



# TEST REPORT: GSM120A12

## 120W 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

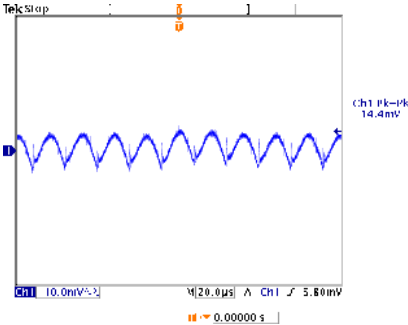
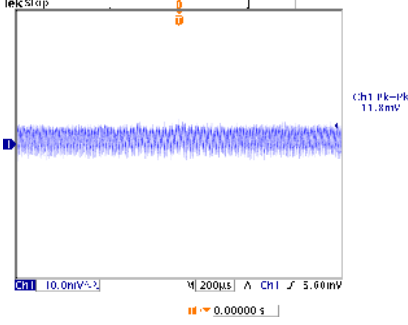
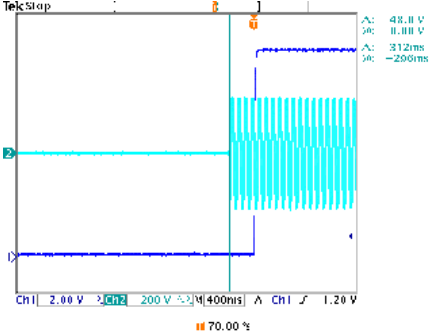
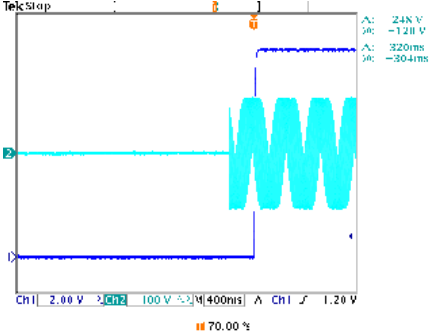
Safety Test

E.M.C. Test

### ■ RELIABILITY TEST

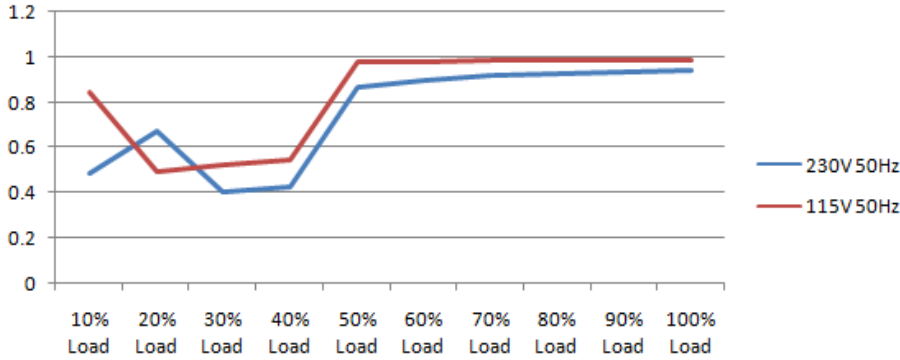
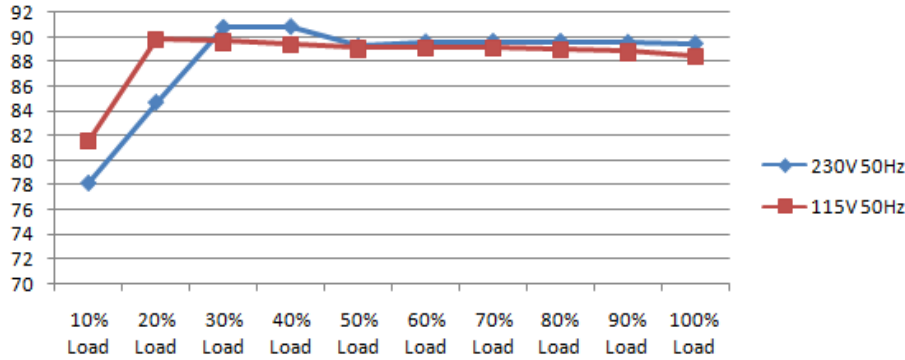
ENVIRONMENT TEST

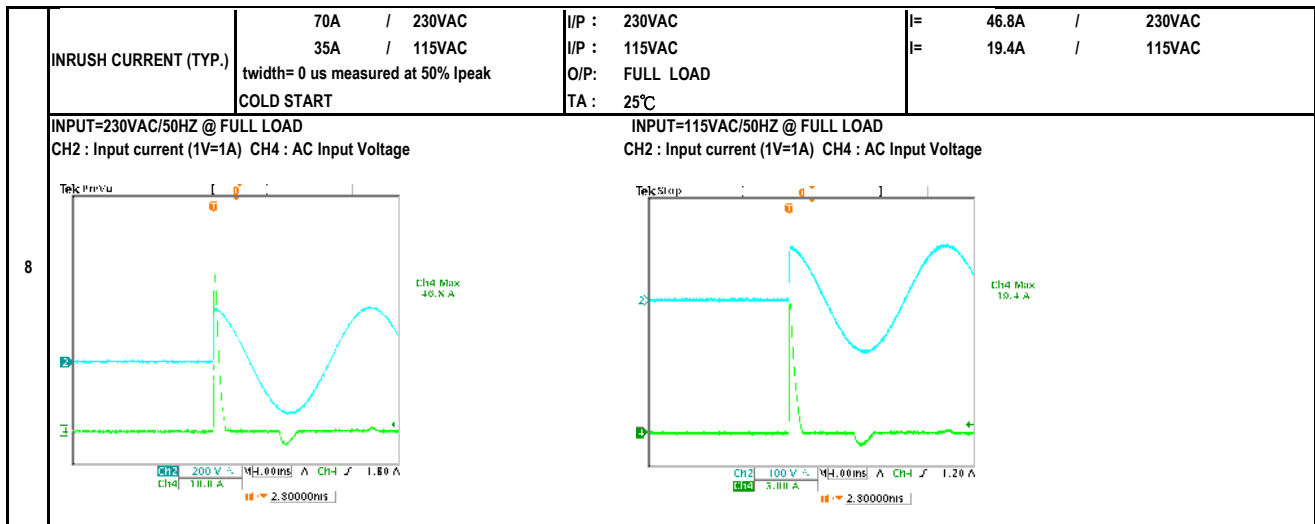
# DESIGN VERIFY TEST OUTPUT FUNCTION

| NO | TEST ITEM                                                                                                                                                           | SPECIFICATION                                                                                          | TEST CONDITION                                                                                                                                                       | RESULT                                                                                                 |
|----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
| 1  | OUTPUT VOLTAGE TOLERANCE (Max)                                                                                                                                      | V1 : 5.0% ~ -5.0%                                                                                      | I/P : 100VAC / 264VAC<br>O/P: FULL / MINLOAD<br>TA= 25°C                                                                                                             | V1: 2.08% ~ 0.33%                                                                                      |
| 2  | LINE REGULATION (MAX.)                                                                                                                                              | V1 : 1.0% ~ -1.0%                                                                                      | I/P : 100VAC / 264VAC<br>O/P: FULL LOAD<br>TA : 25°C                                                                                                                 | V1: 0.08% ~ 0.00%                                                                                      |
| 3  | LOAD REGULATION (MAX.)                                                                                                                                              | V1 : 5.0% ~ -5.0%                                                                                      | I/P : 230VAC<br>O/P: MIN LOAD ~ FULL LOAD<br>TA : 25°C                                                                                                               | V1: 0.74% ~ -0.91%                                                                                     |
| 4  | OVER/UNDERSHOOT TEST                                                                                                                                                | < ±5%                                                                                                  | I/P : 230VAC<br>O/P: FULL LOAD<br>TA : 25°C                                                                                                                          | TEST< 1.3 %                                                                                            |
| 5  | RIPPLE & NOISE(Max)                                                                                                                                                 | V1 : 100 mVp-p                                                                                         | I/P : 230VAC<br>O/P: FULL LOAD<br>TA : 25°C                                                                                                                          | V1 : 14.4 mVp-p                                                                                        |
|    |                                                                                                                                                                     | high frequency :<br> |                                                                                                                                                                      | low frequency :<br> |
| 6  | SET UP TIME (MAX.)                                                                                                                                                  | 230VAC : 1500ms<br>115VAC : 2000ms                                                                     | I/P : 230VAC<br>I/P : 115VAC<br>O/P: FULL LOAD<br>TA : 25°C                                                                                                          | 230VAC : 312ms<br>115VAC : 320ms                                                                       |
|    | INPUT=230VAC/50HZ @ FULL LOAD<br>CH1 : Output Voltage CH2 : AC Input Voltage<br> |                                                                                                        | INPUT=115VAC/60HZ @ FULL LOAD<br>CH1 : Output Voltage CH2 : AC Input Voltage<br> |                                                                                                        |

|   |                                                                              |                                |                                                                                                   |                                      |
|---|------------------------------------------------------------------------------|--------------------------------|---------------------------------------------------------------------------------------------------|--------------------------------------|
| 7 | RISE TIME (MAX.)                                                             | 230VAC : 30ms<br>115VAC : 30ms | I/P : 230VAC<br>I/P : 115VAC<br>O/P: FULL LOAD<br>TA : 25°C                                       | 230VAC : 15.6ms<br>115VAC : 16.0ms   |
|   | INPUT=230VAC/50HZ @ FULL LOAD<br>CH1 : Output Voltage                        |                                | INPUT=115VAC/60HZ @ FULL LOAD<br>CH1 : Output Voltage                                             |                                      |
| 8 |                                                                              |                                |                                                                                                   |                                      |
|   |                                                                              |                                |                                                                                                   |                                      |
| 9 | HOLD UP TIME (TYP.)                                                          | 230VAC : 40ms<br>115VAC : 24ms | I/P : 230VAC<br>I/P : 115VAC<br>O/P: FULL LOAD<br>TA : 25°C                                       | 230VAC : 42.8ms<br>115VAC : 29.6ms   |
|   | INPUT=230VAC/50HZ @ FULL LOAD<br>CH1 : Output Voltage CH2 : AC Input Voltage |                                | INPUT=115VAC/60HZ @ FULL LOAD<br>CH1 : Output Voltage CH2 : AC Input Voltage                      |                                      |
| 9 | DYNAMIC LOAD                                                                 | V1 : 1200 mVp-p                | I/P : 230VAC<br>O/P: (1)Full/Min load 50%duty/120HZ<br>(2)Full/Min load 50%duty/1KHZ<br>TA : 25°C | V1: (1). 624mv (2). 422mv unit:mVp-p |
|   | FULL /Min LOAD 50%DUTY / 120HZ                                               |                                | FULL /Min LOAD 50%DUTY / 1KHZ                                                                     |                                      |
| 9 |                                                                              |                                |                                                                                                   |                                      |
|   |                                                                              |                                |                                                                                                   |                                      |

## INPUT FUNCTION TEST

| NO                                                                                   | TEST ITEM                 | SPECIFICATION                                                  | TEST CONDITION                                                                                                                                                                          | RESULT                                   |
|--------------------------------------------------------------------------------------|---------------------------|----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|
| 1                                                                                    | INPUT VOLTAGE RANGE       | 80VAC ~ 264VAC                                                 | I/P : TESTING<br>O/P : FULL LOAD<br>Ta : 25°C<br><br>I/P :<br>LOW-LINE = 97VAC<br>HIGH-LINE = 300VAC<br>O/P : FULL/MIN LOAD<br>ON:30 Sec ; OFF:30 Sec 10MIN<br>(POWER ON/OFF NO DAMAGE) | 65.0VAC ~ 264VAC<br><br>TEST : OK        |
| 2                                                                                    | INPUT FREQUENCY RANGE     | 47HZ ~ 63HZ<br>NO DAMAGE                                       | I/P : 100VAC ~ 264VAC<br>O/P : FULL~MIN LOAD<br>Ta : 25°C                                                                                                                               | TEST : OK                                |
| 3                                                                                    | INPUT CURRENT (TYP.)      | 0.7 / 230VAC<br>1.4 / 115VAC                                   | I/P : 230VAC<br>I/P : 115VAC<br>O/P : FULL LOAD<br>Ta : 25°C                                                                                                                            | I= 0.5315 / 230VAC<br>I= 1.0173 / 115VAC |
| 4                                                                                    | LEAKAGE CURRENT           | < 115uA Earth leakage current<br>< 100uA Touch leakage current | I/P : 264VAC<br>O/P : MIN LOAD<br>Ta : 25°C                                                                                                                                             | 51 uA Earth<br>41 uA Touch               |
| 5                                                                                    | NO LOAD POWER CONSUMPTION | < 0.15W                                                        | I/P : 230VAC<br>O/P : MIN LOAD<br>Ta : 25°C                                                                                                                                             | < 0.1034 W                               |
| 6                                                                                    | POWER FACTOR (TYP.)       | 0.93 / 230VAC<br>0.97 / 115VAC                                 | I/P : 230VAC<br>I/P : 115VAC<br>O/P : FULL LOAD<br>Ta : 25°C                                                                                                                            | PF= 0.94 / 230VAC<br>PF= 0.988 / 115VAC  |
|   |                           |                                                                |                                                                                                                                                                                         |                                          |
| 7                                                                                    | EFFICIENCY (TYP.)         | 88.0%                                                          | I/P : 230VAC<br>O/P : FULL LOAD<br>Ta : 25°C                                                                                                                                            | 89.529 %                                 |
|  |                           |                                                                |                                                                                                                                                                                         |                                          |



### PROTECTION FUNCTION TEST

| NO | TEST ITEM                   | SPECIFICATION                          | TEST CONDITION                                                         | RESULT                                                                   |
|----|-----------------------------|----------------------------------------|------------------------------------------------------------------------|--------------------------------------------------------------------------|
| 1  | OVER LOAD PROTECTION        | 105% ~ 160%                            | I/P: 264VAC<br>I/P: 230VAC<br>I/P: 100VAC<br>O/P: TESTING<br>TA : 25°C | 136% 264VAC<br>136% 230VAC<br>131% 100VAC<br>Hiccup Mode                 |
| 2  | OVER VOLTAGE PROTECTION     | 12.60V ~ 16.20V                        | I/P: 264VAC<br>I/P: 230VAC<br>I/P: 80VAC<br>O/P: MIN LOAD<br>TA : 25°C | 14.10V 264VAC<br>14.10V 230VAC<br>14.10V 80VAC<br>Shut down Re- power ON |
| 3  | OVER TEMPERATURE PROTECTION | Shut down Re- power ON                 | I/P: 264VAC<br>I/P: 80VAC<br>O/P: FULL LOAD                            | O.T.P. Active<br>Shut down Re- power ON                                  |
| 4  | SHORT PROTECTION            | SHORT EVERY OUTPUT<br>1 HOUR NO DAMAGE | I/P: 264VAC<br>I/P: 80VAC<br>O/P: FULL LOAD<br>Ta: 25°C                | NO DAMAGE<br>Hiccup Mode                                                 |

### COMPONENT STRESS TEST

| NO | TEST ITEM            | SPECIFICATION                                        | TEST CONDITION                                                                                                            | RESULT                                                                                     |
|----|----------------------|------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| 1  | PWM Power Transistor | Q32 Rated : 700V 11.0A                               | I/P : 267VAC<br><br>VDS :<br>O/P : (1)Full Load Turn on<br>(2) Output Short<br>(3)Full load continue<br>Ta : 25°C         | VIN: 267VAC<br>VDS:<br>(1). 608.00V<br>(2). 620.00V<br>(3). 604.00V                        |
| 2  | O/P Diode (MOSFET)   | Q101 Rated : 75V 80.0A<br><br>Q102 Rated : 75V 80.0A | I/P : 267VAC<br><br>VDS :<br>O/P : (1)Full Load Turn on<br>(2) Output Short<br>(3)Full load continue<br>Ta : 25°C         | Q101 Q102<br>VDS : VDS :<br>(1). 72.40V 71.60V<br>(2). 52.80V 54.00V<br>(3). 72.00V 70.80V |
| 3  | Input Capacitor      | C5 Rated : 120uf 420V                                | I/P : 267VAC<br>O/P : (1)Full Load Turn on /Off<br>(2)Min load Turn on /Off<br>(3)Full Load /Min load Change<br>Ta : 25°C | (1). 412.00V<br>(2). 408.00V<br>(3). 414.00V                                               |

|   |                      |                                                                                                                                                                               |                                                                                                                                                                                                                                  |                                                                                                                                                                       |
|---|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4 | Control IC           | <p>U2      Rated :    28V      (max)<br/>                         -0.3V      (min)</p> <p>U101    Rated :    38V      (max)<br/>                         -0.4V      (min)</p> | <p>I/P :    267VAC<br/>O/P :    (1)Full Load<br/>          (2)Output Short<br/>          (3)O.L.P<br/>          (4)O.V.P<br/>          (5)Low Line No Load Vo(min)<br/>Ta :    25°C</p>                                          | <p>U2      U101</p> <p>(1).    20.20V    14.40V<br/>(2).    16.60V    3.00V<br/>(3).    17.80V    8.20V<br/>(4).    20.20V    14.20V<br/>(5).    11.10V    12.70V</p> |
| 5 | PFC Power Transistor | <p>Q31      Rated :    600V    15.8A</p>                                                                                                                                      | <p>I/P :    267VAC<br/><br/>VDS :<br/>O/P :    (1)Full Load Turn on<br/>          (2) Output Short<br/>          (3)Full load continue<br/>Ta :    25°C</p>                                                                      | <p>VIN:    267VAC<br/>VDS:<br/>(1).    452.00V<br/>(2).    416.00V<br/>(3).    436.00V</p>                                                                            |
| 6 | PFC Diode            | <p>D1      Rated :    600V    9.0A</p>                                                                                                                                        | <p>I/P :    267VAC<br/><br/>O/P :    (1)Full Load Turn on<br/>          (2) Output Short<br/>          (3)Dynamic Load Full/Min Load 90%Duty/5KHz<br/>          (4)Dynamic Load Full/Min Load 50%Duty/120Hz<br/>Ta :    25°C</p> | <p>267VAC<br/>(1).    436.00V<br/>(2).    424.00V<br/>(3).    448.00V<br/>(4).    444.00V</p>                                                                         |
| 8 | Clamp Diode          | <p>D30      Rated :    800V    3.0A</p>                                                                                                                                       | <p>I/P :    267VAC<br/>O/P :    (1)Dynamic Load Full/Min Load 90%Duty/1KHz<br/>          (2)Full load continue<br/>Ta :    25°C</p>                                                                                              | <p>(1).    552.00V<br/>(2).    552.00V</p>                                                                                                                            |

#### SAFETY & E.M.C. TEST

##### SAFETY TEST

| NO | TEST ITEM            | SPECIFICATION                                                                                                             | TEST CONDITION                                                                                                          | RESULT                                                                                       |
|----|----------------------|---------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|
|    |                      | <p>I/P-O/P :      4.000KVAC    /min</p> <p>I/P-FG :        2.000KVAC    /min</p> <p>O/P-FG :        0.500KVAC    /min</p> | <p>I/P-O/P: 4.400KVAC    /min</p> <p>I/P-FG: 2.400KVAC    /min</p> <p>O/P-FG: 0.600KVAC    /min</p> <p>Ta :    25°C</p> | <p>I/P-O/P:    2.28mA</p> <p>I/P-FG:    1.50mA</p> <p>O/P-FG:    2.95mA</p> <p>NO DAMAGE</p> |
| 2  | ISOLATION RESISTANCE | I/P-O/P :      500VDC>100MΩ                                                                                               | <p>I/P-O/P: 500VDC</p> <p>Ta :    25°C/70%RH</p>                                                                        | <p>I/P-O/P:    9999MΩ</p> <p>NO DAMAGE</p>                                                   |

##### E.M.C. TEST

| NO | TEST ITEM  | SPECIFICATION                           | TEST CONDITION                                                                                 | RESULT                                   |
|----|------------|-----------------------------------------|------------------------------------------------------------------------------------------------|------------------------------------------|
| 1  | HARMONIC   | EN61000-3-2<br>CLASS A                  | <p>I/P :    230VAC    /50HZ</p> <p>O/P :    FULL LOAD</p> <p>Ta :    25°C</p>                  | PASS                                     |
| 2  | CONDUCTION | EN55011<br>CLASS B                      | <p>I/P :    230VAC    /50HZ</p> <p>O/P :    FULL LOAD    /    50% LOAD</p> <p>Ta :    25°C</p> | <p>PASS</p> <p>Test by certified Lab</p> |
| 3  | RADIATION  | EN55011<br>CLASS B                      | <p>I/P :    230VAC    /50HZ</p> <p>O/P :    FULL LOAD</p> <p>Ta :    25°C</p>                  | <p>PASS</p> <p>Test by certified Lab</p> |
| 4  | E.S.D      | EN61000-4-2<br>AIR: 15KV / Contact: 8KV | <p>I/P :    230VAC    /50HZ</p> <p>O/P :    FULL LOAD</p> <p>Ta :    25°C</p>                  | CRITERIA A                               |
| 5  | E.F.T      | EN61000-4-4<br>INPUT: 2KV               | <p>I/P :    230VAC    /50HZ</p> <p>O/P :    FULL LOAD</p> <p>Ta :    25°C</p>                  | CRITERIA A                               |
| 6  | SURGE      | EN61000-4-5<br>L-N:1KV;L/N-PE: 2KV      | <p>I/P :    230VAC    /50HZ</p> <p>O/P :    FULL LOAD</p> <p>Ta :    25°C</p>                  | CRITERIA A                               |

## RELIABILITY TEST

| NO | TEST ITEM                                              | SPECIFICATION                                                                                                                                                                                                                                                                  | TEST CONDITION                                                                | RESULT             |
|----|--------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------|
| 1  | TEMPERATURE RISE TEST                                  | MODEL : GSM120A12-R7B                                                                                                                                                                                                                                                          |                                                                               |                    |
|    |                                                        | 1. ROOM AMBIENT BURN-IN : 1.0hrs<br>IP: 230VAC O/P: 100% LOAD TA= 19.1℃                                                                                                                                                                                                        |                                                                               |                    |
|    |                                                        | 2. HIGH AMBIENT BURN-IN : 1.0hrs<br>IP: 230VAC O/P: 100% LOAD TA= 38.3℃                                                                                                                                                                                                        |                                                                               |                    |
|    |                                                        |                                                                                                                                                                                                                                                                                | NO. Position ROOM AMBIENT 19.1℃ HIGH AMBIENT Ta: 38.3℃                        |                    |
|    |                                                        |                                                                                                                                                                                                                                                                                | 1 RTH1 77.8℃ 80.2℃                                                            |                    |
|    |                                                        |                                                                                                                                                                                                                                                                                | 2 LF1 58.8℃ 72.4℃                                                             |                    |
|    |                                                        |                                                                                                                                                                                                                                                                                | 3 LF2 55.8℃ 71.8℃                                                             |                    |
|    |                                                        |                                                                                                                                                                                                                                                                                | 4 LF3 54.8℃ 71.3℃                                                             |                    |
|    |                                                        |                                                                                                                                                                                                                                                                                | 5 L1 58.9℃ 75.0℃                                                              |                    |
|    |                                                        |                                                                                                                                                                                                                                                                                | 6 L2 60.1℃ 76.6℃                                                              |                    |
|    |                                                        |                                                                                                                                                                                                                                                                                | 7 C5 62.5℃ 78.7℃                                                              |                    |
|    |                                                        |                                                                                                                                                                                                                                                                                | 8 C52 66.6℃ 83.2℃                                                             |                    |
|    |                                                        |                                                                                                                                                                                                                                                                                | 9 T1 65.5℃ 82.8℃                                                              |                    |
|    |                                                        |                                                                                                                                                                                                                                                                                | 10 BD1 58.8℃ 74.7℃                                                            |                    |
|    |                                                        |                                                                                                                                                                                                                                                                                | 11 Q31 61.7℃ 79.3℃                                                            |                    |
|    |                                                        |                                                                                                                                                                                                                                                                                | 12 D1 61.1℃ 77.8℃                                                             |                    |
|    |                                                        |                                                                                                                                                                                                                                                                                | 13 Q32 68.8℃ 85.6℃                                                            |                    |
|    |                                                        |                                                                                                                                                                                                                                                                                | 14 Q102 62.6℃ 80.4℃                                                           |                    |
|    |                                                        |                                                                                                                                                                                                                                                                                | 15 Q101 61.3℃ 78.4℃                                                           |                    |
|    |                                                        |                                                                                                                                                                                                                                                                                | 16 C110 59.0℃ 76.9℃                                                           |                    |
|    |                                                        |                                                                                                                                                                                                                                                                                | 17 C113 63.5℃ 81.4℃                                                           |                    |
|    |                                                        |                                                                                                                                                                                                                                                                                | 18 LF100 63.4℃ 81.5℃                                                          |                    |
|    |                                                        |                                                                                                                                                                                                                                                                                | 19 U2 56.9℃ 75.5℃                                                             |                    |
|    |                                                        |                                                                                                                                                                                                                                                                                | 20 RTH30 63.0℃ 80.6℃                                                          |                    |
| 2  | OVER LOAD BURN-IN TEST                                 | NO DAMAGE<br>1 HOUR ( MIN )                                                                                                                                                                                                                                                    | I/P : 230VAC<br>O/P : 134.1% LOAD<br>Ta : 25℃                                 | TEST : OK          |
| 3  | LOW TEMPERATURE TURN ON TEST                           | NO DAMAGE<br>1 HOUR ( MIN )                                                                                                                                                                                                                                                    | I/P : 264VAC / 100VAC<br>O/P : FULL LOAD<br>Ta : -30.0℃                       | TEST : OK          |
| 4  | HIGH HUMIDITY<br>HIGH TEMPERATURE<br>HIGH VOLTAGE TEST | AFTER 12 HOURS<br>IN CHAMBER ON<br>CONTROL 40℃<br>NO DAMAGE                                                                                                                                                                                                                    | I/P : 272VAC<br>O/P : FULL LOAD<br>Ta : 40℃<br>HUMIDITY= 95.0% RH             | TEST : OK          |
| 5  | TEMPERATURE COEFFICIENT                                | ±0.03% /(0℃~40℃)                                                                                                                                                                                                                                                               | I/P : 230VAC<br>O/P : FULL LOAD                                               | ±0.0082% /(0℃~40℃) |
| 6  | STORAGE TEMPERATURE TEST                               | 1. Thermal shock Temperature : -40℃ ~ +85℃<br>2. Temperature change rate : 25℃ / MIN<br>3. Dwell time low and high temperature : 30 MIN/EACH<br>4. Total test cycle : 5 CYCLE<br>5. Input/Output condition : STATIC                                                            |                                                                               | TEST : OK          |
| 7  | THERMAL SHOCK TEST                                     | 1. Thermal shock Temperature : -35℃ ~ +45℃<br>2. Temperature change rate : 25℃ / MIN<br>3. Dwell time low and high temperature : 30 MIN/EACH<br>4. Total test cycle : 10 CYCLE<br>5. Input/Output condition :<br>230VAC Full Load AC ON/OFF test turn on 58sec ; turn off 2sec |                                                                               | TEST : OK          |
| 8  | VIBRATION TEST                                         | 1 Carton & 1 Set<br>(1) Waveform : Sine Wave<br>(2) Frequency : 10~500Hz<br>(4) Acceleration : 2G<br>(5) Test Time : 60 min in each axis (X.Y.Z)<br>(6) Ta : 25℃                                                                                                               |                                                                               | TEST : OK          |
| 9  | CAPACITOR LIFE CYCLE                                   | :SUPPOSE C113 IS THE MOST CRITICAL COMPONENT<br>(1) I/P : 230VAC O/P : FULL LOAD Ta= 25.0℃ LIFE TIME<br>(2) I/P : 230VAC O/P : FULL LOAD Ta= 40.0℃ LIFE TIME<br>(3) I/P : 230VAC O/P : 75% LOAD Ta= 40.0℃ LIFE TIME<br>(4) I/P : 230VAC O/P : 50% LOAD Ta= 40.0℃ LIFE TIME     | (1). 95381.1 HRS<br>(2). 36890.4 HRS<br>(3). 97177.8 HRS<br>(4). 222071.2 HRS |                    |
| 10 | MTBF                                                   | MIL-HDBK-217F<br>TOTAL FAILURE RATE : 368.5 KHRS                                                                                                                                                                                                                               |                                                                               |                    |
| 11 | DMTBF /Accelerated Life test                           | Demonstration Mean Time Between Failure (Expected Life): Above 30000HRS @ TA 40℃                                                                                                                                                                                               |                                                                               |                    |

| TEST RESULT | TESTER | REVIEW | APPROVAL |
|-------------|--------|--------|----------|
| PASS        | FRANK  | GESG   | WANGDZ   |

2007/3/20 A50-S014