



# Test Report: MPM-45-24

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45W AC-DC High Reliable PCB-Mount Green Medical Power  
Module

## ■ 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

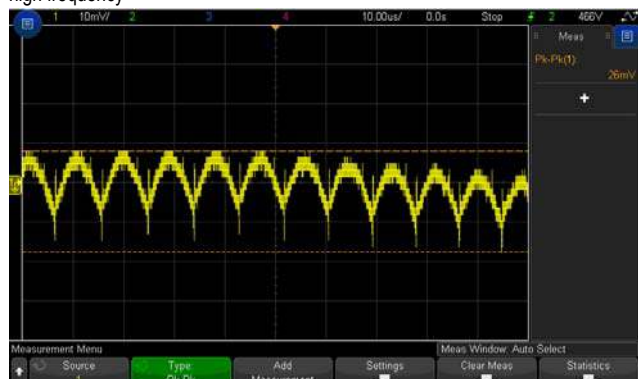
ENVIRONMENT TEST

## DESIGN VERIFY TEST

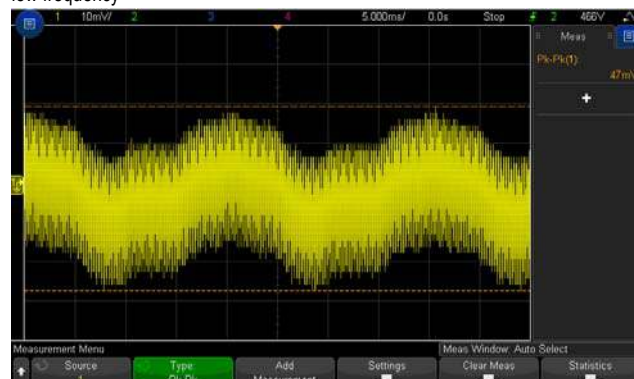
### OUTPUT FUNCTION TEST

| NO | TEST ITEM                        | SPECIFICATION     | TEST CONDITION                                      | RESULT           |
|----|----------------------------------|-------------------|-----------------------------------------------------|------------------|
| 1  | OUTPUT VOLTAGE(Max)<br>TOLERANCE | V1: -2%~ +2 %     | I/P: 80VAC /264VAC<br>O/P:FULL/ MIN. LOAD<br>Ta:25℃ | V1: -0.08%~0.13% |
| 2  | LINE REGULATION (Max)            | V1: -0.5%~ +0.5 % | I/P: 80VAC~ 264VAC<br>O/P:FULL LOAD<br>Ta:25℃       | V1:-0.03%~0.13%  |
| 3  | LOAD REGULATION(Max)             | V1: -0.5%~ +0.5 % | I/P: 230VAC<br>O/P:FULL ~MIN LOAD<br>Ta:25℃         | V1:-0.08%~0.10%  |
| 4  | OVER/UNDERSHOOT TEST             | $\leq \pm 5\%$    | I/P: 230VAC<br>O/P:FULL LOAD<br>Ta:25℃              | 0.4%             |
| 5  | PEAK LOAD TEST                   | $\geq 10$ Sec.    | I/P: 230VAC<br>O/P:PEAK LOAD<br>Ta:25℃              | OK               |
| 6  | RIPPLE & NOISE(Max )             | V1: 200mVp-p      | I/P:230VAC<br>O/P:FULL LOAD<br>Ta:25℃               | V1: 47mVp-p      |

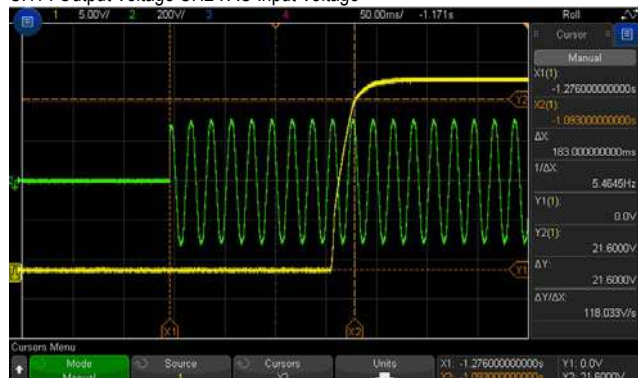
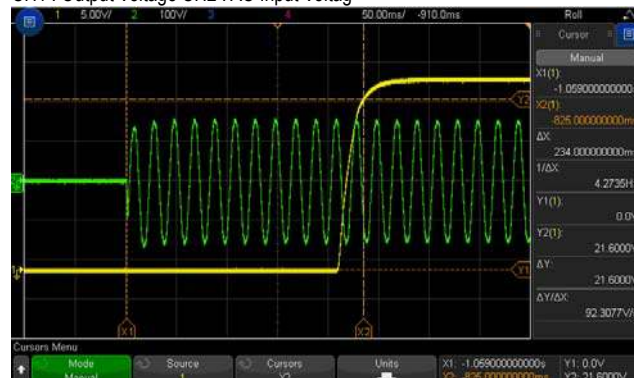
high frequency :

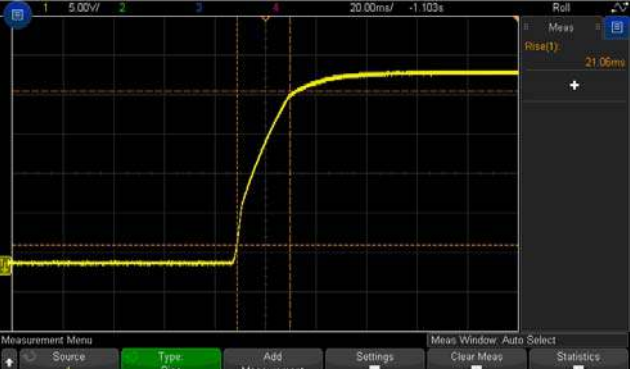
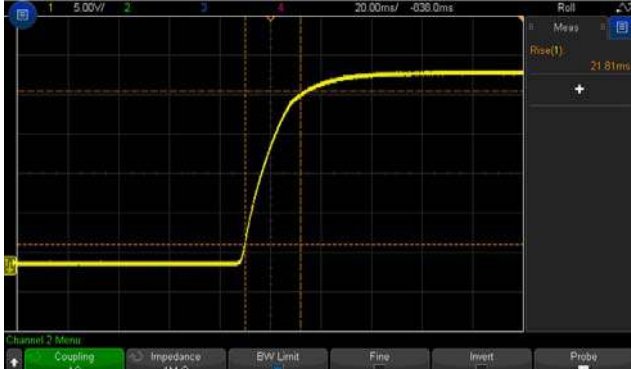
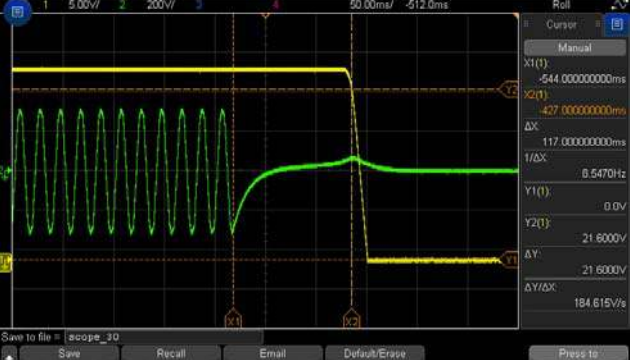
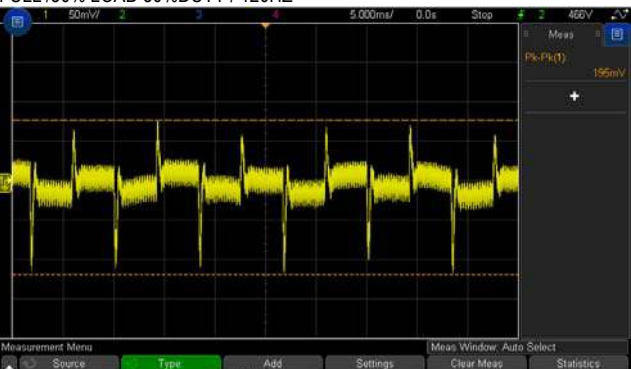
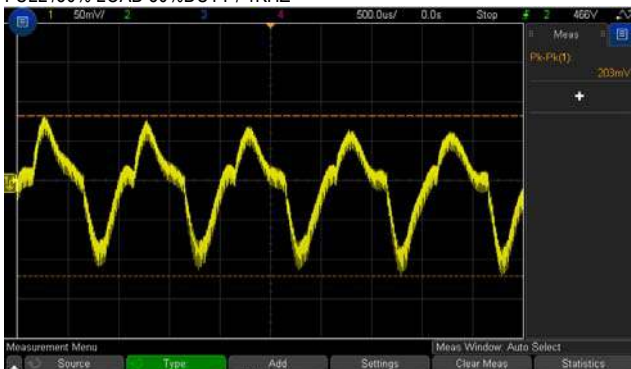


low frequency :



|   |                  |                                |                                                               |                                |
|---|------------------|--------------------------------|---------------------------------------------------------------|--------------------------------|
| 7 | SET UP TIME(Max) | 230VAC/1000ms<br>115VAC/1000ms | I/P : 230 VAC<br>I/P : 115 VAC<br>O/P : FULL LOAD<br>Ta : 25℃ | 230VAC/ 183ms<br>115VAC/ 234ms |
|---|------------------|--------------------------------|---------------------------------------------------------------|--------------------------------|

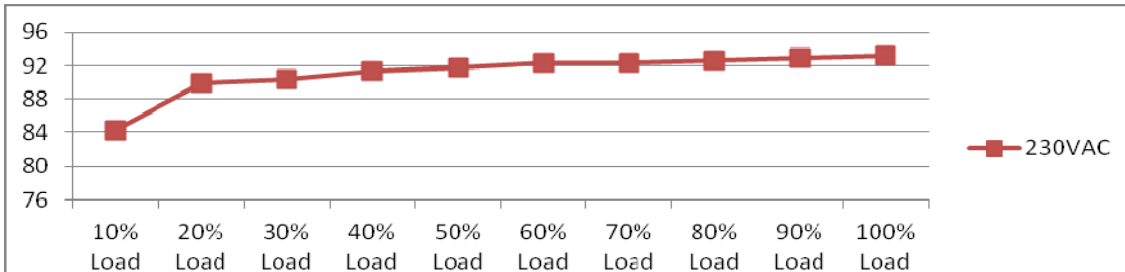
INPUT=230VAC/50HZ @ FULL LOAD  
CH1 : Output Voltage CH2 : AC Input Voltage

INPUT=115VAC/60HZ @ FULL LOAD  
CH1 : Output Voltage CH2 : AC Input Voltage


|    |                                                                                                                                                                 |                            |                                                                                                                                                                  |                                    |
|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| 8  | RISE TIME (Max)                                                                                                                                                 | 230VAC/30ms<br>115VAC/30ms | I/P : 230 VAC<br>I/P : 115 VAC<br>O/P : FULL LOAD<br>Ta : 25°C                                                                                                   | 230VAC/ 21.06ms<br>115VAC/ 21.81ms |
|    | INPUT=230VAC/50HZ @ FULL LOAD<br>CH1 : Output Voltage                          |                            | INPUT=115VAC/60HZ @ FULL LOAD<br>CH1 : Output Voltage                          |                                    |
| 9  | HOLD UP TIME (Typ.)                                                                                                                                             | 230VAC/50ms<br>115VAC/12ms | I/P : 230 VAC<br>I/P : 115 VAC<br>O/P : FULL LOAD<br>Ta : 25°C                                                                                                   | 230VAC/ 117ms<br>115VAC/ 22ms      |
|    | 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  |                                    |
| 10 | DYNAMIC LOAD                                                                                                                                                    | V1: 2400 mVp-p             | I/P: 230VAC<br>O/P:<br>(1)FULL /MIN LOAD 50%DUTY / 120HZ<br>(2)FULL /MIN LOAD 50%DUTY / 1KHZ<br>Ta:25°C                                                          | 195mVp-p<br>203mVp-p               |
|    | FULL /50% LOAD 50%DUTY / 120HZ                                               |                            | FULL /50% LOAD 50%DUTY / 1KHZ                                                |                                    |

### INPUT FUNCTION TEST

| NO | TEST ITEM             | SPECIFICATION                 | TEST CONDITION                                                                                                                                                     | RESULT                             |
|----|-----------------------|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| 1  | INPUT VOLTAGE RANGE   | 80VAC~264VAC<br>113VDC~370VDC | I/P: TESTING<br>O/P: FULL LOAD<br>Ta: 25°C                                                                                                                         | 68V~264V<br>96VDC~370VDC           |
|    |                       |                               | I/P:<br>LOW-LINE-3V=77 V<br>HIGH-LINE+10V=300 V<br>O/P: FULL/MIN LOAD<br>(PLEASE CHECK DERATING CURVE)<br>ON: 30 Sec OFF: 30 Sec 10MIN<br>(POWER ON/OFF NO DAMAGE) | TEST: OK                           |
| 2  | INPUT FREQUENCY RANGE | 47HZ ~63 HZ<br>NO DAMAGE      | I/P: 80 VAC ~264 VAC<br>O/P: FULL~MIN LOAD<br>Ta: 25°C                                                                                                             | TEST: OK                           |
| 3  | INPUT CURRENT (Typ.)  | 230V/ 0.6 A<br>115V/ 1.2 A    | I/P : 230 VAC<br>I/P : 115 VAC<br>O/P : FULL LOAD<br>Ta : 25°C                                                                                                     | I=0.39A/ 230VAC<br>I=0.62A/ 115VAC |
| 4  | LEAKAGE CURRENT       | < 100uA / 264VAC              | I/P : 264VAC<br>O/P : Min LOAD<br>Ta : 25°C                                                                                                                        | Touch current : 80.7 uA            |
| 5  | NO LOAD CONSUMPTION   | <0.1 W                        | I/P : 115VAC/230VAC<br>O/P : NO LOAD<br>Ta : 25°C                                                                                                                  | 0.051W/115VAC<br>0.077W/230VAC     |
| 7  | EFFICIENCY(Typ.)      | 92.5%                         | I/P: 230 VAC<br>O/P: FULL LOAD<br>Ta: 25°C                                                                                                                         | 93.2%                              |

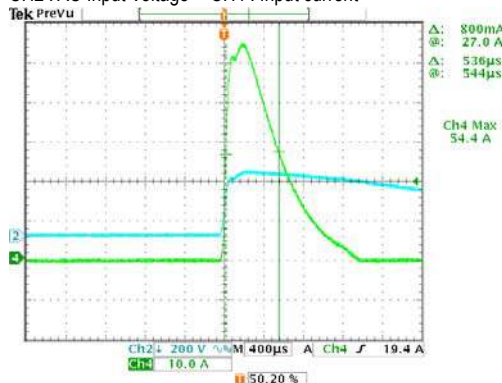
EFFICIENCY vs LOAD



|   |                      |                                    |                                                                |                                    |
|---|----------------------|------------------------------------|----------------------------------------------------------------|------------------------------------|
| 8 | INRUSH CURRENT(Typ.) | 230V/60A<br>115V/30A<br>COLD START | I/P : 230 VAC<br>I/P : 115 VAC<br>O/P : FULL LOAD<br>Ta : 25°C | I=54.4A/ 230VAC<br>I=22.8A/ 115VAC |
|---|----------------------|------------------------------------|----------------------------------------------------------------|------------------------------------|

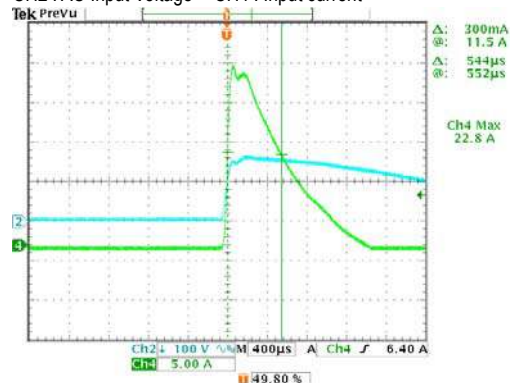
INPUT=230VAC/50HZ @ FULL LOAD

CH2 : AC Input Voltage CH4 : Input current



INPUT=115VAC/ 60HZ @ FULL LOAD

CH2 : AC Input Voltage CH4 : Input current



### PROTECTION FUNCTION TEST

| NO | TEST ITEM                   | SPECIFICATION                                                       | TEST CONDITION                                                      | RESULT                                                                                                                                         |
|----|-----------------------------|---------------------------------------------------------------------|---------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| 1  | OVER LOAD PROTECTION        | 115%~ 135 %                                                         | I/P: 264VAC<br>I/P: 230VAC<br>I/P: 100VAC<br>O/P: TESTING<br>Ta:25℃ | 124.4% 264VAC<br>130.8%/ 230VAC<br>122.3%100VAC<br>PROTECTION TYPE :<br>Hiccup mode ,recovers automatically after fault condition is removed ° |
| 2  | OVER VOLTAGE PROTECTION     | 25.2V~32.4V                                                         | I/P: 264VAC<br>I/P: 230VAC<br>I/P: 80VAC<br>O/P: MIN LOAD<br>Ta:25℃ | 27.4VAC<br>27.4VAC<br>27.4VAC<br>PROTECTION TYPE :<br>Shut down O/P voltage ,re-power on to recover.                                           |
| 3  | OVER TEMPERATURE PROTECTION | Protection type :<br>Shut down O/P voltage, re-power on to recover. | I/P: 264VAC<br>I/P: 80VAC<br>O/P: FULL LOAD                         | O.T.P. Active<br>Protection type :<br>Shut down O/P voltage ,re-power on to recover.                                                           |
| 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℃               | NO DAMAGE<br>PROTECTION TYPE :<br>Hiccup mode ,recovers automatically after fault condition is removed °                                       |

### COMPONENT STRESS TEST

| NO | TEST ITEM                                            | SPECIFICATION             | TEST CONDITION                                                                                                                                                                                                                                                                                                                                                       | RESULT                                                                                                                        |
|----|------------------------------------------------------|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| 1  | PWM Transistor<br>( D to S) or (C to E) Peak Voltage | Q1 Rated:<br>7A/600V      | AC ON/OFF<br>I/P: High-Line +3V =267V<br>VDS:<br>O/P: (1) Full Load<br>(2) Output Short<br>(3) Dynamic Load Full Load/<br>Min. Load 90%Duty/1KHz<br>(4) Dynamic Load Full Load/<br>Min. Load 90%Duty/3KHz<br>(5) Dynamic Load Full Load/<br>Min. Load 90%Duty/5KHz<br>(6) Dynamic Load 100% Load/<br>Min. Load 50%Duty/120Hz<br>(7) 0%→400% Load.<br>Ta:25℃          | VDS:<br>(1) 535V<br>(2) 434V<br>(3) 535V<br>(4) 535V<br>(5) 535V<br>(6) 535V<br>(7) 535V                                      |
| 4  | Diode Peak Voltage                                   | Q100 Rated:<br>27.4A/150V | AC ON/OFF<br>I/P: High-Line +3V =267 V<br>O/P: (1) Full Load<br>(2) Output Short<br>(3) Dynamic Load Full Load/<br>Min. Load 90%Duty/1KHz<br>(4) Dynamic Load Full Load/<br>Min. Load 90%Duty/3KHz<br>(5) Dynamic Load Full Load/<br>Min. Load 90%Duty/5KHz<br>(6) Dynamic Load 100% Load/<br>Min. Load 50%Duty/120Hz<br>(7) 0%→400% Load.<br>(8). NO LOAD<br>Ta:25℃ | Q100:<br>VDS:<br>(1) 122.7V<br>(2) 129.1V<br>(3) 122.7V<br>(4) 128.3V<br>(5) 122.7V<br>(6) 124.3V<br>(7) 132.0V<br>(8) 124.3V |

|   |                          |                                                                           |                                                                                                                                                              |                                                                                                                                        |
|---|--------------------------|---------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| 5 | Input Capacitor Voltage  | C5 Rated:<br>120 $\mu$ / 400 V                                            | I/P:High-Line +3V =267V<br>O/P: (1)Full Load input on/off<br>(2) Min load input on /Off<br>(3)Full Load /Min load Change<br>(4)Full load continue<br>Ta:25°C | (1) 368V<br>(2) 368V<br>(3) 368V<br>(4) 364V                                                                                           |
| 6 | Control IC Voltage Test  | PWM IC U2 Rated:<br>-0.3 V~ 30 V<br><br>O/P IC U100 Rated:<br>-0.3V~ 38 V | AC ON/OFF<br>I/P:High-Line +3V =267V<br>O/P(1)FULL LOAD<br>(2) Output Short<br>(3)O.L.P<br>(4)O.V.P.<br>(5)NO LOAD (LOW LINE)<br>Ta:25°C                     | U2<br>(1)17.3V<br>(2)17.3V<br>(3)17.3V<br>(4)14.7V<br>(5)17.3V<br><br>U100<br>(1)15.1V<br>(2)15.1V<br>(3)13.5V<br>(4)18.1V<br>(5)15.3V |
| 9 | Clamp Diode Peak Voltage | D1 Rated :<br>650 V/ 1 A                                                  | AC ON/OFF<br>I/P : High-Line +3V = 267V<br>O/P : (1) Dynamic Load<br>90%Duty/1KHz<br>(2)Full load continue<br>Ta : 25°C                                      | (1) 465V<br>(2) 461V                                                                                                                   |

### SAFETY TEST

| NO | TEST ITEM            | SPECIFICATION                | TEST CONDITION                  | RESULT                               |
|----|----------------------|------------------------------|---------------------------------|--------------------------------------|
| 1  | WITHSTAND VOLTAGE    | I/P-O/P: 4KVAC/min           | I/P-O/P:4.4 KVAC/min<br>Ta:25°C | I/P-O/P:2.249mA<br>NO DAMAGE         |
| 2  | ISOLATION RESISTANCE | I/P-O/P:500VDC>100M $\Omega$ | I/P-O/P: 600 VDC<br>Ta:25°C     | I/P-O/P: 9999M $\Omega$<br>NO DAMAGE |

### E.M.C TEST

| NO | TEST ITEM                                                                                                                         | SPECIFICATION                                             | TEST CONDITION                                           | RESULT                                                                                |
|----|-----------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|----------------------------------------------------------|---------------------------------------------------------------------------------------|
| 1  | HARMONIC                                                                                                                          | EN61000-3-2<br>CLASS A                                    | I/P:230VAC/50HZ<br>O/P:FULL LOAD<br>Ta:25°C              | PASS                                                                                  |
| 2  | CONDUCTION                                                                                                                        | EN55011<br>CLASS B                                        | I/P : 230 VAC (50HZ)<br>O/P : FULL/50% LOAD<br>Ta : 25°C | PASS<br>Test by certified Lab                                                         |
| 3  | RADIATION                                                                                                                         | EN55011<br>CLASS B                                        | I/P : 230 VAC (50HZ)<br>O/P : FULL LOAD<br>Ta : 25°C     | PASS<br>Test by certified Lab                                                         |
| 4  | E.S.D                                                                                                                             | EN61000-4-2<br><u>MEDICAL</u><br>AIR: 15KV / Contact: 8KV | I/P : 230 VAC/50HZ<br>O/P : FULL LOAD<br>Ta : 25°C       | <input checked="" type="checkbox"/> CRITERIA A<br><input type="checkbox"/> CRITERIA B |
| 5  | E.F.T                                                                                                                             | EN61000-4-4<br>MEDICAL<br>INPUT : 2KV                     | I/P : 230 VAC/50HZ<br>O/P : FULL LOAD<br>Ta : 25°C       | <input checked="" type="checkbox"/> CRITERIA A<br><input type="checkbox"/> CRITERIA B |
| 6  | SURGE                                                                                                                             | IEC61000-4-5<br>MEDICAL<br>L-N : 1KV                      | I/P : 230 VAC/50HZ<br>O/P : FULL LOAD<br>Ta : 25°C       | <input checked="" type="checkbox"/> CRITERIA A<br><input type="checkbox"/> CRITERIA B |
| 7  | Test by certified Lab & Test Report Prepare<br>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                                             | <div>MODEL : MPM-45-48</div> <div>1. ROOM AMBIENT BURN-IN : 2 HRS</div> <div>I/P : 230VAC O/P : FULL LOAD Ta= 28 °C</div> <div>2. HIGH AMBIENT BURN-IN : 2 HRS</div> <div>I/P : 230VAC O/P : FULL LOAD Ta= 60.6°C</div> <table><tr><th>NO</th><th>Position</th><th>ROOM AMBIENT Ta= 28 °C</th><th>HIGH AMBIENT Ta=60.6 °C</th></tr><tr><td>1</td><td>RTH1</td><td>51.2°C</td><td>76.8°C</td></tr><tr><td>2</td><td>LF1</td><td>50°C</td><td>77.8°C</td></tr><tr><td>3</td><td>LF2</td><td>51.4°C</td><td>79.8°C</td></tr><tr><td>4</td><td>C1</td><td>49.9°C</td><td>78°C</td></tr><tr><td>5</td><td>BD1</td><td>53°C</td><td>81.5°C</td></tr><tr><td>6</td><td>C5</td><td>51.9°C</td><td>80.7°C</td></tr><tr><td>7</td><td>Q1</td><td>55.8°C</td><td>84.8°C</td></tr><tr><td>8</td><td>C11</td><td>55.1°C</td><td>80.4°C</td></tr><tr><td>9</td><td>RTH2</td><td>52.4°C</td><td>81.6°C</td></tr><tr><td>10</td><td>T1 coil</td><td>54.9°C</td><td>83.9°C</td></tr><tr><td>11</td><td>T1 core</td><td>54.1°C</td><td>83.1°C</td></tr><tr><td>12</td><td>Q100</td><td>55.6°C</td><td>84.7°C</td></tr><tr><td>13</td><td>C105</td><td>52.7°C</td><td>82°C</td></tr><tr><td>14</td><td>C106</td><td>47.8°C</td><td>77.3°C</td></tr><tr><td>15</td><td>C107</td><td>47.6°C</td><td>73.8°C</td></tr><tr><td>16</td><td>L100</td><td>46°C</td><td>75.8°C</td></tr><tr><td>17</td><td>R22</td><td>54°C</td><td>82.6°C</td></tr><tr><td>18</td><td>D1</td><td>52.8°C</td><td>82.8°C</td></tr><tr><td>19</td><td>U2</td><td>53.8°C</td><td>83°C</td></tr><tr><td>20</td><td>U3</td><td>49.5°C</td><td>79.8°C</td></tr><tr><td>21</td><td>R5</td><td>56.2°C</td><td>85.6°C</td></tr><tr><td>22</td><td>C8</td><td>54.5°C</td><td>83.9°C</td></tr><tr><td>23</td><td>R21</td><td>53.6°C</td><td>82.8°C</td></tr><tr><td>24</td><td>D2</td><td>54.4°C</td><td>84.5°C</td></tr><tr><td>25</td><td>R11</td><td>53.2°C</td><td>82.7°C</td></tr><tr><td>26</td><td>Q2</td><td>51.3°C</td><td>81°C</td></tr><tr><td>27</td><td>PCB</td><td>51.1°C</td><td>80.7°C</td></tr></table> |                                                                    |                        | NO | Position | ROOM AMBIENT Ta= 28 °C | HIGH AMBIENT Ta=60.6 °C | 1 | RTH1 | 51.2°C | 76.8°C | 2 | LF1 | 50°C | 77.8°C | 3 | LF2 | 51.4°C | 79.8°C | 4 | C1 | 49.9°C | 78°C | 5 | BD1 | 53°C | 81.5°C | 6 | C5 | 51.9°C | 80.7°C | 7 | Q1 | 55.8°C | 84.8°C | 8 | C11 | 55.1°C | 80.4°C | 9 | RTH2 | 52.4°C | 81.6°C | 10 | T1 coil | 54.9°C | 83.9°C | 11 | T1 core | 54.1°C | 83.1°C | 12 | Q100 | 55.6°C | 84.7°C | 13 | C105 | 52.7°C | 82°C | 14 | C106 | 47.8°C | 77.3°C | 15 | C107 | 47.6°C | 73.8°C | 16 | L100 | 46°C | 75.8°C | 17 | R22 | 54°C | 82.6°C | 18 | D1 | 52.8°C | 82.8°C | 19 | U2 | 53.8°C | 83°C | 20 | U3 | 49.5°C | 79.8°C | 21 | R5 | 56.2°C | 85.6°C | 22 | C8 | 54.5°C | 83.9°C | 23 | R21 | 53.6°C | 82.8°C | 24 | D2 | 54.4°C | 84.5°C | 25 | R11 | 53.2°C | 82.7°C | 26 | Q2 | 51.3°C | 81°C | 27 | PCB | 51.1°C | 80.7°C |
| NO | Position                                                          | ROOM AMBIENT Ta= 28 °C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | HIGH AMBIENT Ta=60.6 °C                                            |                        |    |          |                        |                         |   |      |        |        |   |     |      |        |   |     |        |        |   |    |        |      |   |     |      |        |   |    |        |        |   |    |        |        |   |     |        |        |   |      |        |        |    |         |        |        |    |         |        |        |    |      |        |        |    |      |        |      |    |      |        |        |    |      |        |        |    |      |      |        |    |     |      |        |    |    |        |        |    |    |        |      |    |    |        |        |    |    |        |        |    |    |        |        |    |     |        |        |    |    |        |        |    |     |        |        |    |    |        |      |    |     |        |        |
| 1  | RTH1                                                              | 51.2°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 76.8°C                                                             |                        |    |          |                        |                         |   |      |        |        |   |     |      |        |   |     |        |        |   |    |        |      |   |     |      |        |   |    |        |        |   |    |        |        |   |     |        |        |   |      |        |        |    |         |        |        |    |         |        |        |    |      |        |        |    |      |        |      |    |      |        |        |    |      |        |        |    |      |      |        |    |     |      |        |    |    |        |        |    |    |        |      |    |    |        |        |    |    |        |        |    |    |        |        |    |     |        |        |    |    |        |        |    |     |        |        |    |    |        |      |    |     |        |        |
| 2  | LF1                                                               | 50°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 77.8°C                                                             |                        |    |          |                        |                         |   |      |        |        |   |     |      |        |   |     |        |        |   |    |        |      |   |     |      |        |   |    |        |        |   |    |        |        |   |     |        |        |   |      |        |        |    |         |        |        |    |         |        |        |    |      |        |        |    |      |        |      |    |      |        |        |    |      |        |        |    |      |      |        |    |     |      |        |    |    |        |        |    |    |        |      |    |    |        |        |    |    |        |        |    |    |        |        |    |     |        |        |    |    |        |        |    |     |        |        |    |    |        |      |    |     |        |        |
| 3  | LF2                                                               | 51.4°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 79.8°C                                                             |                        |    |          |                        |                         |   |      |        |        |   |     |      |        |   |     |        |        |   |    |        |      |   |     |      |        |   |    |        |        |   |    |        |        |   |     |        |        |   |      |        |        |    |         |        |        |    |         |        |        |    |      |        |        |    |      |        |      |    |      |        |        |    |      |        |        |    |      |      |        |    |     |      |        |    |    |        |        |    |    |        |      |    |    |        |        |    |    |        |        |    |    |        |        |    |     |        |        |    |    |        |        |    |     |        |        |    |    |        |      |    |     |        |        |
| 4  | C1                                                                | 49.9°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 78°C                                                               |                        |    |          |                        |                         |   |      |        |        |   |     |      |        |   |     |        |        |   |    |        |      |   |     |      |        |   |    |        |        |   |    |        |        |   |     |        |        |   |      |        |        |    |         |        |        |    |         |        |        |    |      |        |        |    |      |        |      |    |      |        |        |    |      |        |        |    |      |      |        |    |     |      |        |    |    |        |        |    |    |        |      |    |    |        |        |    |    |        |        |    |    |        |        |    |     |        |        |    |    |        |        |    |     |        |        |    |    |        |      |    |     |        |        |
| 5  | BD1                                                               | 53°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 81.5°C                                                             |                        |    |          |                        |                         |   |      |        |        |   |     |      |        |   |     |        |        |   |    |        |      |   |     |      |        |   |    |        |        |   |    |        |        |   |     |        |        |   |      |        |        |    |         |        |        |    |         |        |        |    |      |        |        |    |      |        |      |    |      |        |        |    |      |        |        |    |      |      |        |    |     |      |        |    |    |        |        |    |    |        |      |    |    |        |        |    |    |        |        |    |    |        |        |    |     |        |        |    |    |        |        |    |     |        |        |    |    |        |      |    |     |        |        |
| 6  | C5                                                                | 51.9°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 80.7°C                                                             |                        |    |          |                        |                         |   |      |        |        |   |     |      |        |   |     |        |        |   |    |        |      |   |     |      |        |   |    |        |        |   |    |        |        |   |     |        |        |   |      |        |        |    |         |        |        |    |         |        |        |    |      |        |        |    |      |        |      |    |      |        |        |    |      |        |        |    |      |      |        |    |     |      |        |    |    |        |        |    |    |        |      |    |    |        |        |    |    |        |        |    |    |        |        |    |     |        |        |    |    |        |        |    |     |        |        |    |    |        |      |    |     |        |        |
| 7  | Q1                                                                | 55.8°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 84.8°C                                                             |                        |    |          |                        |                         |   |      |        |        |   |     |      |        |   |     |        |        |   |    |        |      |   |     |      |        |   |    |        |        |   |    |        |        |   |     |        |        |   |      |        |        |    |         |        |        |    |         |        |        |    |      |        |        |    |      |        |      |    |      |        |        |    |      |        |        |    |      |      |        |    |     |      |        |    |    |        |        |    |    |        |      |    |    |        |        |    |    |        |        |    |    |        |        |    |     |        |        |    |    |        |        |    |     |        |        |    |    |        |      |    |     |        |        |
| 8  | C11                                                               | 55.1°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 80.4°C                                                             |                        |    |          |                        |                         |   |      |        |        |   |     |      |        |   |     |        |        |   |    |        |      |   |     |      |        |   |    |        |        |   |    |        |        |   |     |        |        |   |      |        |        |    |         |        |        |    |         |        |        |    |      |        |        |    |      |        |      |    |      |        |        |    |      |        |        |    |      |      |        |    |     |      |        |    |    |        |        |    |    |        |      |    |    |        |        |    |    |        |        |    |    |        |        |    |     |        |        |    |    |        |        |    |     |        |        |    |    |        |      |    |     |        |        |
| 9  | RTH2                                                              | 52.4°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 81.6°C                                                             |                        |    |          |                        |                         |   |      |        |        |   |     |      |        |   |     |        |        |   |    |        |      |   |     |      |        |   |    |        |        |   |    |        |        |   |     |        |        |   |      |        |        |    |         |        |        |    |         |        |        |    |      |        |        |    |      |        |      |    |      |        |        |    |      |        |        |    |      |      |        |    |     |      |        |    |    |        |        |    |    |        |      |    |    |        |        |    |    |        |        |    |    |        |        |    |     |        |        |    |    |        |        |    |     |        |        |    |    |        |      |    |     |        |        |
| 10 | T1 coil                                                           | 54.9°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 83.9°C                                                             |                        |    |          |                        |                         |   |      |        |        |   |     |      |        |   |     |        |        |   |    |        |      |   |     |      |        |   |    |        |        |   |    |        |        |   |     |        |        |   |      |        |        |    |         |        |        |    |         |        |        |    |      |        |        |    |      |        |      |    |      |        |        |    |      |        |        |    |      |      |        |    |     |      |        |    |    |        |        |    |    |        |      |    |    |        |        |    |    |        |        |    |    |        |        |    |     |        |        |    |    |        |        |    |     |        |        |    |    |        |      |    |     |        |        |
| 11 | T1 core                                                           | 54.1°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 83.1°C                                                             |                        |    |          |                        |                         |   |      |        |        |   |     |      |        |   |     |        |        |   |    |        |      |   |     |      |        |   |    |        |        |   |    |        |        |   |     |        |        |   |      |        |        |    |         |        |        |    |         |        |        |    |      |        |        |    |      |        |      |    |      |        |        |    |      |        |        |    |      |      |        |    |     |      |        |    |    |        |        |    |    |        |      |    |    |        |        |    |    |        |        |    |    |        |        |    |     |        |        |    |    |        |        |    |     |        |        |    |    |        |      |    |     |        |        |
| 12 | Q100                                                              | 55.6°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 84.7°C                                                             |                        |    |          |                        |                         |   |      |        |        |   |     |      |        |   |     |        |        |   |    |        |      |   |     |      |        |   |    |        |        |   |    |        |        |   |     |        |        |   |      |        |        |    |         |        |        |    |         |        |        |    |      |        |        |    |      |        |      |    |      |        |        |    |      |        |        |    |      |      |        |    |     |      |        |    |    |        |        |    |    |        |      |    |    |        |        |    |    |        |        |    |    |        |        |    |     |        |        |    |    |        |        |    |     |        |        |    |    |        |      |    |     |        |        |
| 13 | C105                                                              | 52.7°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 82°C                                                               |                        |    |          |                        |                         |   |      |        |        |   |     |      |        |   |     |        |        |   |    |        |      |   |     |      |        |   |    |        |        |   |    |        |        |   |     |        |        |   |      |        |        |    |         |        |        |    |         |        |        |    |      |        |        |    |      |        |      |    |      |        |        |    |      |        |        |    |      |      |        |    |     |      |        |    |    |        |        |    |    |        |      |    |    |        |        |    |    |        |        |    |    |        |        |    |     |        |        |    |    |        |        |    |     |        |        |    |    |        |      |    |     |        |        |
| 14 | C106                                                              | 47.8°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 77.3°C                                                             |                        |    |          |                        |                         |   |      |        |        |   |     |      |        |   |     |        |        |   |    |        |      |   |     |      |        |   |    |        |        |   |    |        |        |   |     |        |        |   |      |        |        |    |         |        |        |    |         |        |        |    |      |        |        |    |      |        |      |    |      |        |        |    |      |        |        |    |      |      |        |    |     |      |        |    |    |        |        |    |    |        |      |    |    |        |        |    |    |        |        |    |    |        |        |    |     |        |        |    |    |        |        |    |     |        |        |    |    |        |      |    |     |        |        |
| 15 | C107                                                              | 47.6°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 73.8°C                                                             |                        |    |          |                        |                         |   |      |        |        |   |     |      |        |   |     |        |        |   |    |        |      |   |     |      |        |   |    |        |        |   |    |        |        |   |     |        |        |   |      |        |        |    |         |        |        |    |         |        |        |    |      |        |        |    |      |        |      |    |      |        |        |    |      |        |        |    |      |      |        |    |     |      |        |    |    |        |        |    |    |        |      |    |    |        |        |    |    |        |        |    |    |        |        |    |     |        |        |    |    |        |        |    |     |        |        |    |    |        |      |    |     |        |        |
| 16 | L100                                                              | 46°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 75.8°C                                                             |                        |    |          |                        |                         |   |      |        |        |   |     |      |        |   |     |        |        |   |    |        |      |   |     |      |        |   |    |        |        |   |    |        |        |   |     |        |        |   |      |        |        |    |         |        |        |    |         |        |        |    |      |        |        |    |      |        |      |    |      |        |        |    |      |        |        |    |      |      |        |    |     |      |        |    |    |        |        |    |    |        |      |    |    |        |        |    |    |        |        |    |    |        |        |    |     |        |        |    |    |        |        |    |     |        |        |    |    |        |      |    |     |        |        |
| 17 | R22                                                               | 54°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 82.6°C                                                             |                        |    |          |                        |                         |   |      |        |        |   |     |      |        |   |     |        |        |   |    |        |      |   |     |      |        |   |    |        |        |   |    |        |        |   |     |        |        |   |      |        |        |    |         |        |        |    |         |        |        |    |      |        |        |    |      |        |      |    |      |        |        |    |      |        |        |    |      |      |        |    |     |      |        |    |    |        |        |    |    |        |      |    |    |        |        |    |    |        |        |    |    |        |        |    |     |        |        |    |    |        |        |    |     |        |        |    |    |        |      |    |     |        |        |
| 18 | D1                                                                | 52.8°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 82.8°C                                                             |                        |    |          |                        |                         |   |      |        |        |   |     |      |        |   |     |        |        |   |    |        |      |   |     |      |        |   |    |        |        |   |    |        |        |   |     |        |        |   |      |        |        |    |         |        |        |    |         |        |        |    |      |        |        |    |      |        |      |    |      |        |        |    |      |        |        |    |      |      |        |    |     |      |        |    |    |        |        |    |    |        |      |    |    |        |        |    |    |        |        |    |    |        |        |    |     |        |        |    |    |        |        |    |     |        |        |    |    |        |      |    |     |        |        |
| 19 | U2                                                                | 53.8°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 83°C                                                               |                        |    |          |                        |                         |   |      |        |        |   |     |      |        |   |     |        |        |   |    |        |      |   |     |      |        |   |    |        |        |   |    |        |        |   |     |        |        |   |      |        |        |    |         |        |        |    |         |        |        |    |      |        |        |    |      |        |      |    |      |        |        |    |      |        |        |    |      |      |        |    |     |      |        |    |    |        |        |    |    |        |      |    |    |        |        |    |    |        |        |    |    |        |        |    |     |        |        |    |    |        |        |    |     |        |        |    |    |        |      |    |     |        |        |
| 20 | U3                                                                | 49.5°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 79.8°C                                                             |                        |    |          |                        |                         |   |      |        |        |   |     |      |        |   |     |        |        |   |    |        |      |   |     |      |        |   |    |        |        |   |    |        |        |   |     |        |        |   |      |        |        |    |         |        |        |    |         |        |        |    |      |        |        |    |      |        |      |    |      |        |        |    |      |        |        |    |      |      |        |    |     |      |        |    |    |        |        |    |    |        |      |    |    |        |        |    |    |        |        |    |    |        |        |    |     |        |        |    |    |        |        |    |     |        |        |    |    |        |      |    |     |        |        |
| 21 | R5                                                                | 56.2°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 85.6°C                                                             |                        |    |          |                        |                         |   |      |        |        |   |     |      |        |   |     |        |        |   |    |        |      |   |     |      |        |   |    |        |        |   |    |        |        |   |     |        |        |   |      |        |        |    |         |        |        |    |         |        |        |    |      |        |        |    |      |        |      |    |      |        |        |    |      |        |        |    |      |      |        |    |     |      |        |    |    |        |        |    |    |        |      |    |    |        |        |    |    |        |        |    |    |        |        |    |     |        |        |    |    |        |        |    |     |        |        |    |    |        |      |    |     |        |        |
| 22 | C8                                                                | 54.5°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 83.9°C                                                             |                        |    |          |                        |                         |   |      |        |        |   |     |      |        |   |     |        |        |   |    |        |      |   |     |      |        |   |    |        |        |   |    |        |        |   |     |        |        |   |      |        |        |    |         |        |        |    |         |        |        |    |      |        |        |    |      |        |      |    |      |        |        |    |      |        |        |    |      |      |        |    |     |      |        |    |    |        |        |    |    |        |      |    |    |        |        |    |    |        |        |    |    |        |        |    |     |        |        |    |    |        |        |    |     |        |        |    |    |        |      |    |     |        |        |
| 23 | R21                                                               | 53.6°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 82.8°C                                                             |                        |    |          |                        |                         |   |      |        |        |   |     |      |        |   |     |        |        |   |    |        |      |   |     |      |        |   |    |        |        |   |    |        |        |   |     |        |        |   |      |        |        |    |         |        |        |    |         |        |        |    |      |        |        |    |      |        |      |    |      |        |        |    |      |        |        |    |      |      |        |    |     |      |        |    |    |        |        |    |    |        |      |    |    |        |        |    |    |        |        |    |    |        |        |    |     |        |        |    |    |        |        |    |     |        |        |    |    |        |      |    |     |        |        |
| 24 | D2                                                                | 54.4°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 84.5°C                                                             |                        |    |          |                        |                         |   |      |        |        |   |     |      |        |   |     |        |        |   |    |        |      |   |     |      |        |   |    |        |        |   |    |        |        |   |     |        |        |   |      |        |        |    |         |        |        |    |         |        |        |    |      |        |        |    |      |        |      |    |      |        |        |    |      |        |        |    |      |      |        |    |     |      |        |    |    |        |        |    |    |        |      |    |    |        |        |    |    |        |        |    |    |        |        |    |     |        |        |    |    |        |        |    |     |        |        |    |    |        |      |    |     |        |        |
| 25 | R11                                                               | 53.2°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 82.7°C                                                             |                        |    |          |                        |                         |   |      |        |        |   |     |      |        |   |     |        |        |   |    |        |      |   |     |      |        |   |    |        |        |   |    |        |        |   |     |        |        |   |      |        |        |    |         |        |        |    |         |        |        |    |      |        |        |    |      |        |      |    |      |        |        |    |      |        |        |    |      |      |        |    |     |      |        |    |    |        |        |    |    |        |      |    |    |        |        |    |    |        |        |    |    |        |        |    |     |        |        |    |    |        |        |    |     |        |        |    |    |        |      |    |     |        |        |
| 26 | Q2                                                                | 51.3°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 81°C                                                               |                        |    |          |                        |                         |   |      |        |        |   |     |      |        |   |     |        |        |   |    |        |      |   |     |      |        |   |    |        |        |   |    |        |        |   |     |        |        |   |      |        |        |    |         |        |        |    |         |        |        |    |      |        |        |    |      |        |      |    |      |        |        |    |      |        |        |    |      |      |        |    |     |      |        |    |    |        |        |    |    |        |      |    |    |        |        |    |    |        |        |    |    |        |        |    |     |        |        |    |    |        |        |    |     |        |        |    |    |        |      |    |     |        |        |
| 27 | PCB                                                               | 51.1°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 80.7°C                                                             |                        |    |          |                        |                         |   |      |        |        |   |     |      |        |   |     |        |        |   |    |        |      |   |     |      |        |   |    |        |        |   |    |        |        |   |     |        |        |   |      |        |        |    |         |        |        |    |         |        |        |    |      |        |        |    |      |        |      |    |      |        |        |    |      |        |        |    |      |      |        |    |     |      |        |    |    |        |        |    |    |        |      |    |    |        |        |    |    |        |        |    |    |        |        |    |     |        |        |    |    |        |        |    |     |        |        |    |    |        |      |    |     |        |        |
| 2  | OVER LOAD BURN-IN TEST                                            | NO DAMAGE<br>1 HOUR ( MIN )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | I/P : 230 VAC<br>O/P : 134 % LOAD<br>Ta : 25°C                     | TEST : OK              |    |          |                        |                         |   |      |        |        |   |     |      |        |   |     |        |        |   |    |        |      |   |     |      |        |   |    |        |        |   |    |        |        |   |     |        |        |   |      |        |        |    |         |        |        |    |         |        |        |    |      |        |        |    |      |        |      |    |      |        |        |    |      |        |        |    |      |      |        |    |     |      |        |    |    |        |        |    |    |        |      |    |    |        |        |    |    |        |        |    |    |        |        |    |     |        |        |    |    |        |        |    |     |        |        |    |    |        |      |    |     |        |        |
| 3  | LOW TEMPERATURE<br>TURN ON TEST                                   | TURN ON AFTER 2 HOUR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | I/P : 264VAC/100VAC<br>O/P : 100 % LOAD<br>Ta= -35 °C              | TEST : OK              |    |          |                        |                         |   |      |        |        |   |     |      |        |   |     |        |        |   |    |        |      |   |     |      |        |   |    |        |        |   |    |        |        |   |     |        |        |   |      |        |        |    |         |        |        |    |         |        |        |    |      |        |        |    |      |        |      |    |      |        |        |    |      |        |        |    |      |      |        |    |     |      |        |    |    |        |        |    |    |        |      |    |    |        |        |    |    |        |        |    |    |        |        |    |     |        |        |    |    |        |        |    |     |        |        |    |    |        |      |    |     |        |        |
| 4  | HIGH HUMIDITY<br>HIGH TEMPERATURE<br>HIGH VOLTAGE<br>TURN ON TEST | AFTER 12 HOURS<br>IN CHAMBER ON<br>CONTROL 60 °C /95 %R.H<br>NO DAMAGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | I/P : 272 VAC<br>O/P : FULL LOAD<br>Ta= 60 °C<br>HUMIDITY= 95 %R.H | TEST : OK              |    |          |                        |                         |   |      |        |        |   |     |      |        |   |     |        |        |   |    |        |      |   |     |      |        |   |    |        |        |   |    |        |        |   |     |        |        |   |      |        |        |    |         |        |        |    |         |        |        |    |      |        |        |    |      |        |      |    |      |        |        |    |      |        |        |    |      |      |        |    |     |      |        |    |    |        |        |    |    |        |      |    |    |        |        |    |    |        |        |    |    |        |        |    |     |        |        |    |    |        |        |    |     |        |        |    |    |        |      |    |     |        |        |
| 5  | TEMPERATURE<br>COEFFICIENT                                        | ± 0.03 %/°C (0~50°C)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | I/P : 230 VAC<br>O/P : FULL LOAD                                   | ± 0.0116 %/°C (0~50°C) |    |          |                        |                         |   |      |        |        |   |     |      |        |   |     |        |        |   |    |        |      |   |     |      |        |   |    |        |        |   |    |        |        |   |     |        |        |   |      |        |        |    |         |        |        |    |         |        |        |    |      |        |        |    |      |        |      |    |      |        |        |    |      |        |        |    |      |      |        |    |     |      |        |    |    |        |        |    |    |        |      |    |    |        |        |    |    |        |        |    |    |        |        |    |     |        |        |    |    |        |        |    |     |        |        |    |    |        |      |    |     |        |        |

|    |                          |                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                            |                                                                   |
|----|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|
|    |                          |                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                            |                                                                   |
| 6  | STORAGE TEMPERATURE TEST | -40~85℃                                                                                                                                                                                                                                                               | 1. Thermal shock Temperature : -45℃~ +90℃<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 : STATIC                                                                                        |                                                                   |
| 7  | THERMAL SHOCK TEST       | -30~60℃                                                                                                                                                                                                                                                               | 1. Thermal shock Temperature : -35℃~ +65℃<br>2. Temperature change rate : 25℃ / MIN<br>3. Dwell time low and high temperature : 30 MIN/EACH<br>4. Total test cycle : 16 CYCLE<br>5. Input/Output condition :<br>15cycle:230V/ FULL LOAD AC ON 3sec/AC OFF 1sec TEST<br>1cycle:230V/ FULL LOAD Burn In Test |                                                                   |
| 8  | VIBRATION TEST           | 10 ~ 500Hz, 2G 10min./1cycle, 60min. each along X, Y, Z axes                                                                                                                                                                                                          | 1 Carton & 1 Set<br>(1) Waveform : Sine Wave<br>(2) Frequency : 10~500Hz<br>(3) Sweep Time : 10min/sweep cycle<br>(4) Acceleration : 3G<br>(5) Test Time : 180min in each axis (X.Y.Z)<br>(6) Ta : 25℃                                                                                                     |                                                                   |
| 9  | CAPACITOR LIFE CYCLE     | SUPPOSE C105 IS THE MOST CRITICAL COMPONENT<br>(1) I/P : 230VAC O/P : FULL LOAD Ta= 25 ℃ LIFE TIME<br>(2) I/P : 230VAC O/P : FULL LOAD Ta= 60 ℃ LIFE TIME<br>(3) I/P : 230VAC O/P : 75% LOAD Ta= 60 ℃ LIFE TIME<br>(4) I/P : 230VAC O/P : 50% LOAD Ta= 60 ℃ LIFE TIME |                                                                                                                                                                                                                                                                                                            | (1) 463228 HRS<br>(2) 51508 HRS<br>(3) 68503 HRS<br>(4) 94082 HRS |
| 10 | MTBF                     | Conducted by Parts Stress Analysis Prediction<br>563.44K hrs min. MIL-HDBK-217F (25℃); 1530.14 K hrs min.Telcordia TR/SR-332 (Bellcore) (25℃)                                                                                                                         |                                                                                                                                                                                                                                                                                                            |                                                                   |
| 11 | Ongoing Reliability Test | I/P : 230VAC O/P : FULL LOAD TA=50℃<br>Demonstration Mean Time Between Failure : 30,000 hours                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                            |                                                                   |

| TEST RESULT | TESTER | REVIEW | APPROVAL |
|-------------|--------|--------|----------|
| PASS        | LIUTT  |        | Wangdz   |

2018.4.30 GP-A50-F010