



Eight Discipline Report (8D Report)

To: 8D report No.:
 From: : Chicony power Technology RMA claim No.: N/A
 CC : N/A Chicony P/N: A090A098P
 Customer P/N:
 Submit date: 2018/07/31 Product description: 90W adapter
 Receive date: 2018/08/03 Defect D/C or Lot No.:
 Subject : EMI Fail

CE

D1.) 問題解決成員: Use Team Approach

主持者 (Team Leader) : Brian Chen, Cf Liu

內部成員 (Internal Team Members):

CQS	Cecilia Sun
MFG	Alan Zhu
IPQC/QE	Nono Chen
PE	Qing_Ye
IE	Aimee_Li
RD	Brian_Chen

外部成員 (External Team Member):

N/A

D2.) 問題說明: Problem Description:


(Note: Use who, what, when, where, why, how, how many to specify the Customer's problem.)

We got feedback from customer on July. 31th 2018 that there are 1pcs defect adapter.

The adapter is fail about conduction item.

P/N:

CPT P/N: A090A098P-HW01

Original (highlight)							
Test place	SGS – Compliance Certification Services Inc.					Date	2018/7/31
Condition	Line Input	Phase	Freq.(MHz)	QP (dB)	AVG (dB)	Result	Waveform
With system	230V	L	0.498	-5.23	2.19	Fail	
		N	0.498	-5.21	1.79		



D3.)內部或客戶的暫時解決辦法及實施日期:Implement and Verify Containment Action:

(Note: Internal / external containment action effectiveness and date.)

Take one adapter to verify and analysis in SGS Company on Aug. 3rd 2018.

Owner: TPE RD Date: 2018/8/3

D4.)不良原因確認: Define and Verify Root Causes:

(Note: Identify and verify all suspect causes, which needs explain why the problem occurred.)



1. Confirmation



We go to retest the fail sample in SGS, and compare result with Customer highlight fail report.

At the same time, we take another new sample to confirm conduction with system and dummy load.

According to test result, the waveform and value are as below:

- a. Both two samples fail with system.
- b. Both two samples pass with dummy load under full load condition.

Original (retest about Customer highlight sample)							
Test place	SGS – Compliance Certification Services Inc.					Date	2018/8/3
Condition	Line Input	Phase	Freq.(MHz)	QP (dB)	AVG (dB)	Result	Waveform
With system	230VAC	L	0.500	-6.26	1.04	Fail	
		N	0.499	-6.67	083		
Condition	Line Input	Phase	Freq.(MHz)	QP (dB)	AVG (dB)	Result	Waveform
Full load (dummy load)	230VAC	L	0.518	-12.26	-7.16	Pass	
		N	12.902	-11.21	-7.31		










Original (retest about new sample)							
Test place	SGS – Compliance Certification Services Inc.					Date	2018/8/3
Condition	Line Input	Phase	Freq.(MHz)	QP (dB)	AVG (dB)	Result	Waveform
With system	230VAC	L	0.492	-6.48	1.12	Fail	
		N	0.492	-7.09	0.71		
Condition	Line Input	Phase	Freq.(MHz)	QP (dB)	AVG (dB)	Result	Waveform
Full load (dummy load)	230VAC	L	0.504	-13.26	-8.36	Pass	
		N	12.520	-15.21	-11.31		

2. Simulation











We try to simulate fail condition with dummy load in another third party (Bureau Veritas Consumer Products Services Limited).

According to experiment result, we found the worst condition which occurs at 30% to 40% load with dummy load.

The test results which load condition is 10% step by step are as below:

Original (new sample: dummy load)							
Test place	Bureau Veritas Consumer Products Services Limited					Date	2018/8/8
Condition	Line Input	Phase	Freq.(MHz)	QP (dB)	AVG (dB)	Result	Waveform
10%	230VAC	L	0.483	-12.09	-10.53	Pass	 Con duction 10-0035-1.png
		N	0.483	-12.8	-11.28		 Con duction 10-0036-1.png
20%		L	0.483	-11.52	-5.55		 Con duction 10-0038-1.png
		N	0.483	-12.2	-6.25		 Con duction 10-0037-1.png
30%		L	0.479	-11.99	-2.4		 Con duction 10-0039-1.png
		N	0.478	-12.72	-3.27		 Con duction 10-0040-1.png
40%		L	0.478	-12.05	-2.55		 Con duction 10-0046-1.png
		N	0.478	-12.8	-3.54		 Con duction 10-0047-1.png
50%		L	0.473	-13.48	-4.25		 Con duction 10-0049-1.png

		N	0.473	-14.52	-5.65		 Conduction 10-0048-1.png
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Original (new sample: dummy load)							
Test place	Bureau Veritas Consumer Products Services Limited					Date	2018/8/8
Condition	Line Input	Phase	Freq.(MHz)	QP (dB)	AVG (dB)	Result	Waveform
60%	230VAC	L	0.472	-14.42	-5.85	Pass	 Conduction 10-0050-1.png
		N	0.472	-16.16	-7.95		 Conduction 10-0051-1.png
70%		L	0.487	-13.13	-8.77		 Conduction 10-0056-1.png
		N	0.487	-12.01	-12.51		 Conduction 10-0057-1.png
80%		L	0.496	-13.43	-11.2		 Conduction 10-0059-4.png
		N	0.504	-12.03	-15.98		 Conduction 10-0058-1.png
90%		L	0.629	-13.66	-12.36		 Conduction 10-0060-1.png
		N	0.630	-11.75	-17.35		 Conduction 10-0061-1.png
100%		L	0.494	-13.52	-12.71		 Conduction 10-0063-1.png
		N	0.619	-11.74	-18.55		 Conduction 10-0062-1.png

3. Improvement



There has inside copper shielding in transformer, and it will impact conduction.

In order to improve result, we will define the length of inside copper shielding in specification which can optimize it significantly.





Transformer Specification											
Original						Solution					
繞線順序	線徑 (φ)			圈數 (T)	繞線方式	繞線層數	膠帶層數	NOTE			
							1				
N1	T1A - T1B	Triple wire	0.55mm x 1P	5	密繞	1	1	TOP 端進線			
S1	5 -	Copper foil	0.025mm x 3mm	0.9			2	NOTE 1			
N2	3 - 1	2UEW-B	0.26mm x 1P	21	密繞	2	1				
S2	5 -	Copper foil	0.025mm x 3mm	0.9			1	NOTE 1			
N3	T1A - T1B	Triple wire	0.5mm x 1P	5	密繞	1	2	TOP 端進線			
N4	1 - 4	2UEW-B	0.26mm x 1P	10	密繞	1	2				
N5	T1A - T1B	Triple wire	0.37mm x 1P	5	密繞	1	1	TOP 端進線			
N6	2 - 5	2UEW-B	0.26mm x 1P	6	置中密繞	1	1				
N7	T1C - T1A	Triple wire	0.3mm x 1P	4	密繞	1	2	PIN 端進線 NOTE 10			
		Over core									
S3		Copper foil	W= 5mm #1181	1	Vertical			NOTE 2			
S4	5 -	Copper foil	W= 3mm #1181	1	Horizontal						
								外層膠帶 See NOTE 8			
繞線順序	線徑 (φ)			圈數 (T)	繞線方式	繞線層數	膠帶層數	NOTE			
							1				
N1	T1A - T1B	Triple wire	0.55mm x 1P	5	密繞	1	1	TOP 端進線			
S1	5 -	Copper foil	0.025mm x 3mm	0.9			2	NOTE 1 (40mm)			
N2	3 - 1	2UEW-B	0.26mm x 1P	21	密繞	2	1				
S2	5 -	Copper foil	0.025mm x 3mm	0.9			1	NOTE 1 (52mm)			
N3	T1A - T1B	Triple wire	0.5mm x 1P	5	密繞	1	2	TOP 端進線			
N4	1 - 4	2UEW-B	0.26mm x 1P	10	密繞	1	2				
N5	T1A - T1B	Triple wire	0.37mm x 1P	5	密繞	1	1	TOP 端進線			
N6	2 - 5	2UEW-B	0.26mm x 1P	6	置中密繞	1	1				
N7	T1C - T1A	Triple wire	0.3mm x 1P	4	密繞	1	2	PIN 端進線 NOTE 10			
		Over core									
S3		Copper foil	W= 5mm #1181	1	Vertical			NOTE 2			
S4	5 -	Copper foil	W= 3mm #1181	1	Horizontal						
								外層膠帶 See NOTE 8			



After transformer changed, we retest conduction in SGS and Bureau.


Improve (new sample: dummy load & system)							
Test place	SGS – Compliance Certification Services Inc.					Date	2018/8/10
Condition	Line Input	Phase	Freq.(MHz)	QP (dB)	AVG (dB)	Result	Waveform
With system	230VAC	L	0.906	-18.18	-15.88	Pass	
		N	0.490	-17.47	-11.27		
10%		L	0.494	-21.08	-19.58		 A090A098P_improve.pdf
		N	0.494	-19.19	-17.89		
20%		L	0.494	-20.48	-14.68		
		N	0.494	-19.09	-12.99		
30%		L	0.486	-20.95	-11.81		
		N	0.486	-19.88	-10.14		
40%		L	0.482	-20.43	-11.61		
		N	0.482	-19.33	-9.7		
50%		L	0.498	-11.9	-13.9		
		N	0.493	-11.41	-10.11		
60%		L	0.510	-12.48	-15.88		
		N	0.502	-11.38	-10.88		
70%		L	0.510	-12.18	-16.18		
		N	0.494	-10.59	-10.69		
80%		L	0.490	-12.76	-16.66		
		N	0.502	-11.65	-12.18		
90%		L	0.494	-12.98	-17.08		
		N	0.618	-10.96	-14.38		
100%		L	0.486	-13.63	-17.7		
		N	12.440	-13.73	-9.7		






Improve (retest about new sample: dummy load)							
Test place	Bureau Veritas Consumer Products Services Limited					Date	2018/8/15
Condition	Line Input	Phase	Freq.(MHz)	QP (dB)	AVG (dB)	Result	Waveform
30%	230VAC	L	0.490	-20.73	-11.78	Pass	
		N	0.490	-19.93	-10.6		
40%		L	0.482	-19.68	-11.01		
		N	0.482	-19.5	-10.31		

4. Verification

Due to the transformer has been modified; we also confirm the items of ISN and radiation in SGS.

ISN							
Test place	SGS – Compliance Certification Services Inc.					Date	2018/8/10
Condition	Line Input	Phase	Freq.(MHz)	QP (dB)	AVG (dB)	Result	Waveform
With system	230VAC	L	24.626	-13.19	-4.09	Pass	
		N	24.610	-13.89	-4.09		

Radiation (dummy load & system)							
Test place	SGS – Compliance Certification Services Inc.					Date	2018/8/16
Condition	Line Input	Phase	Freq.(MHz)	PK (dB)	QP (dB)	Result	Waveform
With system	110VAC	V	38.730	-1.3	-5.88	Pass	
		H	857.410	-1.25	NA		
	230VAC	V	30.000	0.41	-3.22		
		H	730.340	-1.59	NA		
Full load (Tr original)	110VAC	V	123.120	-5.46	NA		
		H	741.980	-4.31	NA		
	230VAC	V	125.060	-5.1	NA		
		H	all	> -6	NA		

Radiation (dummy load & system)							
Test place	SGS – Compliance Certification Services Inc.					Date	2018/8/16
Condition	Line Input	Phase	Freq.(MHz)	PK (dB)	QP (dB)	Result	Waveform
Full load (Tr changed)	110VAC	V	127.970	-6.85	NA	Pass	
		H	all	> -6	NA		
	230VAC	V	122.150	-5.18	NA		
		H	all	> -6	NA		

D5.)改善措施:improvement measure:

(Note: Be make sure the corrective actions is effective in process as well as able to fix the customer complaint problem)

The transformer has inside copper shielding (S1 & S2), but it does not describe the length.

S1 and S2 only show the turns which are 0.9Ts.

Moreover, the factory replies that the original length of S1 is 55mm and S2 is 60mm.

Therefore, we will define the length of S1 from 55mm to 40mm and S2 from 60mm to 52mm in transformer specification.

Transformer Specification																	
Original								Solution									
繞線 順序		線徑 (φ)	圈數 (T)	繞線 方式	繞線 層數	膠帶 層數	NOTE	繞線 順序		線徑 (φ)	圈數 (T)	繞線 方式	繞線 層數	膠帶 層數	NOTE		
						1								1			
N1	T1A – T1B	Triple wire	0.55mm x 1P	5	密繞	1	1	TOP 端進線	N1	T1A – T1B	Triple wire	0.55mm x 1P	5	密繞	1	1	TOP 端進線
S1	5 –	Copper foil	0.025mm x 3mm	0.9			2	NOTE 1	S1	5 –	Copper foil	0.025mm x 3mm	0.9		2	NOTE 1 (40mm)	
N2	3 – 1	2UEW-B	0.26mm x 1P	21	密繞	2	1		N2	3 – 1	2UEW-B	0.26mm x 1P	21	密繞	2	1	
S2	5 –	Copper foil	0.025mm x 3mm	0.9			1	NOTE 1	S2	5 –	Copper foil	0.025mm x 3mm	0.9		1	NOTE 1 (52mm)	
N3	T1A – T1B	Triple wire	0.5mm x 1P	5	密繞	1	2	TOP 端進線	N3	T1A – T1B	Triple wire	0.5mm x 1P	5	密繞	1	2	TOP 端進線
N4	1 – 4	2UEW-B	0.26mm x 1P	10	密繞	1	2		N4	1 – 4	2UEW-B	0.26mm x 1P	10	密繞	1	2	
N5	T1A – T1B	Triple wire	0.37mm x 1P	5	密繞	1	1	TOP 端進線	N5	T1A – T1B	Triple wire	0.37mm x 1P	5	密繞	1	1	TOP 端進線
N6	2 – 5	2UEW-B	0.26mm x 1P	6	置中密繞	1	1		N6	2 – 5	2UEW-B	0.26mm x 1P	6	置中密繞	1	1	
N7	T1C – T1A	Triple wire	0.3mm x 1P	4	密繞	1	2	PIN 端進線 NOTE 10	N7	T1C – T1A	Triple wire	0.3mm x 1P	4	密繞	1	2	PIN 端進線 NOTE 10
		Over core									Over core						
S3		Copper foil	W= 5mm #1181	1	Vertical			NOTE 2	S3		Copper foil	W= 5mm #1181	1	Vertical		NOTE 2	
S4	5 –	Copper foil	W= 3mm #1181	1	Horizontal				S4	5 –	Copper foil	W= 3mm #1181	1	Horizontal			
							外層膠帶	See NOTE 8								外層膠帶	See NOTE 8

Owner: EE and CQS

Date: 2018/08/16

D6.)改善措施實施日期:Implement Permanent Corrective Actions:

(Note: Be provide the phase-in date or lot# of corrective actions implementation in process)



Due date :2018.08.16

D7.)預防再發生措施:Prevent Recurrence:

(Note: Modified the management, operating systems, practices, and procedures to prevent recurrence for the problems as well as lessons learned cases.)

QIT members and IPQC will continue trace this issue day by day.

D8.)確認並感謝問題解決成員:Check and Congratulate the Team:

(Note: Recognize the collective efforts of the team.)

Thanks to all QIT members.

Signature Team Leader:

Name – Title

Signature by Approver:

Name-Title