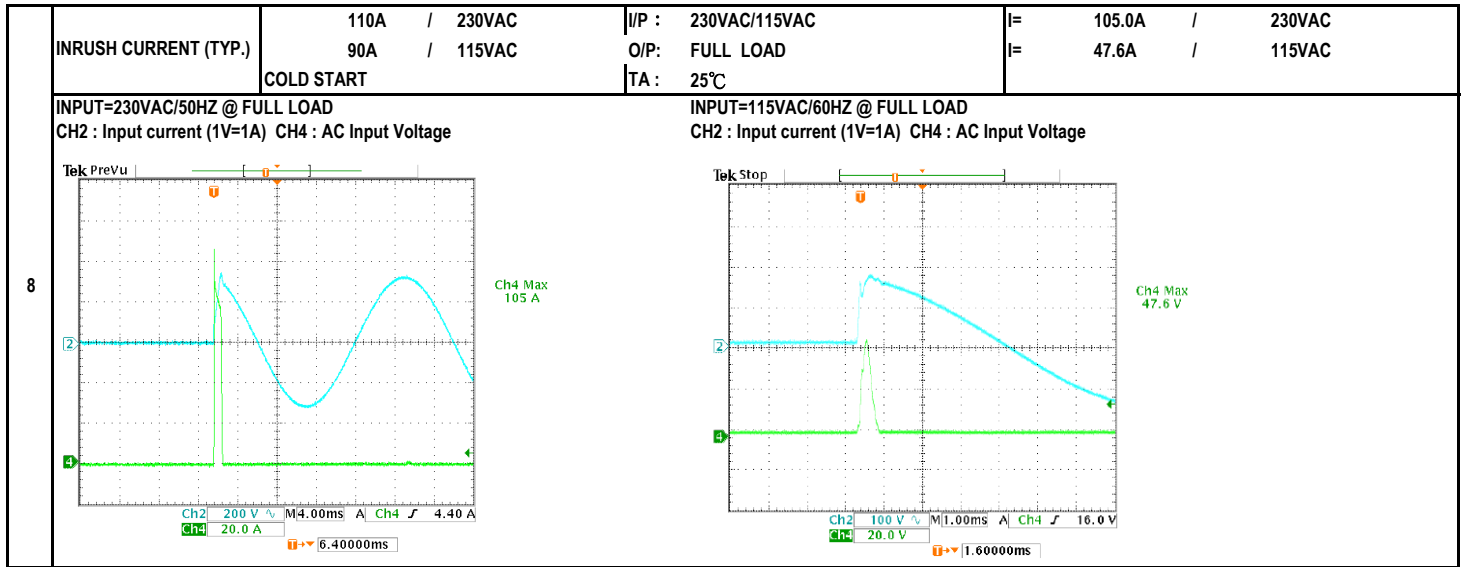
INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	80VAC ~ 264VAC	I/P : TESTING O/P : FULL LOAD Ta : 25°C	65.0VAC ~ 264VAC
			I/P : LOW-LINE = 92VAC HIGH-LINE = 300VAC O/P : FULL/MIN LOAD ON:30 Sec ; OFF:30 Sec 10MIN (POWER ON/OFF NO DAMAGE)	TEST : OK
2	INPUT FREQUENCY RANGE	47HZ ~ 63HZ NO DAMAGE	I/P : 95VAC ~ 264VAC O/P : FULL-MIN LOAD Ta : 25°C	TEST : OK
3	INPUT CURRENT (TYP.)	2.0A / 230VAC 4.0A / 115VAC	I/P : 230VAC I/P : 115VAC O/P : FULL LOAD TA : 25°C	I= 1.0469A / 230VAC I= 2.0681A / 115VAC
4	LEAKAGE CURRENT	<115uA for earth leakage	I/P : 264VAC O/P : MIN LOAD	L-FG: 75 uA N-FG: 73 uA
		<100uA for touch leakage	TA : 25°C	L-V: 66 uA N-V: 66 uA
5	NO LOAD POWER CONSUMPTION	< 0.15W	I/P : 230VAC O/P : MIN LOAD TA : 25°C	< 0.1186 W
6	POWER FACTOR (TYP.)	0.91 / 230VAC 0.98 / 115VAC	I/P : 230VAC I/P : 115VAC O/P : FULL LOAD TA : 25°C	PF= 0.9652 / 230VAC PF= 0.9952 / 115VAC



7	EFFICIENCY (TYP.)	94.5%	I/P : 230VAC O/P : FULL LOAD TA : 25°C	94.727 %
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PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER LOAD PROTECTION	105% ~ 135%	I/P: 264VAC I/P: 230VAC I/P: 95VAC O/P: TESTING TA : 25°C	108.9% 264VAC 108.7% 230VAC 108.0% 95VAC Hiccup Mode
2	OVER VOLTAGE PROTECTION	50.40V ~ 64.80V	I/P: 264VAC I/P: 230VAC I/P: 80VAC O/P: MIN LOAD TA : 25°C	57.20V 264VAC 57.20V 230VAC 57.20V 80VAC Shut down Re- power ON
3	OVER TEMPERATURE PROTECTION	Shut down o/p voltage, recovers automatically after temperature goes down	I/P: 264VAC I/P: 80VAC O/P: FULL LOAD	O.T.P. Active Shut down o/p voltage, recovers automatically after temperature goes down
4	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P: 264VAC I/P: 80VAC O/P: FULL LOAD Ta: 25°C	NO DAMAGE Hiccup Mode

COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	PWM Power Transistor	Q5 Rated : 600V 18.0A	I/P : 267VAC VDS : O/P : (1)Full Load Turn on (2) Output Short (3)Full load continue Ta : 25°C	Q5 Q6 VIN: 267VAC 267VAC (1). 492.00V 532.00V (2). 510.00V 528.00V (3). 444.00V 450.00V
		Q6 Rated : 600V 18.0A		
2	O/P Diode (MOSFET)	Q101 Rated : 150V 30A	I/P : 267VAC O/P : (1)Full Load Turn on (2) Output Short (3)Full load continue (4)Burst mode Ta : 25°C	Q101 Q102 (1). 111.00V 108.00V (2). 16.10V 12.40V (3). 110.00V 108.00V (4). 105.00V 106.00V
		Q102 Rated : 150V 30A		
3	Input Capacitor	C5 Rated : 220uf 450V	I/P : 267VAC O/P : (1)Full Load Turn on /Off (2)Min load Turn on /Off (3)Full Load /Min load Change Ta : 25°C	C5 (1). 442.00V (2). 442.00V (3). 434.00V



4	Control IC	U1 Rated : 38V (max) -0.4V (min)	I/P : 267VAC O/P : (1)Full Load (2)Output Short (3)O.L.P (4)O.V.P (5)Low Line No Load Vo(min) Ta : 25°C	U1 (1). 25.00V (2). 20.00V (3). 22.30V (4). 28.40V (5). 26.00V
5	PFC Power Transistor	Q1 Rated : 600V 15.8A Q2 Rated : 600V 15.8A	I/P : 267VAC VDS : O/P : (1)Full Load Turn on (2) Output Short (3)Full load continue Ta : 25°C	Q1 Q2 VIN: 267VAC 267VAC (1). 512.00V 510.00V (2). 510.00V 508.00V (3). 486.00V 484.00V
6	PFC Diode	D2 Rated : 600V 15.0A	I/P : 267VAC O/P : (1)Full Load Turn on (2) Output Short (3)Dynamic Load Full/Min Load 90%Duty/5KHz (4)Dynamic Load Full/Min Load 50%Duty/120Hz Ta : 25°C	D2 (1). 448.00V (2). 452.00V (3). 450.00V (4). 450.00V

■ SAFETY & E.M.C. TEST

SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	WITHSTAND VOLTAGE	I/P-O/P : 4.000KVAC /min I/P-FG : 2.000KVAC /min O/P-FG : 0.500KVAC /min	I/P-O/P: 4.400KVAC /min I/P-FG: 2.400KVAC /min O/P-FG: 0.600KVAC /min Ta : 25°C	I/P-O/P: 1.33mA I/P-FG: 0.88mA O/P-FG: 1.71mA NO DAMAGE
2	ISOLATION RESISTANCE	I/P-O/P : 500VDC>100MΩ	I/P-O/P: 600VDC Ta : 25°C/70%RH	I/P-O/P: 9999MΩ NO DAMAGE

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	EN55011 CLASS B	I/P : 230VAC /50HZ O/P : FULL LOAD / 50% LOAD Ta : 25°C	PASS Test by certified Lab
3	RADIATION	EN55011 CLASS B	I/P : 230VAC /50HZ O/P : FULL LOAD Ta : 25°C	PASS Test by certified Lab
4	E.S.D	EN61000-4-2 AIR: 15KV / Contact: 8KV	I/P : 230VAC /50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A
5	E.F.T	EN61000-4-4 INPUT: 2KV	I/P : 230VAC /50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A
6	SURGE	EN61000-4-5 L-N: 1KV;L/N-PE: 2KV	I/P : 230VAC /50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A



RELIABILITY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	
1	TEMPERATURE RISE TEST	MODEL : GSM220A24-R7B			
		1. ROOM AMBIENT BURN-IN : 1.0hrs IP: 230VAC O/P: 100% LOAD TA= 21.2°C			
		2. HIGH AMBIENT BURN-IN : 1.0hrs IP: 230VAC O/P: 100% LOAD TA= 39.6°C			
			NO. Position ROOM AMBIENT 21.2°C HIGH AMBIENT Ta: 39.6°C		
			1 LF1 55.3°C 72.2°C		
			2 LF2 56.5°C 73.5°C		
			3 L2 59.5°C 76.2°C		
			4 BD1 60.0°C 76.7°C		
			5 L1 63.4°C 79.9°C		
			6 Q1 58.7°C 75.5°C		
			7 Q2 59.7°C 76.4°C		
			8 D2 61.2°C 77.9°C		
			9 C5 63.1°C 79.3°C		
			10 TSW1 56.6°C 73.2°C		
			11 C83 64.1°C 80.5°C		
			12 RTH2 60.4°C 77.2°C		
			13 T1 COIL 75.0°C 91.3°C		
			14 C109 65.7°C 82.6°C		
			15 Q102 68.9°C 86.1°C		
			16 Q101 68.3°C 85.4°C		
			17 Q5 61.7°C 78.7°C		
	18 Q6 61.6°C 78.7°C				
	19 U1 68.1°C 84.6°C				
	20 D3 59.1°C 75.8°C				
2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)	I/P : 230VAC O/P : 114.13% LOAD Ta : 25°C	TEST : OK	
3	LOW TEMPERATURE TURN ON TEST	NO DAMAGE 1 HOUR (MIN)	I/P : 264VAC / 95VAC O/P : FULL LOAD Ta : -30.0°C	TEST : OK	
4	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 40°C NO DAMAGE	I/P : 272VAC O/P : FULL LOAD Ta : 40°C HUMIDITY= 95.0% RH	TEST : OK	
5	TEMPERATURE COEFFICIENT	±0.03% /(0°C~50°C)	I/P : 230VAC O/P : FULL LOAD	±0.0069% /(0°C~50°C)	
6	STORAGE TEMPERATURE TEST	1. Thermal shock Temperature : -40°C ~ +85°C 2. Temperature change rate : 25°C / MIN 3. Dwell time low and high temperature : 30 MIN/EACH 4. Total test cycle : 5 CYCLE 5. Input/Output condition : STATIC		TEST : OK	
7	THERMAL SHOCK TEST	1. Thermal shock Temperature : -35°C ~ +45°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 : 230VAC Full Load AC ON/OFF test turn on 58sec ; turn off 2sec		TEST : OK	
8	VIBRATION TEST	1 Carton & 1 Set (1) Waveform : Sine Wave (2) Frequency : 10~500Hz (4) Acceleration : 2G (5) Test Time : 60 min in each axis (X.Y.Z) (6) Ta : 25°C		TEST : OK	
9	CAPACITOR LIFE CYCLE	:SUPPOSE C109 IS THE MOST CRITICAL COMPONENT	(1) I/P : 230VAC O/P : FULL LOAD Ta= 25.0°C LIFE TIME (2) I/P : 230VAC O/P : FULL LOAD Ta= 40.0°C LIFE TIME (3) I/P : 230VAC O/P : 75% LOAD Ta= 40.0°C LIFE TIME (4) I/P : 230VAC O/P : 50% LOAD Ta= 40.0°C LIFE TIME	(1). 146140.8 HRS (2). 57283.2 HRS (3). 145530 HRS (4). 215745 HRS	



10	MTBF	2028.6K hrs min. Telcordia SR-332 (Bellcore) ; 210.8K hrs min. MIL-HDBK-217F (25 °C)			
11	DMTBF /Accelerated Life test	Demonstration Mean Time Between Failure (Expected Life): Above	30000HRS	@ TA	40 °C

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	FRANK	GESG	WANGDZ