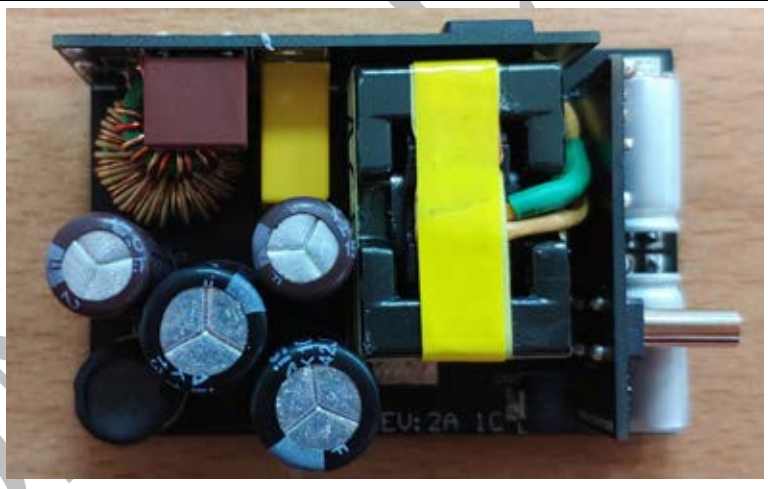
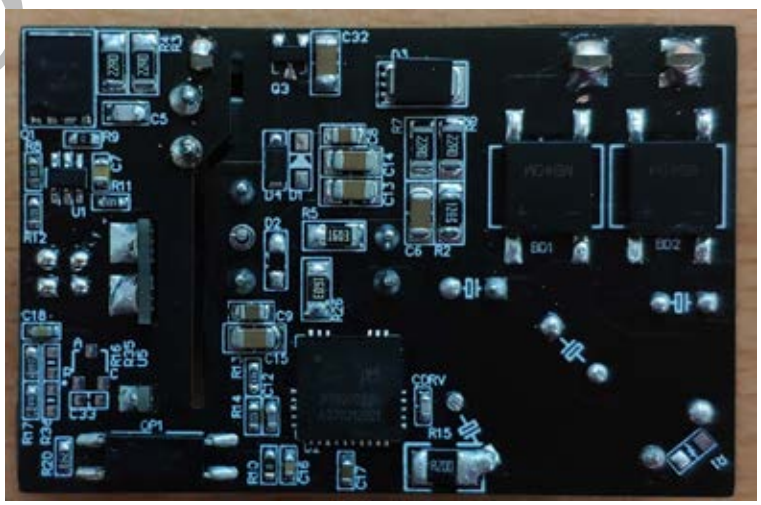
# JP8020 Evaluation Board: 65W USB_PD Module

## Operating Conditions

| Parameter | Value |
|---|---|
| Input Voltage Range | 100~240 Vac |
| Input Frequency Range | 60/50 Hz |
| Output Voltage @ PD FOR TYPE C<br>Output Current @ PD FOR TYPE C | 5/9/12/15/20V<br>3A/3A/3A/3.25A |
| Max. Output Wattage | 65W |
| Operating Temperature | -- |
| **Performance** | |
| No-Load / Stand-by Power Consumption 230Vac/50Hz | < 75mW |
| Meet EN55022 CLASS B EMI | |
| Meets DOE6 and CoC V Tier 2 | |
| Power density using GaN switch 22.89 W / inch3 without enclosure | |



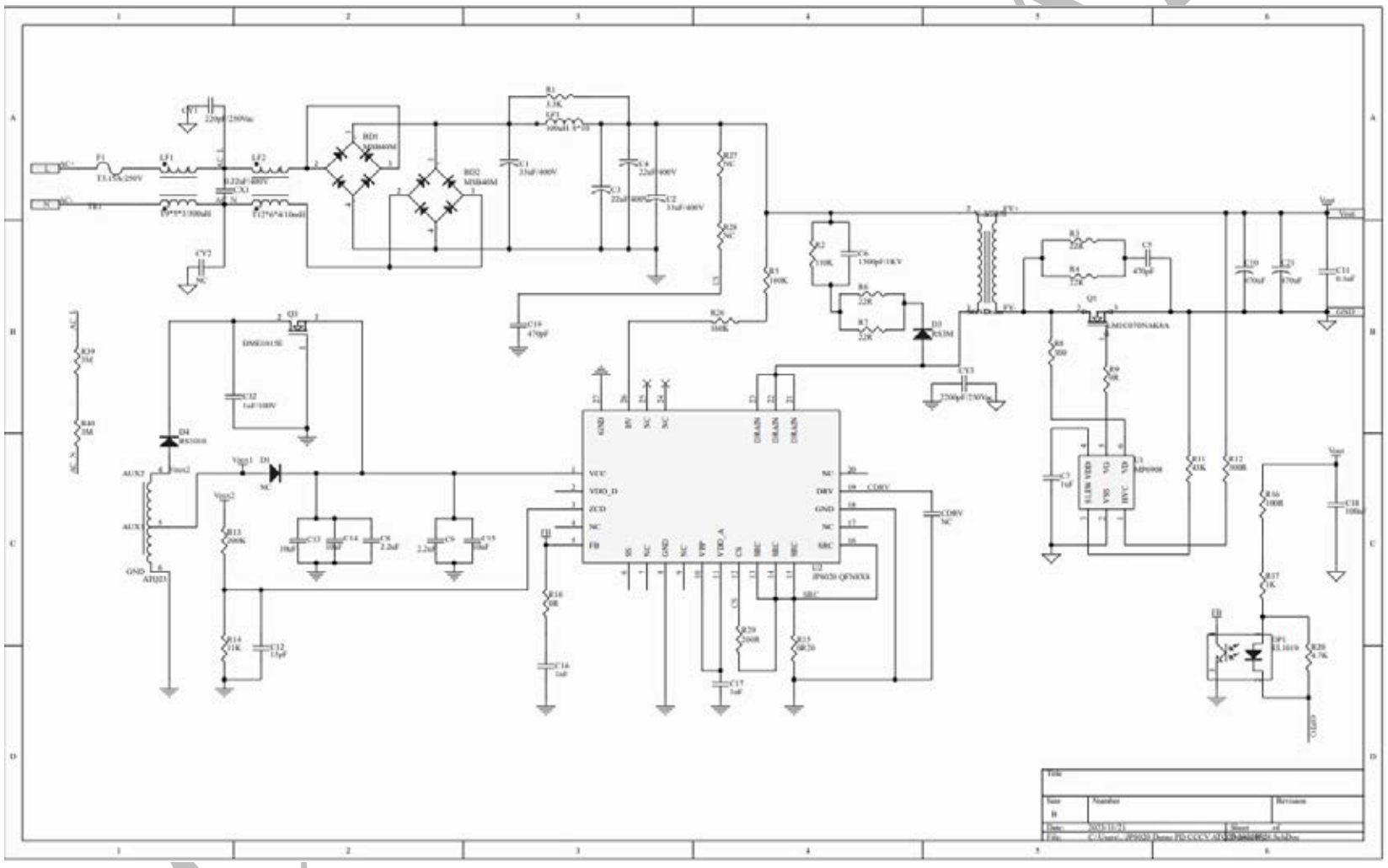


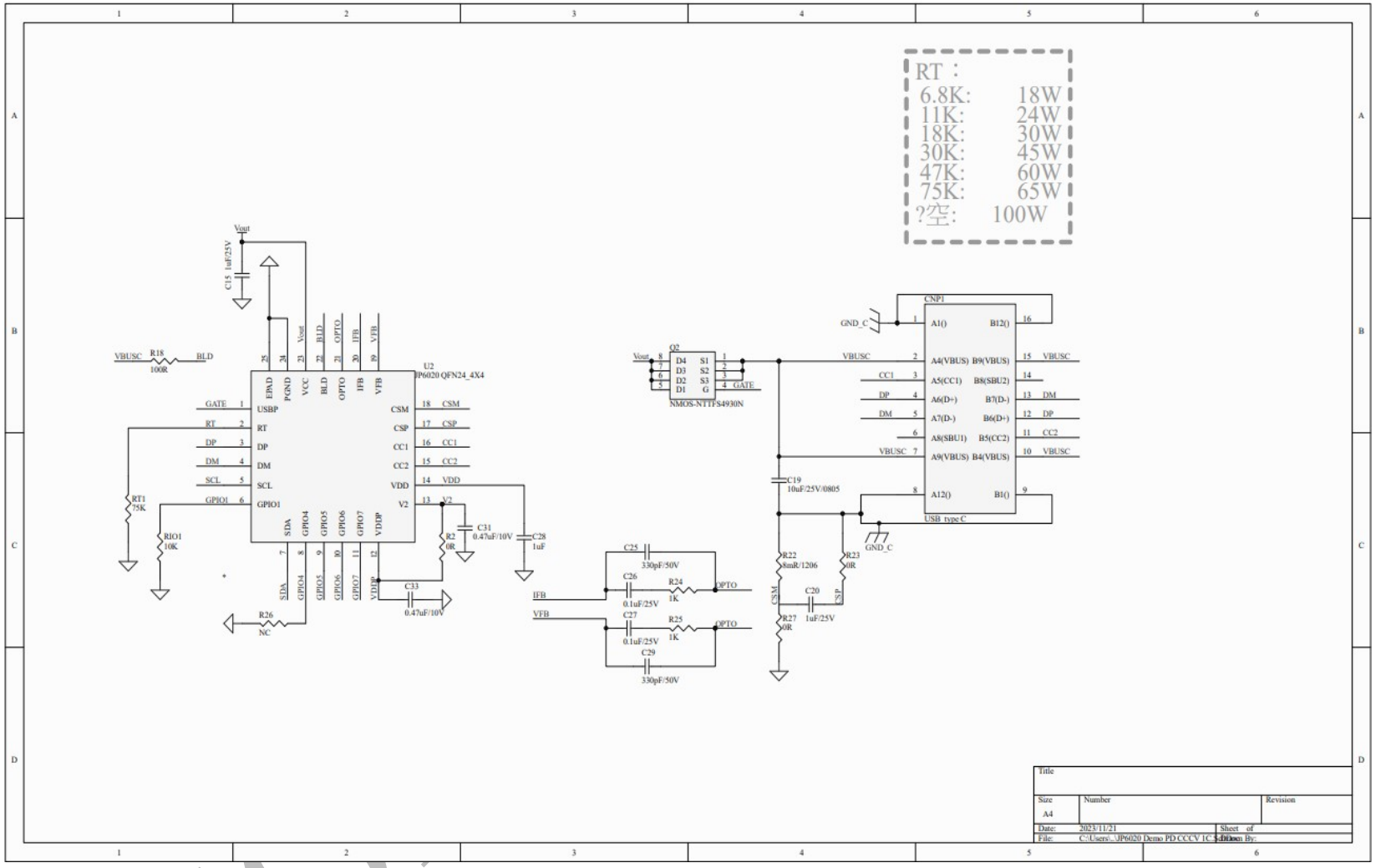
# Power Supply Specification

| Description | Symbol | Min | Typ | Max | Units | Comment/Conditions |
|---|---|---|---|---|---|---|
| **INPUT** | | | | | | |
| Voltage | VIN | 100 | | 240 | VAC | 2 Wire, no P.E |
| Frequency | fLINE | 47 | 50/60 | 63 | Hz | |
| No-load Input Power | PIN | | | 75 | mW | Input 230 VAC |
| **OUTPUT** | | | | | | |
| Output Voltage(5V) | | | 5 | | V | Measured at the End of PCB |
| Output Current(5V) | | | 3 | | A | |
| Output Ripple Voltage(5V) | | | | 300 | mV | |
| Output Voltage(9V) | | | 9 | | V | Measured at the End of PCB |
| Output Current(9V) | | | 3 | | A | |
| Output Ripple Voltage(9V) | | | | 300 | mV | |
| Output Voltage(12V) | | | 12 | | V | Measured at the End of PCB |
| Output Current(12V) | | | 3 | | A | |
| Output Ripple Voltage(12V) | | | | 300 | mV | |
| Output Voltage(15V) | | | 15 | | V | Measured at the End of PCB |
| Output Current(15V) | | | 3 | | A | |
| Output Ripple Voltage(15V) | | | | 300 | mV | |
| Output Voltage(20V) | | | 20 | | V | Measured at the End of PCB |
| Output Current(20V) | | | 3.25 | | A | |
| Output Ripple Voltage(20V) | | | | 300 | mV | |
| Continuous Output Power | | | 65 | | W | |
| Average Efficiency | $\eta$ | | | | | |
| Ambient Temperature | TAMB | 0 | | 40 | ℃ | |

# 1 Application Circuit

65W Demo Board Schematic




RT :
6.8K: 18W
11K: 24W
18K: 30W
30K: 45W
47K: 60W
75K: 65W
?空: 100W
U2
JP6020 QFN24_4X4
CNP1
USB type-C
Q2
NMOS-NTTFS4930N
Title
Size
A4
Number
Revision
Date: 2023/11/21
File: C:\Users\..\JP6020 Demo PD CCCV 1C 5.DDB
Sheet of
Drawn By:

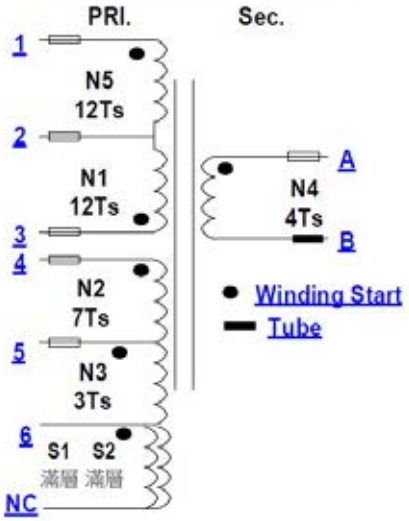
# 2 BOM

| POSITION | ITEM DESCRIPTION | Footprint | QTY |
|---|---|---|---|
| BD1, BD2 | DI208S | BRIDGE_DBS | 2 |
| C12 | 晶片電容 15pF/25V/X7R | C0603 | 1 |
| C16 | 晶片電容 1nF/25V/X7R | C0603 | 1 |
| C18 | 晶片電容 0.1uF/25V/X7R | C0603 | 1 |
| C7, C17, C28 | 晶片電容 1uF/50V/X7R | C0603 | 3 |
| C11 | 晶片電容 0.1uF/50V/X7R | C0805 | 1 |
| C5 | 晶片電容 1000pF/200V/X7R | C0805 | 1 |
| C30 | 晶片電容 1uF/25V/X5R | C0805 | 1 |
| C8, C9 | 晶片電容 2.2uF/50V/X7R | C0805 | 2 |
| C13, C14 | 晶片電容 10uF/50V/X5R | C1206 | 2 |
| C32 | 晶片電容 1uF/100V | C1206 | 1 |
| C6 | 晶片電容 1500pF/1KV | C1206 | 1 |
| CX1 | X2 電容 0.22UF/275VAC/X2 ±10%, 15mm LS | CAP_X2_6*13 | 1 |
| CY1 | Y 電容 220pF/400V TRX-SMD | CAP-Y-7R8x5R4 | 1 |
| CY3 | Y 電容 2200pF/400V TRX-SMD | CAY_Y_4*10 | 1 |
| C1, C2 | 電解電容., 33uF/400V,105℃ 10*20 | CEC10_V_P5 | 2 |
| C3, C4 | 電解電容., 22uF/400V,105℃ 8*16 | CEC16_8_3.5 | 2 |
| C10, C21 | 電解電容., 470uF/25V,105℃ 8*15 | CEC6.3X14_H_P2.5 | 2 |
| D1 | 二極體 SMD 1000V 1A P/N: GS1010 | D_SOD-123_JL | 1 |
| D2 | 二極體 SMD 1N4148 | 1206(D) | 1 |
| D3 | 二極體 SMD 1000V 3A P/N: RS3M | D_DO-214 | 1 |
| D4 | 二極體 SMD 1000V 1A P/N: RS1010 | D_SOD-123_JL | 1 |
| F1 | 保險絲 3.15A 300V 4X8.3_V_P5.24 | FUSE_4X8.3_V_P5.24 | 1 |
| LF1 | LINE FILTER 330uH | L-Chock_9X5X3 | 1 |
| LF2 | LINE FILTER 6mH | L-CHOKE_10X6X4 | 1 |
| LF3 | L=100uH | DR 8X10 | 1 |
| OP1 | 光耦合器 EL1019 SMD | PHOTO_SMD | 1 |
| Q1 | MOSFET N-CH,FDMS86202ET120 120V102A | PG-TDSON-8 | 1 |
| Q3 | MOSFET N-CH,DMZ1015E 100V0.1A | SOT-23 | 1 |
| R8, R12 | 晶片電阻 1% 300Ω | R0603 | 2 |
| R9, R10, | 晶片電阻 1% 0Ω | R0603 | 2 |
| R11 | 晶片電阻 1% 43KΩ | R0603 | 1 |
| R13 | 晶片電阻 1% 200K | R0603 | 1 |
| R14 | 晶片電阻 1% 11K | R0603 | 1 |
| R16 | 晶片電阻 1% 100Ω | R0603 | 1 |
| R17 | 晶片電阻 1% 1K | R0603 | 1 |
| R19 | 晶片電阻 1% 36K | R0603 | 1 |
| R20 | 晶片電阻 1% 4.7K | R0603 | 1 |
| R21 | 晶片電阻 1% 100K | R0603 | 1 |

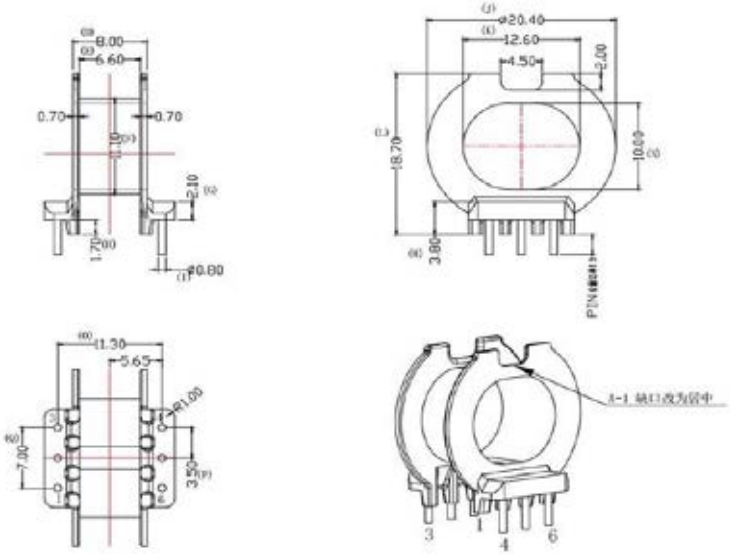
| | | | |
|---|---|---|---|
| R1 | 晶片電阻 1% 3.3K | R0805 | 1 |
| R3, R4 | 晶片電阻 1% 22Ω | R1206 | 2 |
| R5, R26 | 晶片電阻 1% 160K | R1206 | 2 |
| R2 | 晶片電阻 1% 110K | R1206 | 1 |
| R6, R7 | 晶片電阻 1% 30Ω | R1206 | 2 |
| R39, R40 | 晶片電阻 1% 1.5MΩ | R1206 | 2 |
| R15 | 晶片電阻 1% 0.18Ω | R1210 | 1 |
| TR1 | 變壓器 ATQ23.7 | T_ATQ23 | 1 |
| U1 | SR IC MP6908 | SOT-26 | 1 |
| U2 | PWM IC JP8020 | QFN-26_8X8 | 1 |
| **單 C 口小卡 BOM** | | | |
| RT1 | 晶片電阻 1% 75K | R0603 | 1 |
| RIO1 | 晶片電阻 1% 10K | R0603 | 1 |
| C31, C33 | 晶片電容 0.47uF/10V/X7R | C0603 | 2 |
| U2 | JP6020 | QFN24-4X4 | 1 |
| Q2 | MOSFET N-CH,NTTFS4930N 30V23A | WDFN8_3.3X3.3 | 1 |
| R2, R23 | 晶片電阻 1% 0Ω | R0603 | 2 |
| R18 | 晶片電阻 1% 100Ω | R0603 | 1 |
| C26 , C27 | 晶片電容 0.1uF/25V/X7R | C0603 | 2 |
| C25, C29 | 晶片電容 330pF/25V/X7R | C0603 | 2 |
| R24, R25 | 晶片電阻 1% 1K | R0603 | 2 |
| C15 | 晶片電容 1uF/25V/X7R | C0603 | 1 |
| R22 | 合金電阻 8mΩ 1% | R1206 | 1 |
| C19 | 晶片電容 10uF/25V/X5R | C0805 | 1 |
| CNP1 | CU18S19S_TYPEC-16PIN | USB_Type-C 16PIN SMT L=10.0 | 1 |
| C20 | 晶片電容 1uF/25V/X7R | C0603 | 1 |

# 3 Transformer Specification

變壓器示意圖




* A及B 飛線長度30mm



變壓器結構說明

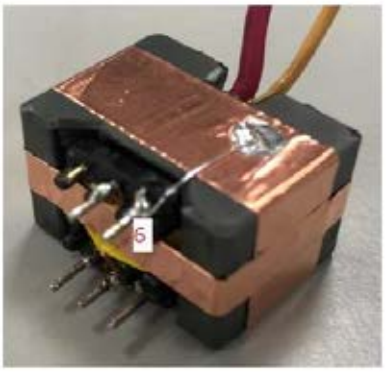
| Step | Winding No. | Start | End | Wire Diameter | Turns | Winding | Tube |
|---|---|---|---|---|---|---|---|
| 1 | N1 | 3 | 1 | 2UEW, 0.1mm x 10 | 12 | 1 layers, 密繞 | YES |
| 2 | N2 | 4 | 5 | 2UEW, 0.13mm x 2 | 7 | 1 layers, 密繞 | YES |
| 3 | N3 | 5 | 6 | 2UEW, 0.13mm x 2 | 3 | 1 layers, 密繞 | YES |
| 4 | S1 | 6 | NC | 2UEW, 0.13mm x 1 | 剩餘滿層 | 1 layers, 密繞 | YES |
| 5 | N4 | A | B | 三層絕緣線, 0.1mm x 100 | 4 | 1 layers, 密繞 | YES |
| 6 | S2 | 6 | NC | 2UEW, 0.13mm x 1 | 滿層 | 1 layers, 密繞 | YES |
| 7 | N5 | 1 | 2 | 2UEW, 0.1mm x 10 | 12 | 1 layers, 密繞 | YES |

繞線結構說明

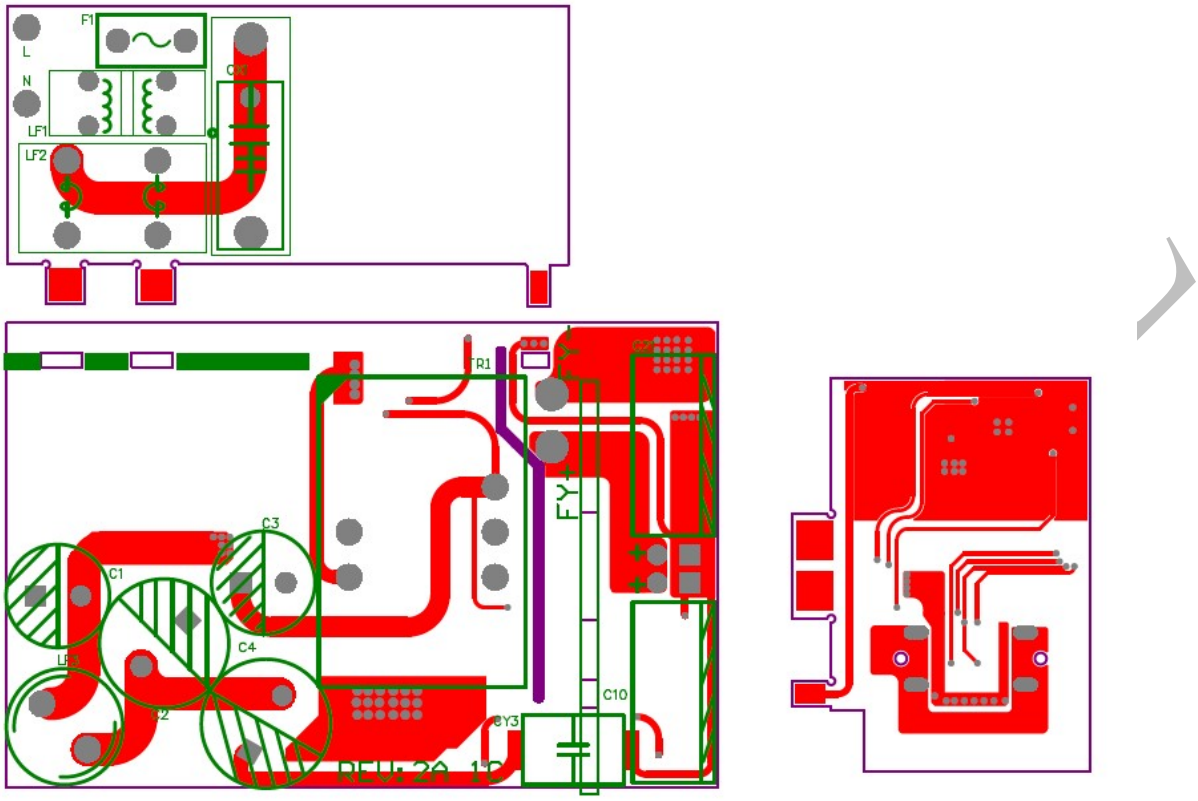

註
變壓器外層須包覆十字銅箔, 並出引線至PIN6
下圖為參考圖面

變壓器電氣特性

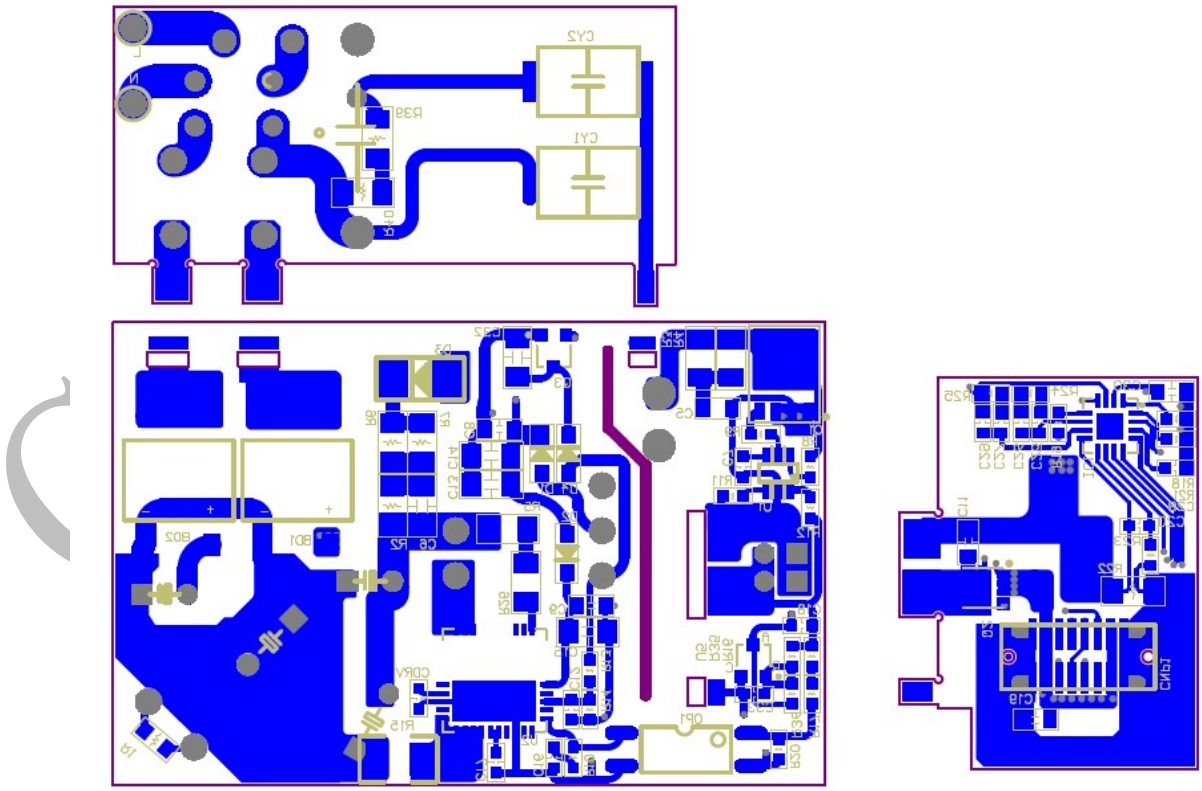
| Parameter | Condition | Value |
|---|---|---|
| Primary Inductance | Lp(3-2) | 200uH |
| Leakage Inductance | Lk(3-2) | 6uH, max |
| Core | ATQ23 | N95 |
| Bobbin | ATQ23 | 3pin + 3pin |



# 4 **PCB Layout** (Note: Not in Scale)




Top View of PCB



Bottom View of PCB

# 5 Performance Evaluation

## 5.1 Standby Power

| | PIN | SPEC |
|---|---|---|
| 230V/50HZ | 47.6mW | <75mW |

## 5.2 System efficiency

**Vout @ PCB end**
**@115Vac/60Hz**

| 5V | | | | | | |
|---|---|---|---|---|---|---|
| 115V 60Hz | PI | VO | IO | EFF | AVG | DOE 6 Spec |
| 25% | 4.28 | 5.17 | 0.75 | 90.74% | 91.63% | 81.39% |
| 50% | 8.52 | 5.2 | 1.5 | 91.66% | | |
| 75% | 12.78 | 5.25 | 2.25 | 92.36% | | |
| 100% | 17.2 | 5.26 | 3 | 91.77% | | |

| 9V | | | | | | |
|---|---|---|---|---|---|---|
| 115V 60Hz | PI | VO | IO | EFF | AVG | DOE 6 Spec |
| 25% | 7.52 | 9.17 | 0.75 | 91.52% | 92.05% | 86.62% |
| 50% | 15 | 9.2 | 1.5 | 91.98% | | |
| 75% | 22.59 | 9.27 | 2.25 | 92.35% | | |
| 100% | 30.17 | 9.29 | 3 | 92.38% | | |

| 12V | | | | | | |
|---|---|---|---|---|---|---|
| 115V 60Hz | PI | VO | IO | EFF | AVG | DOE 6 Spec |
| 25% | 10.18 | 12.3 | 0.75 | 90.62% | 91.65% | 87.40% |
| 50% | 20.09 | 12.35 | 1.5 | 92.2% | | |
| 75% | 30.24 | 12.41 | 2.25 | 92.34% | | |
| 100% | 40.78 | 12.43 | 3 | 91.44% | | |

| 15V | | | | | | |
|---|---|---|---|---|---|---|
| 115V 60Hz | PI | VO | IO | EFF | AVG | DOE 6 Spec |
| 25% | 13.27 | 15.4 | 0.75 | 87.04% | 90.19% | 87.73% |
| 50% | 25.68 | 15.46 | 1.5 | 90.3% | | |
| 75% | 38.16 | 15.51 | 2.25 | 91.45% | | |
| 100% | 50.66 | 15.53 | 3 | 91.97% | | |

| 20V | | | | | | |
|---|---|---|---|---|---|---|
| 115V 60Hz | PI | VO | IO | EFF | AVG | DOE 6 Spec |

| | | | | | | |
|---|---|---|---|---|---|---|
| 25% | 18.92 | 20.6 | 0.81 | 88.41% | 90.93% | 88.00% |
| 50% | 37.1 | 20.66 | 1.63 | 90.99% | | |
| 75% | 54.84 | 20.72 | 2.43 | 91.81% | | |
| 100% | 72.93 | 20.76 | 3.25 | 92.51% | | |

**@230Vac/50Hz**

| 5V | | | | | | |
|---|---|---|---|---|---|---|
| 230V 50Hz | PI | VO | | EFF | AVG | DOE 6 Spec |
| 25% | 4.46 | 5.17 | 0.75 | 86.91% | 88.61% | 81.39% |
| 50% | 8.87 | 5.19 | 1.5 | 87.84% | | |
| 75% | 13.18 | 5.24 | 2.25 | 89.38% | | |
| 100% | 17.44 | 5.25 | 3 | 90.34% | | |
| | | | | | | |
| 9V | | | | | | |
| 230V 50Hz | PI | VO | IO | EFF | AVG | DOE 6 Spec |
| 25% | 7.83 | 9.16 | 0.75 | 87.71% | 89.43% | 86.62% |
| 50% | 15.44 | 9.21 | 1.5 | 89.48% | | |
| 75% | 23.17 | 9.26 | 2.25 | 89.91% | | |
| 100% | 30.68 | 9.27 | 3 | 91.63% | | |
| | | | | | | |
| 12V | | | | | | |
| 230V 50Hz | PI | VO | IO | EFF | AVG | DOE 6 Spec |
| 25% | 10.47 | 12.31 | 0.75 | 88.16% | 90.03% | 87.40% |
| 50% | 20.72 | 12.35 | 1.5 | 89.4% | | |
| 75% | 30.77 | 12.41 | 2.25 | 90.75% | | |
| 100% | 40.84 | 12.5 | 3 | 91.83% | | |
| | | | | | | |
| 15V | | | | | | |
| 230V 50Hz | PI | VO | IO | EFF | AVG | DOE 6 Spec |
| 25% | 13.16 | 15.5 | 0.75 | 88.34% | 90.74% | 87.73% |
| 50% | 25.75 | 15.55 | 1.5 | 90.58% | | |
| 75% | 38.31 | 15.62 | 2.23 | 91.75% | | |
| 100% | 50.89 | 15.66 | 3 | 92.31% | | |
| | | | | | | |
| 20V | | | | | | |
| 230V 50Hz | PI | VO | IO | EFF | AVG | DOE 6 Spec |
| 25% | 18.98 | 20.76 | 0.81 | 88.8% | 91.24% | 88.00% |
| 50% | 37.21 | 20.81 | 1.63 | 90.87% | | |
| 75% | 54.81 | 20.87 | 2.43 | 92.53% | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 100% | 73.26 | 20.91 | 3.25 | 92.76% | | |

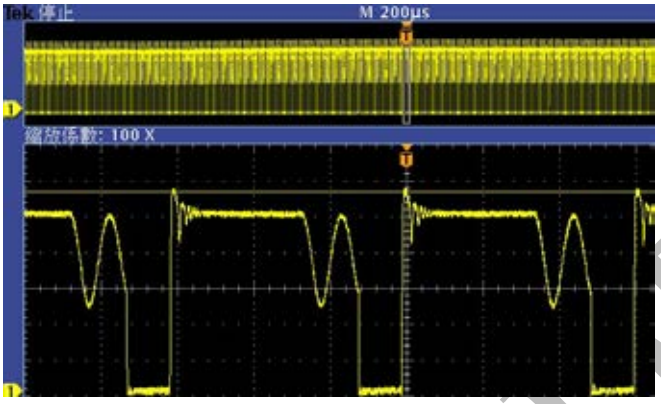
## 5.3 Ripple & Noise

| TYPE C | | |
|---|---|---|
| VIN | 5V | |
| | No Load | Full load |
| 100V/60HZ | 96mV | 94mV |
| 240V/50HZ | 96mV | 98mV |
| VIN | 9V | |
| | No Load | Full load |
| 100V/60HZ | 90mV | 94mV |
| 240V/50HZ | 94mV | 108mV |
| VIN | 12V | |
| | No Load | Full load |
| 100V/60HZ | 96mV | 106mV |
| 240V/50HZ | 116mV | 144mV |
| VIN | 15V | |
| | No Load | Full load |
| 100V/60HZ | 136mV | 148mV |
| 240V/50HZ | 116mV | 152mV |
| VIN | 20V | |
| | No Load | Full load |
| 100V/60HZ | 108mV | 202mV |
| 240V/50HZ | 112mV | 152mV |

# 5.4 Maximum Drain Voltage

| Pri_ DRAIN VOLTAGE | | |
|---|---|---|
| Item | Input voltage | Measured Results |
| Normal full load | 264V/50HZ | 570V |

| SR_MOSFET | | |
|---|---|---|
| Item | Input voltage | Measured Results |
| Normal full load | 264V/50HZ | 90V |

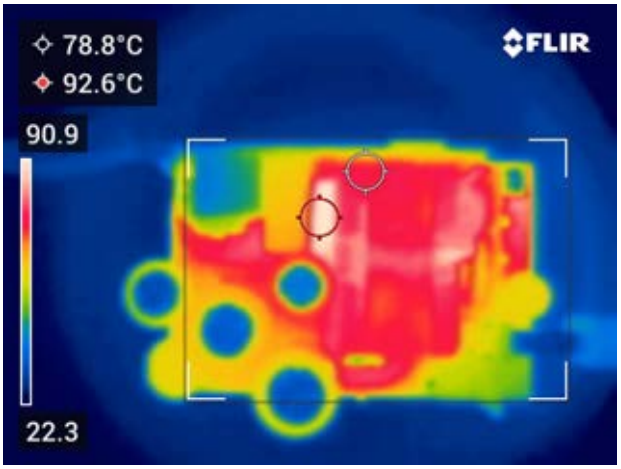



Pri VDS @ 264V/50HZ 20V/3.25A

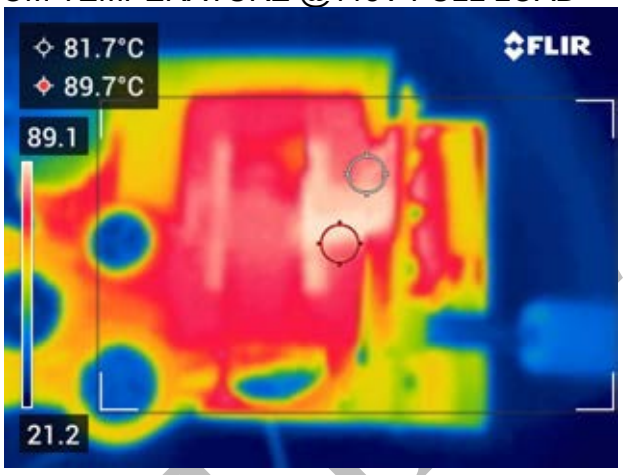

SR MOS VDS @ 264V/50HZ 20V/3.25A

# 5.5 Thermal Test

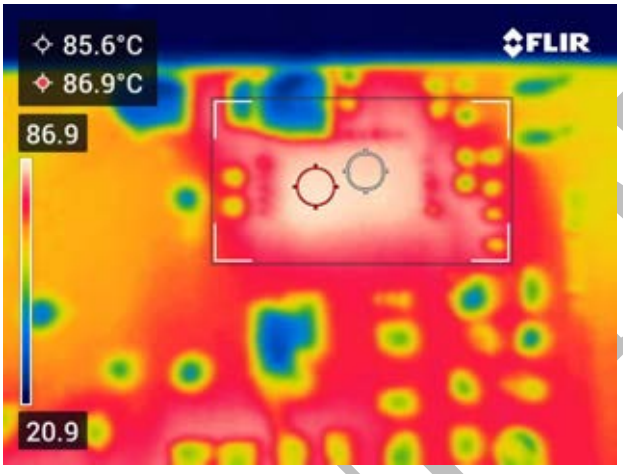
THERMAL PERFORMANCE IS MEASURED ROOM TEMPERATURE @115V FULL LOAD



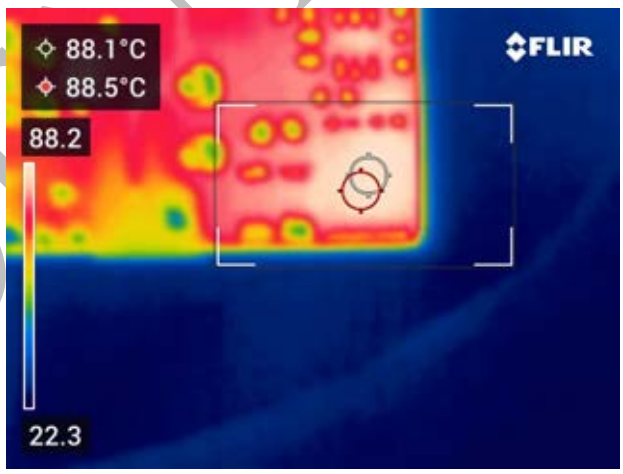

**Transformer Winding (T1) : 92.6℃**



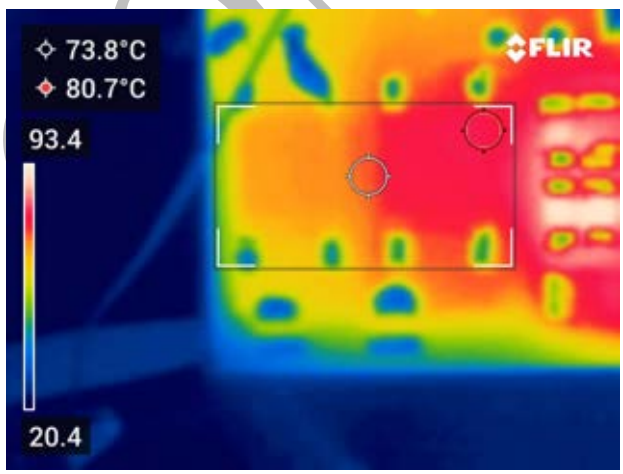

**Transformer CORE (T1) : 89.7℃**



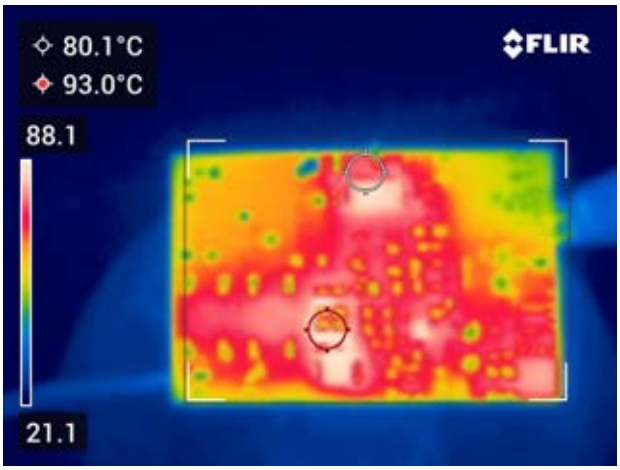

**JP8020 (U2) : 86.9℃**




**SR MOS (Q1) : 88.5℃**




**Bridge (BD1) : 80.7℃**



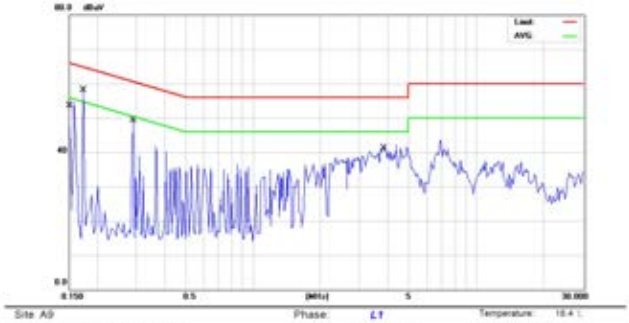

**Snubber resistance (R6) : 93℃**

# 6 Conducted Emission –PK and AV

## EN55022 CLASS B @ FULL LOAD

### 110VAC/60HZ

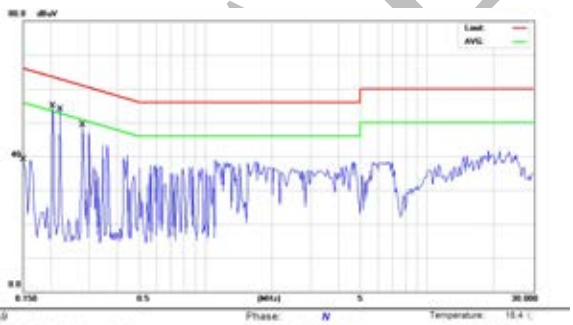
#### LINE



Site: A9
Limit: (CE)EN55032 Class B(QP)
EUT:
M/N: JP8020
Note: C5
Phase: L1
Power: AC 110V/60Hz
Temperature: 18.4 °C
Humidity: 50.3 %
Air Pressure: hpa

| No. | Mk. | Freq. | Reading Level | Factor | Measure-ment | Limit | Over | | |
|---|---|---|---|---|---|---|---|---|---|
| | | (MHz) | (dBuV) | (dB) | (dBuV) | (dBuV) | (dB) | Detector | Comment |
| 1 | * | 0.1500 | 46.26 | 9.67 | 55.93 | 66.00 | -10.07 | QP | |
| 2 | | 0.1500 | 30.08 | 9.67 | 39.75 | 56.00 | -16.25 | AVG | |
| 3 | | 0.1736 | 43.09 | 9.67 | 52.76 | 64.79 | -12.03 | QP | |
| 4 | | 0.1736 | 13.78 | 9.67 | 23.45 | 54.79 | -31.34 | AVG | |
| 5 | | 0.2908 | 36.81 | 9.66 | 46.47 | 60.50 | -14.03 | QP | |
| 6 | | 0.2908 | 18.09 | 9.66 | 27.75 | 50.50 | -22.75 | AVG | |
| 7 | | 3.8709 | 26.26 | 9.75 | 36.01 | 56.00 | -19.99 | QP | |
| 8 | | 3.8709 | 9.56 | 9.75 | 19.31 | 46.00 | -26.69 | AVG | |

#### Neutrel

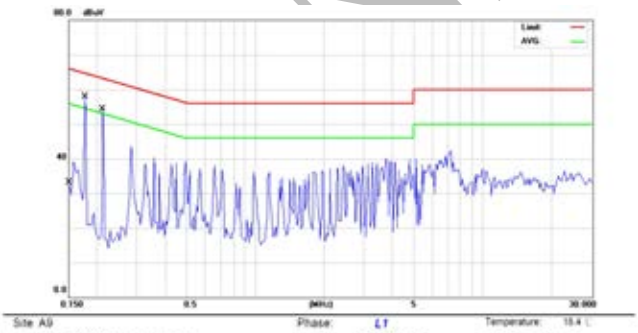


Site: A9
Limit: (CE)EN55032 Class B(QP)
EUT:
M/N: JP8020
Note: C5
Phase: N
Power: AC 110V/60Hz
Temperature: 18.4 °C
Humidity: 50.3 %
Air Pressure: hpa

| No. | Mk. | Freq. | Reading Level | Factor | Measure-ment | Limit | Over | | |
|---|---|---|---|---|---|---|---|---|---|
| | | (MHz) | (dBuV) | (dB) | (dBuV) | (dBuV) | (dB) | Detector | Comment |
| 1 | * | 0.1500 | 45.91 | 9.66 | 55.57 | 66.00 | -10.43 | QP | |
| 2 | | 0.1500 | 27.81 | 9.66 | 37.47 | 56.00 | -18.53 | AVG | |
| 3 | | 0.2051 | 38.59 | 9.66 | 48.25 | 63.40 | -15.15 | QP | |
| 4 | | 0.2051 | 10.89 | 9.66 | 20.55 | 53.40 | -32.85 | AVG | |
| 5 | | 0.2205 | 37.38 | 9.66 | 47.04 | 62.80 | -15.76 | QP | |
| 6 | | 0.2205 | 9.56 | 9.66 | 19.22 | 52.80 | -33.58 | AVG | |
| 7 | | 0.2789 | 32.57 | 9.65 | 42.22 | 60.85 | -18.63 | QP | |
| 8 | | 0.2789 | 14.39 | 9.65 | 24.04 | 50.85 | -26.81 | AVG | |

### 230VAC/50HZ

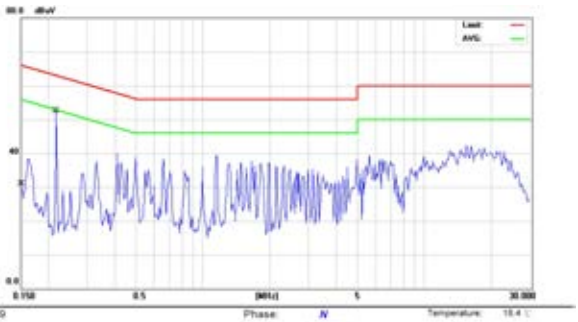
#### LINE



Site: A9
Limit: (CE)EN55032 Class B(QP)
EUT:
M/N: JP8020
Note: C5
Phase: L1
Power: AC 230V/50Hz
Temperature: 18.4 °C
Humidity: 50.3 %
Air Pressure: hpa

| No. | Mk. | Freq. | Reading Level | Factor | Measure-ment | Limit | Over | | |
|---|---|---|---|---|---|---|---|---|---|
| | | (MHz) | (dBuV) | (dB) | (dBuV) | (dBuV) | (dB) | Detector | Comment |
| 1 | * | 0.1500 | 45.18 | 9.67 | 54.85 | 66.00 | -11.15 | QP | |
| 2 | | 0.1500 | 21.51 | 9.67 | 31.18 | 56.00 | -24.82 | AVG | |
| 3 | | 0.1772 | 41.47 | 9.67 | 51.14 | 64.62 | -13.48 | QP | |
| 4 | | 0.1772 | 14.89 | 9.67 | 24.56 | 54.62 | -30.06 | AVG | |
| 5 | | 0.2120 | 37.78 | 9.67 | 47.45 | 63.13 | -15.68 | QP | |
| 6 | | 0.2120 | 10.03 | 9.67 | 19.70 | 53.13 | -33.43 | AVG | |

#### Neutrel



Site: A9
Limit: (CE)EN55032 Class B(QP)
EUT:
M/N: JP8020
Note: C5
Phase: N
Power: AC 230V/50Hz
Temperature: 18.4 °C
Humidity: 50.3 %
Air Pressure: hpa

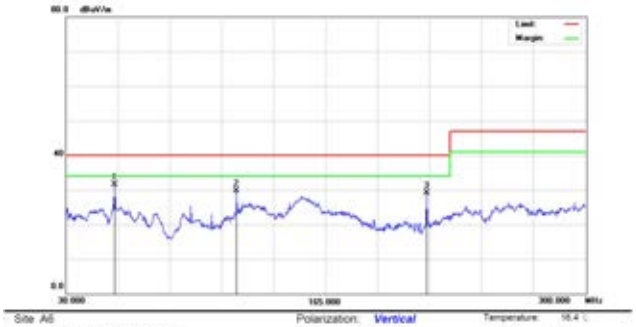
| No. | Mk. | Freq. | Reading Level | Factor | Measure-ment | Limit | Over | | |
|---|---|---|---|---|---|---|---|---|---|
| | | (MHz) | (dBuV) | (dB) | (dBuV) | (dBuV) | (dB) | Detector | Comment |
| 1 | * | 0.1500 | 45.38 | 9.66 | 55.04 | 66.00 | -10.96 | QP | |
| 2 | | 0.1500 | 21.36 | 9.66 | 31.02 | 56.00 | -24.98 | AVG | |
| 3 | | 0.2165 | 37.48 | 9.66 | 47.14 | 62.95 | -15.81 | QP | |
| 4 | | 0.2165 | 9.50 | 9.66 | 19.16 | 52.95 | -33.79 | AVG | |

# 7 Radiated Emission

## EN55022 CLASS B @ FULL LOAD

### 110VAC/60HZ

#### Vertical

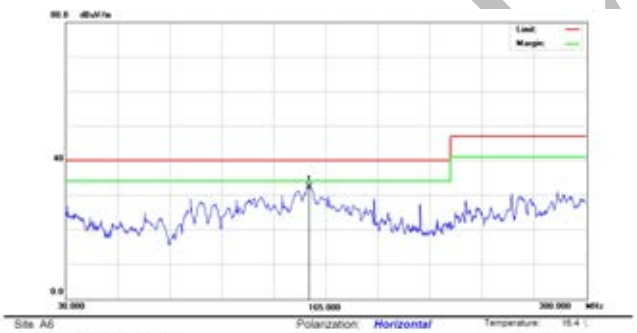


Site: A6
Limit: (RE)EN55032 Class B 3m
EUT:
M/N: JP8020
Note: C5

Polarization: Vertical
Power: AC 110V/60Hz
Distance: 3m
RBW: 120 KHz
VBW: 1000 KHz
Temperature: 16.4 °C
Humidity: 53.4 %
Air Pressure: hpa
Sweep Time: 300 ms

| No. | Mk. | Freq. (MHz) | Reading Level (dBuV) | Factor (dB/m) | Measure-ment (dBuV/m) | Limit (dBuV/m) | Over (dB) | Detector | Antenna Height (cm) | Table Degree (degree) | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | * | 55.3800 | 41.29 | -9.86 | 31.43 | 40.00 | -8.57 | peak | | | |
| 2 | | 118.8300 | 41.04 | -11.38 | 29.66 | 40.00 | -10.34 | peak | | | |
| 3 | | 217.6500 | 39.99 | -10.79 | 29.20 | 40.00 | -10.80 | peak | | | |

#### Horizontal



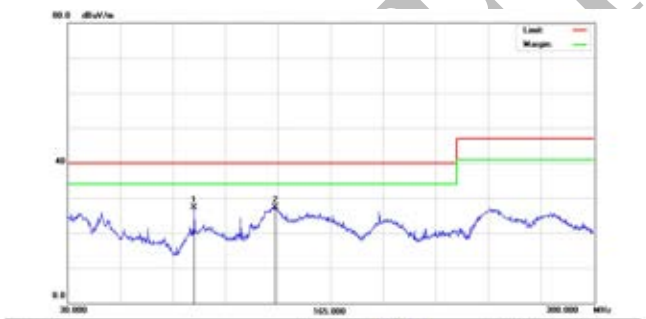
Site: A6
Limit: (RE)EN55032 Class B 3m
EUT:
M/N: JP8020
Note: C5

Polarization: Horizontal
Power: AC 110V/60Hz
Distance: 3m
RBW: 120 KHz
VBW: 1000 KHz
Temperature: 16.4 °C
Humidity: 53.4 %
Air Pressure: hpa
Sweep Time: 300 ms

| No. | Mk. | Freq. (MHz) | Reading Level (dBuV) | Factor (dB/m) | Measure-ment (dBuV/m) | Limit (dBuV/m) | Over (dB) | Detector | Antenna Height (cm) | Table Degree (degree) | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | * | 156.3600 | 41.11 | -8.81 | 32.30 | 40.00 | -7.70 | peak | | | |

### 230VAC/50HZ

#### Vertical

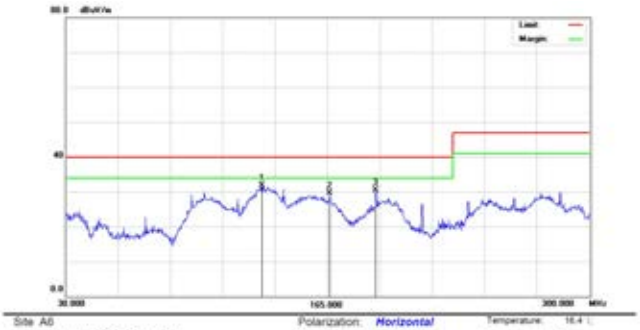


Site: A6
Limit: (RE)EN55032 Class B 3m
EUT:
M/N: JP8020
Note: C5

Polarization: Vertical
Power: AC 230V/50Hz
Distance: 3m
RBW: 120 KHz
VBW: 1000 KHz
Temperature: 16.4 °C
Humidity: 53.4 %
Air Pressure: hpa
Sweep Time: 300 ms

| No. | Mk. | Freq. (MHz) | Reading Level (dBuV) | Factor (dB/m) | Measure-ment (dBuV/m) | Limit (dBuV/m) | Over (dB) | Detector | Antenna Height (cm) | Table Degree (degree) | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | * | 95.0700 | 42.11 | -14.82 | 27.29 | 40.00 | -12.71 | peak | | | |
| 2 | | 136.6500 | 37.07 | -9.79 | 27.28 | 40.00 | -12.72 | peak | | | |

#### Horizontal



Site: A6
Limit: (RE)EN55032 Class B 3m
EUT:
M/N: JP8020
Note: C5

Polarization: Horizontal
Power: AC 230V/50Hz
Distance: 3m
RBW: 120 KHz
VBW: 1000 KHz
Temperature: 16.4 °C
Humidity: 53.4 %
Air Pressure: hpa
Sweep Time: 300 ms

| No. | Mk. | Freq. (MHz) | Reading Level (dBuV) | Factor (dB/m) | Measure-ment (dBuV/m) | Limit (dBuV/m) | Over (dB) | Detector | Antenna Height (cm) | Table Degree (degree) | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | * | 131.2500 | 42.16 | -10.23 | 31.93 | 40.00 | -8.07 | peak | | | |
| 2 | | 166.3500 | 38.81 | -9.18 | 29.63 | 40.00 | -10.37 | peak | | | |
| 3 | | 190.1100 | 41.27 | -10.86 | 30.41 | 40.00 | -9.59 | peak | | | |

## Revision History