REV.	Description	Date
00	SPEC ISSUE (NEW MODEL) ADP-330DB BA	04/15’21
01	102A-215164 Add item 9.9 Acoustic noise test frequency use full frequency 102A-215191 ADD MODEL: ADP-330DB BA1	05/28’21
02	102A-217148 Remark Active PFC and common mode noise setup test condition	07/21’21
03	102A-219037 ADD MODEL: ADP-330DB BA2	09/07’21
04	102A-21A168 Add 3.I Abnormal test remark	10/22’21
05	102A-21C258 UPDATE ITEM 9.6 EMI, ITEM 9.7 RFI	01/04’22
06	102A-221088 ADD MODEL: ADP-330DB BA8	01/17’22
07	102A-222005 UPDATE ITEM 6 Test Item: Pin at No Load, Pin at standby Load (follow ES SPEC and fix remark) UPDATE ITEM 9.6 EMI, 9.7 RFI (fix remark)	02/08’22

台達電子工業股份有限公司
DELTA ELECTRONICS, INC.

DESCRIPTION :
測試規格(Test Specification)

MODEL NO. :
ADP-330DB B SERIES

Date	Drawn	Design (EE)	Design (ME)	DOCUMENT NAME. :	REV.
02/08’22	王玉玲	高明宗	蔡柏崢	**TS-330DB B SERIES**	**07**

FOR MODEL:

ADP-330DB BA	ADP-330DB BA1	ADP-330DB BA2	ADP-330DB BA8

1. **測試注意事項內容，未經工程師許可，不可任意變更。**
   Test Notice contents shall not be changed or revised without engineer permission.

2. **此測試規格用於主線測試,所有項目均需被測試,因設備或線速限制無法全數測試時, 需測試 worst case, QC 需按抽樣標準做抽樣測試.**
   The production line shall perform all or worst test items/conditions, and QC shall follow the sampling plan to perform the sampling test

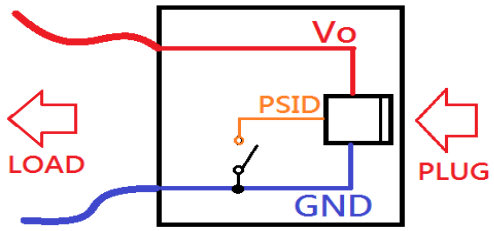
3. **測試注意事項 ：**

   a. 所有 ATS 測試時，需偵測 CONNECTOR 端之電壓。

   b. EMI 測試需熱機 30 分鐘.

   c. 測試轉接頭需並聯 100uF/50V and 0.1uF(小黃豆), 限用日系電容.

   d. 測試 function 用的製具板,Vo 與 PSID 間不用接電阻,而 PSID 與 GND 間須接一顆開關,線路如下所示.除了測試 OCP LEVEL1 外,此開關均切在 ON 的位置.



   e. EMI/RFI/ESD/Burn in 用製具板.GND 與 PSID 間須短路,讓 ADAPTER OCP 切在 LEVEL2 才能抽到滿載.

   f. 由於 ADAPTER POWER ON 後再 Plug in,會需要判斷 Pull low 時間需落在 800us~1ms 間才能將 OCP 切在 LEVEL2.所以測試前須先將製具板 Plug in 好再 Power on.

   g. 如要重新拔插製具板,須斷電並將輸出放電後再重新插入,避免 OCP 被設定在 LEVEL1 導致無法抽滿載.

   h. Full Function test，電子負載需設定 Von 點 15V (base on ADP-240GB BA)

   i. Abnormal test Base on abnormal test adapter should be protection auto or latch and no safety issue.

4. 燒錄 IC：

4.1 Firmware 燒錄

此機種無須燒錄 Firmware.

4.2 PSID 燒錄

4.2.1 此機種需燒錄 PSID,於流完線貼完 LABEL 後燒錄.

4.2.2 燒錄 IC 之 Location Name=IC103, IC 種類如下表格勾選:

選取	DELTA P/N	Description	Vender P/N	Vender
V	2610711008	IC MCU OTP 1K TO-92-3P	BQ2022ALPR	TEXAS INSTRUMENTS
	2610711108	IC MCU OTP 1K SOT-23-3P SMD	BQ2022ADBZR	
	2610560052	IC EPROM 512 120uS TO-92-3P	DS2501+T&R	MAXIM INTEGRATED
	2610560152	IC EPROM 512 120uS SOT-23-3P SMD	DS2501R+T&R	
V	261071112G	IC MCU OTP 1K SOT-23-3P SMD	OB1022MDP	On-Bright Electronics
	2640522900	IC XX2510000021+90W_QCI SMD	MAX28500GSA-W21+2T	MAXIM INTEGRATED
	2640522800	IC XX2510000021+65W_QCI SMD	MAX28500GSA-W21+1T	
	XX2510000021	IC ADAPTER MONITOR SO-8P SMD	MAX28500GSA+T	

*請於選取欄 Key in "V"以代表選取.

4.2.3 EE 需編輯燒錄檔 INI 上傳 SAP 申請料號,並將料號附加於 BOM 表中.產線作業人員得於上線前按照 BOM 表所列之料號於 PLM 下載燒錄檔 INI 以進行燒錄作業.燒錄檔內容如下表格所示:

MODEL	起始码	DELL P/N	Family code	INI File (5060340700 為 INI 檔的十碼料號, 須與 BOM 相符)
ADP-330DB BA/BA1/BA2/BA8	DELL00AC330195169	5P90C	E05	[Model] 1 =5060340700,1 [Parameter] 1 = DELL00AC330195169,1 [Customer] 1 = 5P90C,1 [Family] 1 = E05

4.2.4 燒錄內容規則與範例如下表格說明:

Table Contents of ID Chip

The contents of the ID memory chip are described in the table below.

Field	Byte Length	Byte Offset	Example
Header	4	00h	DELL
Revision Number	2	04h	00
Class of Product	5	06h	AC330
Output Voltage	3	0Bh	195
Output current	3	0Eh	169
PPID & Model Rev	23	11h	********** (See Barcode Printing Format
Checksum	2	28h	[**][**] (See below table description)
Family Code	3	2Ah	E05
Total	45		

EXAMPLE OF CONTENTS

DELL	00	AC330	195	169	**********	[**][**]	E05
↓	↓	↓	↓	↓	↓	↓	↓
Header	Revision Number	Class of Product	Output Voltage	Output current	PPID & Model Rev	Checksum	Family Code

Note that there will be no spaces in between the characters. The spaces shown are for clarification purposes only.

Field	Description
Header	The header shall be four ASCII characters, which will be DELL. 標頭必須是四個 ASCII 字符"DELL"
Revision Number	Two ASCII characters, which represent the code revision number. This will enable Dell to keep track of the contents of BQ2022 after it has been revised. Initially the code revision number will be 00. Should the data that is programmed on the BQ2022 IC be revised then the code revision number will be updated accordingly. 此區為兩個 ASCII 字符,此區代表燒錄內容修訂的版本代碼.主要是為了讓 Dell 在修訂燒錄內容後能夠對其進行跟踪.最初代碼修訂版號為"00".如果之後對燒錄內容有變更,則版本代碼將進行相應的更新。
Class of Product	Five ASCII characters assigned by DELL to identify the product. The first two characters will identify the product type followed by the nominal output power of the product. The first two characters will be AC for all adapters. For power supplies the first two characters will be PS. In the event that the nominal output power is two characters, a zero shall be used to fill the third character. DELL 分配了五個 ASCII 字符來標識產品類型與功率.前兩個字符標識產品類型,後跟產品的標稱輸出功率.對於所有的 Adapter 而言,前兩個字符均為"AC"。對電源供應器而言,前兩個字符為"PS".如果標稱輸出功率是兩個字符,則應使用"0"填充第三個字符,如 65W 的 Adapter,應標為"AC065";如為 240W 的 Adapter 應標為"AC240".
Output Voltage	Three ASCII characters that provides the nominal output voltage of the product. It will be assumed that the last digit represent a tenth of a volt. For example 195 will represent 19.5V and 125 will represent 12.5V. 標示輸出電壓的三個 ASCII 字符.其中前兩位為整數位,而最後一位代表小數第一位.例如 19.5V 應標示為"195"，而 12.5V 應標示為"125".
Output current	Three ASCII characters that provides the full load continuous current of the product. It will be assumed that the last digit is a tenth of an amp. For example 145 will represent 14.5A. In the event that the full load output current is two characters, a zero shall be used to fill the first character e.g. 025 will represent 2.5A. If the output current is for example 9.23A then the three ASCII characters for this field will be 092, thus the full load continuous current will have to be correct to the first decimal. 標示滿載輸出電流的三個 ASCII 字符.其中前兩位為整數位,而最後一位代表小數第一位. 例如"145"代表 14.5A,如果滿載輸出電流是兩個字符則應使用"0"來填充第一個字符,例如"025"代表 2.5A.例如,輸出電流為 9.23A 則此字段的三個 ASCII 字符將為"092".因此滿載連續電流必須正確標示到小數點第一位.
PPID & Model Rev	23 Digit Bar code that will contain the country of Origin ISO code, DELL Part Number, supplier identification code, date of manufacture, unique sequence number and part revision. See below for detail explanation. 標示來自 LABEL 條碼的 23 個 ASCII 字符,其中包含產地 ISO 代碼/DELL part number/Vender 識別碼/生產日期/唯一序列號/零件版本.範例共列了 23 個*,每個*可為 0~9 或 A~Z 的任一字,全部取決於條碼資訊的資訊. 有關條碼的格式與資訊請參考 DELTA DOC:10000-0173-3d
Checksum	Two bytes checksum. CRC will be used to verify that the data transmitted to the ID chip and read from it, is correct. The CRC will be generated using the polynomial X^16 + X^15 + X^2 + 1. 標示 check sum 的兩個字節.CRC 用於驗證傳輸到 ID 芯片並從中讀取的數據是否正確.此 CRC 使用多項式 X ^ 16 + X ^ 15 + X ^ 2 +1 生成.由於此兩字節無法以 ASCII 字符顯示,故以一個括號[ ]來代表一個字節.而括號中的*為 0~9 或 A~F 的任一字,一個括號內應有兩個 0~9 或 A~F 的任一字,全看 CRC 的計算結果.另外,第一字節應為 CRC 計算的低位數,第二字節應為 CRC 計算的高位數.例如: 燒錄內容"DELL00AC240195123CN0RYJJ9DES009C10001A02",CRC 計算結果為 81B2,則應標示為"[B2][81]" 燒錄內容"DELL00AC330195169CN0GMT0MDES009C10001A01",CRC 計算結果為 0F70,則應標示為"[70][0F]" CRC 計算請參考"https://crccalc.com/"中的"CRC-16/ARC".
Family Code (僅部分機種適用)	For some models, three ASCII characters assigned by DELL to identify the product of family. For E4 series the three characters will be "E04"or"E4A". For E5 series the three characters will be "E05". If the family code have no define of spec, the system will default to E4 series. 對部分機種來說 DELL 分配了三個 ASCII 字符來標識系列產品,對於 E4 系列,三個字符將是 “ E04” 或"E4A".對於 E5 系列,三個字符為 “ E05” .如機種規格未定義 Family code,則系統端將直接認定為 E4 系列.

5. 手調測試站：

a. Full Load Test: 檢查滿載輸出是否符合規格

b. Min. Load Test: 檢查輕載輸出是否符合規格

c. OVP Test :

Load Condition : 19.5V/Full load

測試方法: Short R145 檢查輸出電壓是否介於 21.2V~25V, OVP 動作模式為 Latch mode .

d. OTP Test :

Load Condition : 19.5V/Full load

測試方法: 10K 並聯 NTC30,檢查輸出電壓是否 Latch off.

e. LED 狀態:

Power supply 開機後 LED 必須亮燈，關機後 LED 會自動熄滅。

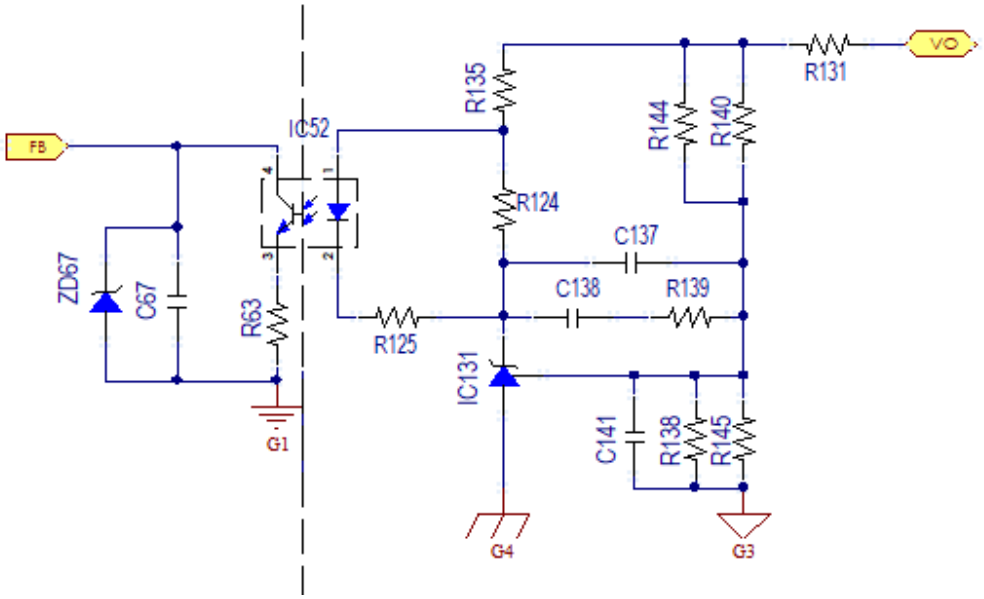
f. AC On/Off:

Power supply 連續開關機 On= 5 秒, Off= 1 秒, 5 次後，必須無損壞情形。

測試時 electronic load 須設定 Von=15V.

g. Loop gain:

由 R131 該 20ohm 電阻進行 loop gain 之量測.線路如下所示(擾動電壓 1.7V)



台達電子工業股份有限公司 DELTA ELECTRONICS, INC.			DESCRIPTION : 測試規格(Test Specification)
THESE DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF DELTA ELECTRONICS, INC. AND SHALL NOT BE REPRODUCED OR USED AS THE BASIS FOR THE MANUFACTURE OR SELL OF APPARATUSES OR DEVICES WITHOUT PERMISSION.			MODEL NO. : ADP-330DB B SERIES
Date	Drawn	Design (EE) / Design (ME)	DOCUMENT NAME. : TS-330DB B SERIES / REV. 07
02/08'22	王玉玲	高明宗 / 蔡柏崢	

6. Function test (ATS) procedure :

Input Specification Table:

INPUT VOLTAGE	MINIMUM	MAXIMUM	NOMINAL(RATED)
LOW RANGE	90 VAC	132 VAC	100 VAC
HIGH RANGE	180V AC	264V AC	240V AC

Output Specification Table:

OUTPUT	MINIMUM	MAXIMUM	NOMINAL(RATED)
Voltage (Vdc)	18.5	20.5	19.5
Loading (Amp) AMB=0~40degC	0	16.92	16.92

Test Item	Vin	Load	Spec	Remark
Inrush Current	264V/50Hz; Phase 90°	19.5V/Full load	< 200A < 250A	AC source 3~4KVA AC source 9KVA Cold start Base on<22% I^2t of Fuse spec
Switch On Time	90V/50Hz	19.5V/Full load	<4Sec	在系統輸出增加 0.1uF//100uF
LED turn on	90V/50Hz	19.5V/ Full load	<4Sec	在系統輸出增加 0.1uF//100uF
Hold up time	100vac/50Hz	50%	8ms	50%Load, 100Vac Vo within regulation
Rise Time	90V/50Hz	19.5V/ Full load	2~100mS	From 10 to 90% voltage, monotonic
Line Regulation	90/180/264V 47/63Hz	19.5V/0A	18.5~20.5V	需量測 cable end 電壓
Line Regulation	90/180/264V 47/63Hz	19.5V/ Full load	18.5~20.5V	需量測 cable end 電壓
Load/Combine Regulation	90V/264V 47/63Hz	19.5V-0A, Half load, Full load	18.5~20.5V	需量測 cable end 電壓
Ripple & Noise	90V/47Hz	19.5V/ Full load	<350mVp-p	在系統輸出增加 0.1uF//100uF
Ripple & Noise	264V/63Hz	19.5V/ Full load	<350mVp-p	在系統輸出增加 0.1uF//100uF
Sync Dynamic	90V/50Hz	19.5V/0A ~ 0.85* Full load	18~21V	S/R:2.5A/uS, 50Hz/100Hz/1KHz/10KHz 在系統輸出增加 0.1uF//100uF 需量測 cable end 電壓
Sync Dynamic	264V/50Hz	19.5V/0A ~ 0.85* Full load	18~21V	S/R:2.5A/uS, 50Hz/100Hz/1KHz/10KHz 在系統輸出增加 0.1uF//100uF 需量測 cable end 電壓
Short Circuit Protection	90V/60Hz	Output load 0 ohm Turn on then short	Latch off	
Short Circuit Protection	264V/50Hz	Output load 0 ohm Turn on then short	Latch off	

Test Item	Vin	Load	Spec	Remark
Over Current Protection	90/264Vac	19.5V/ Full load -Trip	12.31 A > OCP > 10.8A Latch off	the protection delay time shall be less than 400~650ms; PSID float before AC-IN
Over Current Protection	90/264Vac	19.5V/ Full load -Trip	22 A > OCP > 30A Latch off	the protection delay time shall be less than 400~650ms; PSID pull low
Over Voltage Protection	90/264Vac	19.5V/ Full load -Trip	25V > OVP > 21.2V Latch off	
Input Current	90V/50Hz	19.5V/ Full load	<4.4A	
Input Current	180V/50Hz	19.5V/ Full load	<2.2A	
Average Efficiency	115V/60Hz , 230V/50Hz	25%, 50%, 75% & 100% Load	>87%	冷機, 需量測 cable end 電壓, For 產線判定
Average Efficiency	115V/60Hz , 230V/50Hz	25%, 50%, 75% & 100% Load	>89%	熱機 30mins, 需量測 cable end 電壓, 產線不需判定
Pin at No Load	115V/60Hz/230V/50Hz	No Load	Pin<0.18W	Base on bench test 滿足規格為主,無需採記 CPK 這項是極輕載測試,所以會因積分時間及採樣的差異有有不同,產線不需判定輸出端不可接到負載
Pin at standby Load	115V/60Hz/230V/50Hz	(1)0.25W (2)0.6W (3)1.5W (4)2.1W (5)3W (6)4W (7)10%LOAD (8)0.13W (9)0.025W	(1) >=52% (2) >=70% (3) >=77% (4) >=79% (5) >=80% (6) >=81% (7) >=84% (8)Pin <0.33W (9)Pin<0.2W	Base on bench test滿足規格為主無需採記CPK 這項是極輕載測試,所以會因積分時間及採樣的差異有有不同,產線不需判定
Peak Load	90/264Vac	16.92~19.72A(4 second duration and duty cycle 10%)	>=18V	在系統輸出增加 0.1uF//100uF
Transient load	90/264Vac	30.25A(1m second duration and duty cycle 5%)	>=18V	在系統輸出增加 0.1uF//100uF
Transient load	90/264Vac	27.5A(10m second duration and duty cycle 5%)	>=18V	在系統輸出增加 0.1uF//100uF
Extended Frequency Range			NA	
Brown Out	90Vac	Input voltage less than **85Vac** and more than **35Vac**	The Adapter shall turn off	
Full Load Efficiency	90V/60Hz	19.5V/ Full load	>88%	Cold for 產線測試/熱機>=89% 依 Bench 結果判定
Harmonic current IEC-61000-3-2	100/230Vac	full load and Pin=75W(Io=3.5A)	Meet Class D	
Active PFC	115/230Vac	Full load 0.2* Full load	Typ=0.94 Min>=0.92 >0.5	Base on DELL Lab Reference

Test Item	Vin	Load	Spec	Remark
Loop Gain	100/240Vac	Full load	Gain margin< -12dB Phase margin> 45deg	
Overshoot and Undershoot	90/264Vac	Full load	< 21V	需量測 cable end 電壓
System Capacitor Load	90/264Vac	Full load (system load capacitance is **100uF** and ESR is **30mohm**)	shall not cause the adapter to shut down	

Note 1: After completes required DVT test matrix, identifies and selects the worst case condition for the Production MTR. It is not required that all test conditions be tested. Example: If worst case condition for Output Ripple is minimum input voltage and maximum dc load, then that is the test condition to be used.

7. Safety(base on ADP-240GB BA Test method)

7.1 Hi-POT test :

a. Primary to Secondary use 3000+10% Vac.(Rise time DC=1sec, AC=0.1sec).Test time=1sec. EVT1/DVT: arc sense 12mApeak test ; PVT/MP: arc sense 16mApeak test / Arc sense 12mA test, Hi-Limit current=10mA. Lo-Limit current=0.01mA.

b. Primary to Secondary use 4242 Vdc, test time 1sec. In production line.

7.2 Insulation Resistance (IR) test :

PRIMARY to SECONDARY use 500Vdc test；Insulation resistance limit: >100M ohm。

7.3 Leakage Current test :

Applied by measurement of IEC 60950;70uA rms or less (264Vac/50Hz)

8. Burn-in 測試作業規範

Follow delta internal guideline

9. Note:

9.1 漏電流測試輸入電壓條件： Vin=264V/50Hz

9.2 測試接頭的電容(100uF)請使用日系電解電容(NCC/Rubycon)測試。

9.3 OVP then AC Turn On spec : Vo<25V

9.4 Acoustic Noise test 輸入電壓條件 ： Vin=110V/60Hz and Vin=220v/50hz

9.5 Common mode noise setup :

Base on DELL Lab Reference

Vac is 100V/240V with 0% and 100% load condition Typ=150mv Max<=220mV

9.6 EMI : CISPR 32 : CLASS B under 6db with resistive load,
Remark:廠內若有頻段不足內規,可再經由 CL,中達科研中心確認或由 DELL lab 判定.

9.7 RFI : CLASS B under 6db with resistive load,
Remark:廠內若有頻段不足內規,可再經由確認 CL,中達科研中心確認或由 DELL lab 判定.

9.8 Case temp 90Vac/60hz<=95 deg/C 5 face.

9.9 Acoustic noise follow 100~20KHZ<=30dB 標準進行判定 base on condition for DELL SQ