Eight Discipline Report (8D Report)

To: **W company**	8D report No.: **202403001**
From:：**Chicony Power Technology**	RMA claim No.: **N/A**
CC：	Chicony Power P/N: **A360A001P-DL01-A00**
	Customer P/N: **NN34T**
Submit date: **2024/5/17**	Product description: **360W Adapter**
Receive date: **2024/3/19**	
Subject：noise issue * 2pcs	

D1.) 問題解決成員:Use Team Approach

主持者 (Team Leader)：**Cf Liu**

內部成員 (Internal Team Members):

CQS: Candy Zhu **SQE: Wendy**

IPQC/QE: Chaes Cai **IE: Yansong Tong**

MFG: Allison Wang **PE: Plain Chen**

Sales: Steve **RD: Luke/Benson/Hunter**

外部成員 (External Team Member):

D2.)問題說明:Problem Description:

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

3/15 Chicony power received 1pc E5 360W sample from Malaysia which was complained noise issue by user.

3/21 Chicony Power got another sample from D company Shangha

D company P/N: NN34T

#01 PPID: CN-0NN34T-CH200-3CG-017T-A00 , Malaysia

#02 PPID: CN-0NN34T-CH200-3CB-015U-A00 , D company Shangha

D/C: 3CG (2023/12/16) , 3CB (2023/12/12)

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.**)**

1. Shipment record investigation : Till 2024/3/22, Chicony Power has totally shipped 5909pcs

2. Till 3/28, Finished goods stock of each site please refer to below:

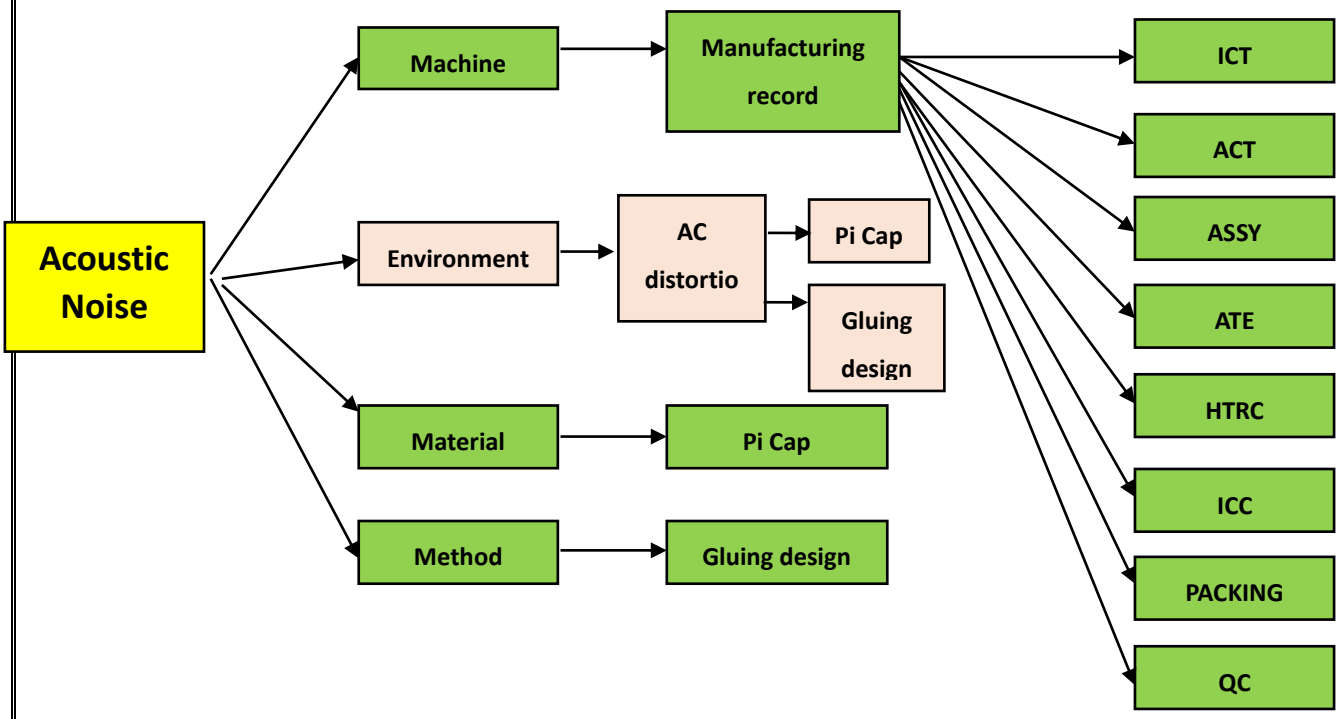
Site	Q'ty (pc)
Wistron (CD)	1382
AMF-Nashville (US)	240
CCC(Xiamen)	24
Compal (KS)	144
Chicony Power Factory	454
Total	**2244**

3. Not shipped to high voltage (220Vac, 230Vac) countries

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.**)**

Failure tree analysis :



1 . Manufacturing record :

Check the SFCS record through by the PPID, both of these 2 samples have passed all test stations normally, no repaired record.

#01 :

生產條碼	FMTN50B70600131
工單	MT2350B706
工單類型	
料號	A360A001PDL01A0
機種	A360A001PDL01
版本	N/A
客戶序號1	CN0NN34TCH2003CG017TA00
客戶名稱	
途程名稱	R-M-HTRC-NODIPSN
生產線別	STO-SHIPPING
規格	
狀態	PASS complete
下道工序	
客戶序號2	

包裝作業資訊 出貨作業資訊 830500663

流程 | 維修 | 抽驗 | 重工 | 物料 | 錫膏 | 鋼板 | 刮刀 | 組裝物料

生產條碼	工單	料號	客戶料號	生產線別	制程	狀態
FMTN50B70600131	MT2350B706	A360A001PDL01A0		L3F07	ICT	OK
FMTN50B70600131	MT2350B706	A360A001PDL01A0		L3F07	ACT	OK
FMTN50B70600131	MT2350B706	A360A001PDL01A0		L3F07	ASSY	OK
FMTN50B70600131	MT2350B706	A360A001PDL01A0		L3F07	PRE-ATE	OK
FMTN50B70600131	MT2350B706	A360A001PDL01A0		L3F07	HTRC	OK
FMTN50B70600131	MT2350B706	A360A001PDL01A0		L3F07	FINAL-ATE	OK
FMTN50B70600131	MT2350B706	A360A001PDL01A0		L3F07	ICC	OK
FMTN50B70600131	MT2350B706	A360A001PDL01A0		L3F07	PACKING	OK
FMTN50B70600131	MT2350B706	A360A001PDL01A0		L3F07	QC	OK
FMTN50B70600131	MT2350B706	A360A001PDL01A0		STO-SHIPPING	SHIPPING	OK

#02 :

出貨序號 CN0NN34TCH2003CB015UA00 ☑ 欄寬自動調整

生產條碼	FMTN50B70300178
工單	MT2350B703
工單類型	
料號	A360A001PDL01A0
機種	A360A001PDL01
版本	N/A
客戶序號1	CN0NN34TCH2003CB015UA00
客戶名稱	
途程名稱	R-M-HTRC-NODIPSN
生產線別	STO-SHIPPING
規格	
狀態	PASS complete
下道工序	
客戶序號2	

包裝作業資訊 出貨作業資訊 830498768

流程 | 維修 | 抽驗 | 重工 | 物料 | 錫膏 | 鋼板 | 刮刀 | 組裝物料

生產條碼	工單	料號	客戶料號	生產線別	制程	狀態
FMTN50B70300178	MT2350B703	A360A001PDL01A0		L3F07	ICT	OK
FMTN50B70300178	MT2350B703	A360A001PDL01A0		L3F07	ACT	OK
FMTN50B70300178	MT2350B703	A360A001PDL01A0		L3F07	ASSY	OK
FMTN50B70300178	MT2350B703	A360A001PDL01A0		L3F07	PRE-ATE	OK
FMTN50B70300178	MT2350B703	A360A001PDL01A0		L3F07	HTRC	OK
FMTN50B70300178	MT2350B703	A360A001PDL01A0		L3F07	FINAL-ATE	OK
FMTN50B70300178	MT2350B703	A360A001PDL01A0		L3F07	ICC	OK
FMTN50B70300178	MT2350B703	A360A001PDL01A0		L3F07	PACKING	OK
FMTN50B70300178	MT2350B703	A360A001PDL01A0		L3F07	PACKING	OK
FMTN50B70300178	MT2350B703	A360A001PDL01A0		L3F07	QC	OK
FMTN50B70300178	MT2350B703	A360A001PDL01A0		STO-SHIPPING	SHIPPING	OK

2. AC distortion :

2.1 Listening the sample

2.1.1 in normal factory office, we can hardly hear the abnormal sound from adapters if the samples is not close to the ear.

2.1.2 in a quiet meeting room, also no abnormal sound was listened. Compare to stock, no difference was found.

Voltage condition : City voltage, Load condition : From 0V to full load

2.2 Test acoustic following D company spec, result: PASS.

D company spec please refer to below:

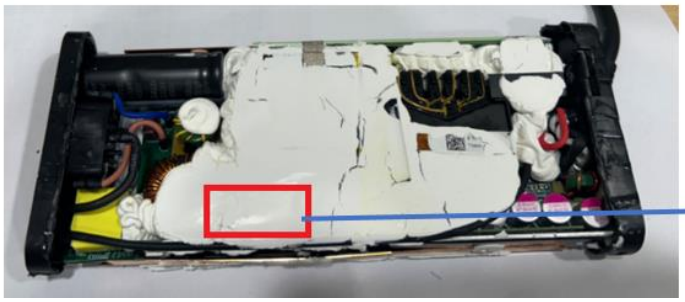
AC Adapter			
Operational Mode	Critical Band Loudness	Prominent Tones	Modulation
All Modes	<0.011	No	<25%

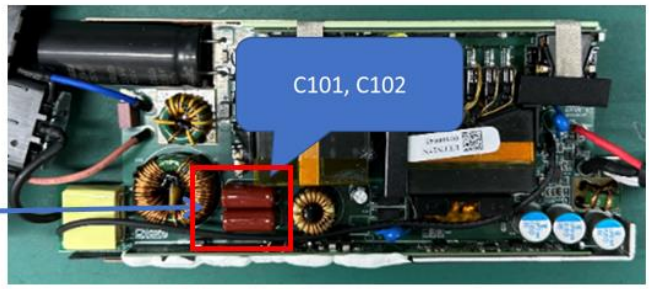
#01 #02

2.3 In order to duplicate the similar noise, we have tried inputting various waveforms at the AC Input, and finally confirmed that louder noise will be generated when AC is distorted.

AC waveforms study

2.4 Further check the noise source, found it came from Pi Cap (C101,C102).





Description	Location	Vendor
FC 2.2u 450V K MPP P 15	C101	STRONG
FC 2.2u 450V K MPP P 15	C102	STRONG

2.5 Use the same condition of AC distortion waveform (DST21-2) to test samples from different suppliers, result: the samples of 3 suppliers all failed the spec under AC distortion condition.

Chicony Power : Avg 31.85 30 (spec<11) 89.97 (spec<25)

System #	Measured Loudness (mSone)	Reported Loudness (mSone) (Spec: <11)	Prominence Ratio (dB)		Modulation(%) (Spec: <25%)
			Value	Frequency	
Background Noise	5.43	5	5.00	13071.32	5.1
#01_220V_50Hz_DST21-2_0%	5.55	5	4.96	13071.32	5.1
#01_220V_50Hz_DST21-2_25%	48.64	50	5.34	2244.92	115.7
#01_220V_50Hz_DST21-2_50%	34.27	35	6.05	2310.71	102.8
#01_220V_50Hz_DST21-2_75%	25.88	25	6.15	2244.92	102.9
#01_220V_50Hz_DST21-2_100%	44.89	45	7.38	3668.02	123.3

D Company : Avg 25.76 25 (spec<11) 91.52 (spec<25)

System #	Measured Loudness (mSone)	Reported Loudness (mSone) (Spec: <11)	Prominence Ratio (dB)		Modulation(%) (Spec: <25%)
			Value	Frequency	
Background Noise	5.43	5	5.00	13071.32	5.1
D_220V_50Hz_DST21-2_0%	5.45	5	5.02	13071.32	5.1
D_220V_50Hz_DST21-2_25%	28.26	30	10.42	3084.42	113.3
D_220V_50Hz_DST21-2_50%	30.77	30	11.38	3084.42	110.2
D_220V_50Hz_DST21-2_75%	32.18	30	9.66	2996.61	114.1
D_220V_50Hz_DST21-2_100%	32.13	30	9.51	2996.61	114.9

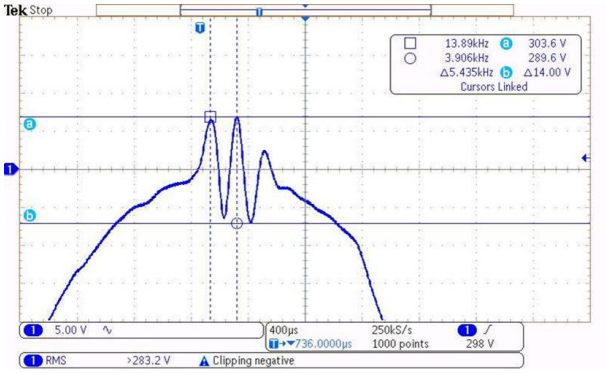
L Company : Avg 20.80 20 (spec<11) 87.8 (spec<25)

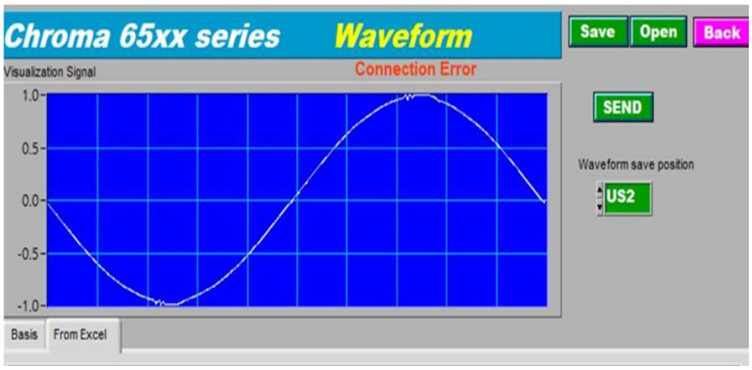
System #	Measured Loudness (mSone)	Reported Loudness (mSone) (Spec: <11)	Prominence Ratio (dB)		Modulation(%) (Spec: <25%)
			Value	Frequency	
Background Noise	5.43	5	5.00	13071.32	5.1
L_220V_50Hz_DST21-2_0%	5.53	5	4.99	13071.32	5.1
L_220V_50Hz_DST21-2_25%	20.62	20	10.29	3886.13	101.5
L_220V_50Hz_DST21-2_50%	26.90	25	10.91	3886.13	101.9
L_220V_50Hz_DST21-2_75%	25.70	25	11.37	3775.5	118.1
L_220V_50Hz_DST21-2_100%	25.21	25	12.80	3775.5	112.4

Compare the Pi Cap of each adapter suppliers' , result as below:

Supplier	Capacitance
Chicony Power	2.2uF * 2PCS
D company	1.5uF * 2PCS
L company	1.5uF * 2PCS

Distortion AC input waveform (DST21-2) :





2.6 Finish goods level noise test : Take the same field returned sample and test the noise under high and low voltage conditions respectively , then input the same AC distortion waveform(DST21-2). Result: the larger voltage, the louder noise.

Chicony Power : Avg 10.56 10 (spec<11) 22.52 (spec<25)

System #	Measured Loudness (mSone)	Reported Loudness (mSone) (Spec: <11)	Prominence Ratio (dB)		Modulation(%) (Spec: <25%)
			Value	Frequency	
Background Noise	5.43	5	5.00	13071.32	5.1
#01_110V_60Hz_DST21-2_0%	5.50	5	4.96	13071.32	5.2
#01_110V_60Hz_DST21-2_25%	5.61	5	9.45	3563.59	5.0
#01_110V_60Hz_DST21-2_50%	5.58	5	7.72	3563.59	5.3
#01_110V_60Hz_DST21-2_75%	15.56	15	8.70	3563.59	9.6
#01_110V_60Hz_DST21-2_100%	20.55	20	8.56	3563.59	87.5

Chicony Power : Avg 31.85 30 (spec<11) 89.97 (spec<25)

#01_220V_50Hz_DST21-2_0%	5.55	5	4.96	13071.32	5.1
#01_220V_50Hz_DST21-2_25%	48.64	50	5.34	2244.92	115.7
#01_220V_50Hz_DST21-2_50%	34.27	35	6.05	2310.71	102.8
#01_220V_50Hz_DST21-2_75%	25.88	25	6.15	2244.92	102.9
#01_220V_50Hz_DST21-2_100%	44.89	45	7.38	3668.02	123.3

3. Pi Cap :

Component level noise test with microphone:

3.1 Test the noise of capacitors with different capacitance values.

Result: the larger the capacitance value, the louder noise.(refer to table 1)

3.2 Test the noise of capacitors of the same specification at the same frequency but with different input voltage conditions.

Result: the large voltage, the louder noise (refer to table 2)

table 1 :

1.0μF/450V噪音测试数据：

1.0μF/450VNoise test data

NO	噪音值 level of noise
1	11.4
2	10.0
3	12.8
4	12.6
5	13.4
6	13.0
7	11.5
8	12.9
9	11.2
10	11.6
MIN	10.0
MAX	13.4
Xbar	12.04

2.2μF/450V噪音测试数据：

2.2μF/450VNoise test data

NO	噪音值 level of noise
1	15.1
2	16.4
3	14.2
4	13.9
5	15.4
6	16.2
7	15.8
8	14.3
9	12.6
10	14.1
MIN	12.6
MAX	16.4
Xbar	14.80

table 2 :

2.5 同规格同频率不同电压之噪音差异对比：(举例规格：105/450V 电容尺寸：W*H*T=18*12*6 mm)

220VAC/50HZ 噪音测试数据：

NO	噪音值
1	11.4
2	10.0
3	12.8
4	12.6
5	13.4
6	13.0
7	11.5
8	12.9
9	11.2
10	11.6
MIN	10.0
MAX	13.4
Xbar	12.04

250VAC/50HZ噪音测试数据：

NO	噪音值
1	15.2
2	13.5
3	12.8
4	13.9
5	12.6
6	14.1
7	12.9
8	13.6
9	11.6
10	14.9
MIN	11.6
MAX	15.2
Xbar	13.51

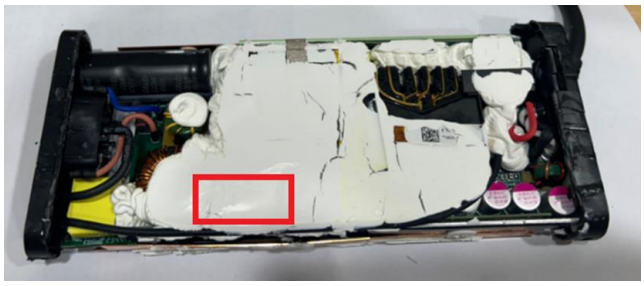
300VAC/50HZV噪音测试数据：

NO	噪音值
1	20.8
2	17.4
3	15.7
4	15.1
5	19.8
6	18.6
7	15.9
8	14.8
9	16.2
10	14.9
MIN	14.8
MAX	20.8
Xbar	16.92

4. Gluing design :

Test the noise of Pi cap with different gluing.

Before : Dip side of Pi cap with glue



System #	Measured Loudness (mSone)	Reported Loudness (mSone) (Spec: <11)	Prominence Ratio (dB)		Modulation(%) (Spec: <25%)
			Value	Frequency	
Background Noise	5.43	5	5.00	13071.32	5.1
#01_220V_50Hz_DST21-2_0%	5.55	5	4.96	13071.32	5.1
#01_220V_50Hz_DST21-2_25%	48.64	50	5.34	2244.92	115.7
#01_220V_50Hz_DST21-2_50%	34.27	35	6.05	2310.71	102.8
#01_220V_50Hz_DST21-2_75%	25.88	25	6.15	2244.92	102.9
#01_220V_50Hz_DST21-2_100%	44.89	45	7.38	3668.02	123.3

After : Dip side of Pi cap without glue

System #	Measured Loudness (mSone)	Reported Loudness (mSone) (Spec: <11)	Prominence Ratio (dB)		Modulation(%) (Spec: <25%)
			Value	Frequency	
Background Noise	5.43	5	5.00	13071.32	5.1
#01_220V_50Hz_DST21-2_0%	6.14	5	4.96	13071.32	5.3
#01_220V_50Hz_DST21-2_25%	8.96	10	6.33	2244.92	8.9
#01_220V_50Hz_DST21-2_50%	7.15	5	5.94	2341.56	7.1
#01_220V_50Hz_DST21-2_75%	7.19	5	5.81	2231.21	7.2
#01_220V_50Hz_DST21-2_100%	8.22	10	6.02	2181.01	8.3

Conclusion:

Based on the above analysis, we concluded that :

1. **The returned samples can pass D company Acoustic Spec;**
2. **The product will generate the noise when AC is distorted, if the distortion is small, the chance of the product noise will also be small. If the distortion is over much , then the louder noise will be found.**
3. **The noise source is from Pi Cap and the large capacitance value, the louder noise. The larger input voltage, the louder noise.**
4. **Dip side of Pi cap without glue can improve noise.**

D5.)改善措施:Corrective Action Verification:

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

1. **For continuing improvement, Chicony power will replace the Pi cap with strong noise resistance to enhance the product's performance regarding noise.**

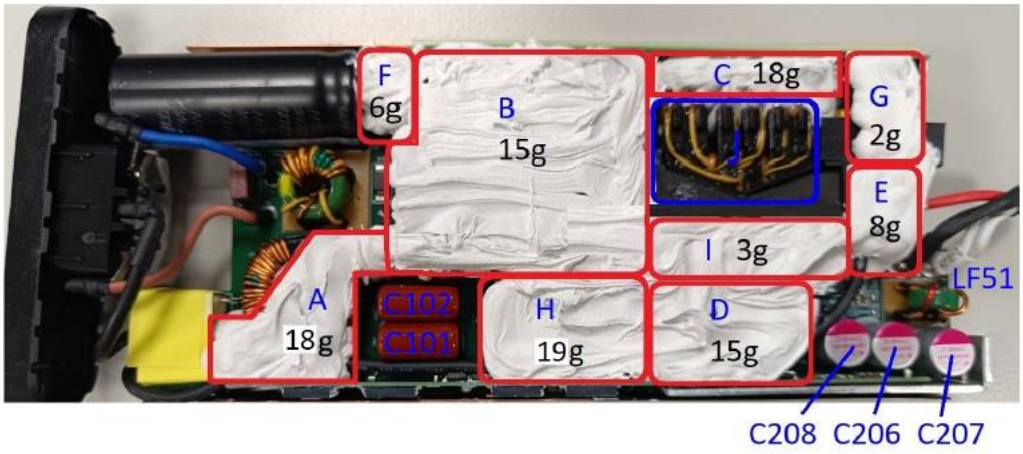
Items	Complete Date
DQA test (Bench &EMC&De-rating)	4/12
System test	4/24
DIDT	4/24
Risk assessment	4/25
ECR submit	4/25
ECR Release	5/2

STRONG improve noise

CARLI improve noise

Owner: EE/Benson , PM/Vicky **Duedate: 5/2**

2. **Dip side of Pi cap (C101,C102) without glue**



Verification: Checked the noise under same AC distortion condition, below result shows when we changed the Pi cap and dip side of Pi cap without glue, the noise performance can be improved greatly.

Before :

System #	Measured Loudness (mSone)	Reported Loudness (mSone) (Spec: <11)	Prominence Ratio (dB)		Modulation(%) (Spec: <25%)
			Value	Frequency	
Background Noise	5.43	5	5.00	13071.32	5.1
#01_220V_50Hz_DST21-2_0%	5.55	5	4.96	13071.32	5.1
#01_220V_50Hz_DST21-2_25%	48.64	50	5.34	2244.92	115.7
#01_220V_50Hz_DST21-2_50%	34.27	35	6.05	2310.71	102.8
#01_220V_50Hz_DST21-2_75%	25.88	25	6.15	2244.92	102.9
#01_220V_50Hz_DST21-2_100%	44.89	45	7.38	3668.02	123.3

After : Used improve cap + dip side of Pi cap without glue

System #	Measured Loudness (mSone)	Reported Loudness (mSone) (Spec: <11)	Prominence Ratio (dB)		Modulation(%) (Spec: <25%)
			Value	Frequency	
Background Noise	5.43	5	5.00	13071.32	5.1
#01_220V_50Hz_DST21-2_0%	5.55	5	4.93	13071.32	5.1
#01_220V_50Hz_DST21-2_25%	5.48	5	4.93	13071.32	5.3
#01_220V_50Hz_DST21-2_50%	5.61	5	4.95	13071.32	5.1
#01_220V_50Hz_DST21-2_75%	5.42	5	5.01	13071.32	5.5
#01_220V_50Hz_DST21-2_100%	5.47	5	5.04	13071.32	5.2

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**)**

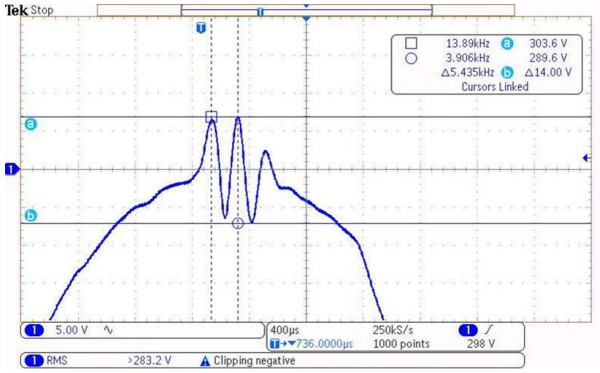
Immediately

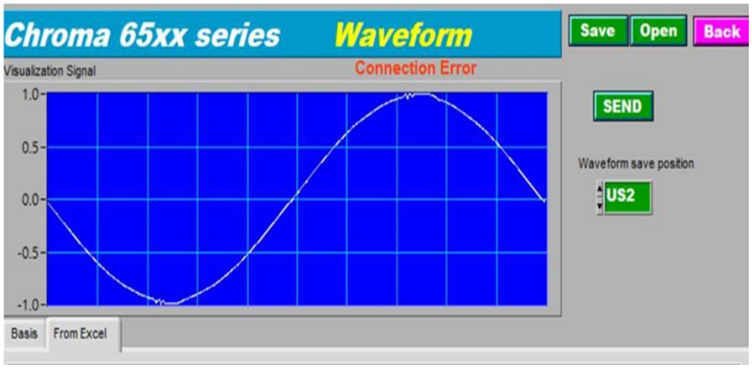
D7.)預防再發生措施:Prevent Recurrence:

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

Chicony Power will add following distortion AC input waveform to the normal acoustic test for the new case in the future.

Distortion AC input waveform (DST21-2) :





Owner: EE/Benson, Complete date: 4/1

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 you all !

CQS: Candy Zhu **SQE: Wendy**

IPQC/QE: Chaes Cai **IE: Yansong Tong**

MFG: Allison Wang **PE: Plain Chen**

Sales: Steve **RD: Luke/Benson/Hunter**

Signature **Team Leader**:	**Cf_Liu**
	Name – Title
Signature by Approver:	
	Name-Title