

[AI2 MAX:BFX-UA300]

Acoustic Improvement Report & Preparing Subsidiary materials for DVT build

Organization
R&D Lab. 2

Issued Date
2020.12.30

Version
1.2

Revision History

Version	Date	Description	Owner
1.0	2020/12/23	1 st Draft version	SH, Son
1.1	2020/12/28	Updated Rub and buzz subsidiary materials information	Lonnie Kim
1.2	2020/12/30	Updated Rub and buzz subsidiary materials based on FII feedback	Lonnie Kim

Rub and Buzz Improvement Points



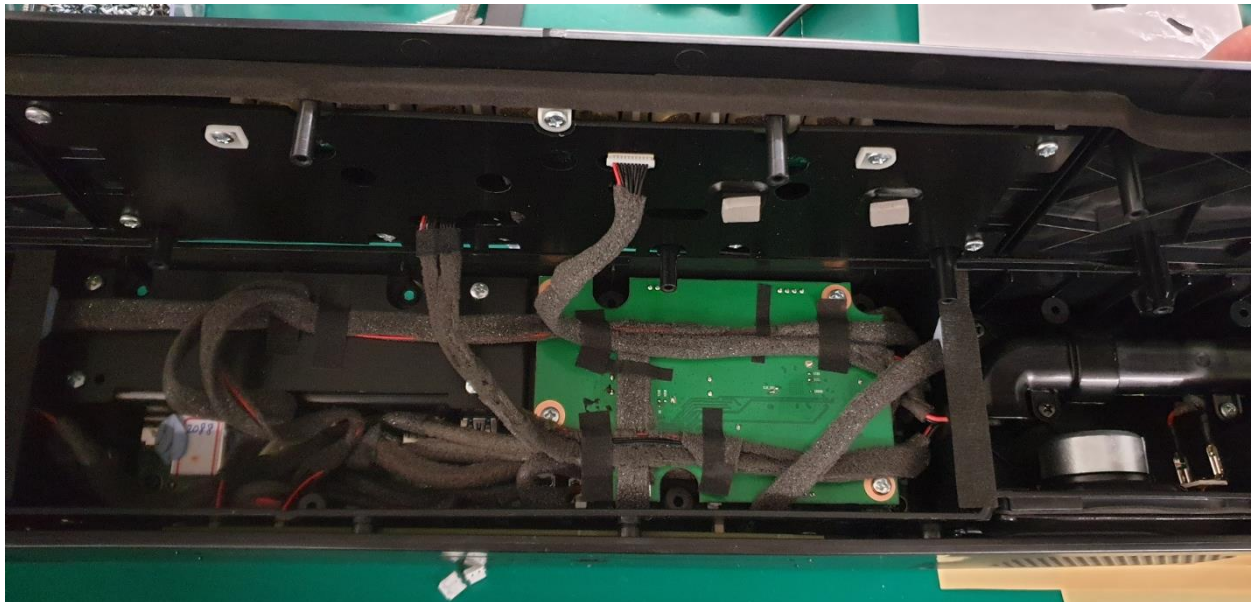
Overall

1. Base line : EVT PCBA and Thermal solution + T0 housing

- Some of parts or structure are may different then DVT build.
- many point from noise occurred in the PCBA area : components, cables, etc..

2. Reference assembly picture

- Applied all of improvement this document below.



70Hz / 100Hz



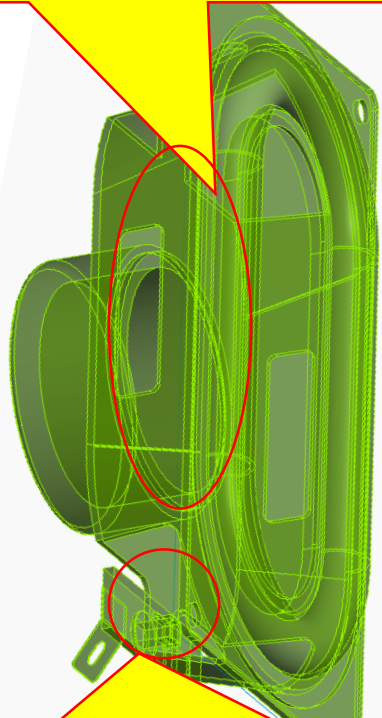
● Speaker Unit : Woofer(Owner: Dreamus)

- Speaker units will Improve for self-vibration
 - Improving the edge of the diaphragm
 - Additional bonding : terminal and voice coil
- Appliance: Next production

Test condition

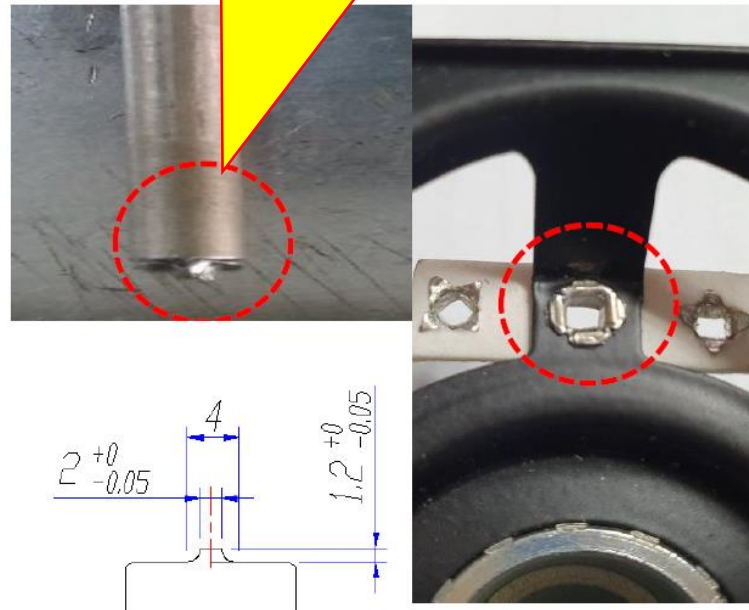
SPK input voltage	8.94V
Input source	Woofer Left

Improving the edge of the diaphragm



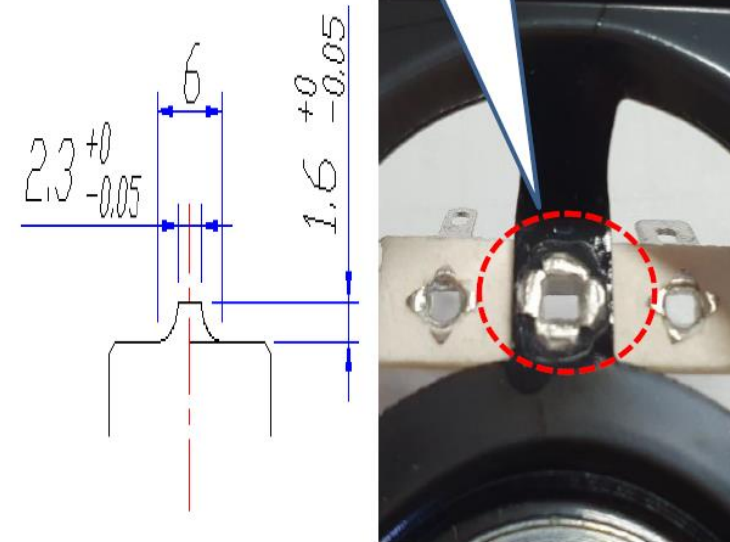
- Additional bonding : terminal and voice coil

Terminal Caulking Mold update



Before

Add bonding



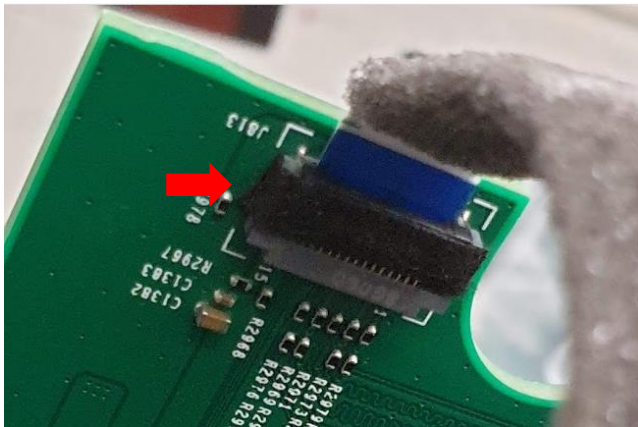
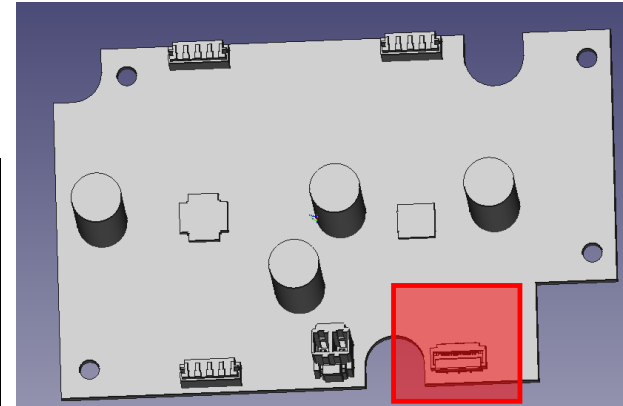
After

- **FFC Cable(Owner: Foxconn)**

- Apply Polyurethane foam for cable
- Apply quick-drying chemicals or Non-woven fabric tape for connector at locking area
 - AMP PCBA and SoC PCBA
- : To avoid vibration with FFC cable and connector
- Appliance: DVT build

Test condition	
SPK input voltage	8.94V
Input source	Woofer Left

Example picture



FII Proposal &
Conclusion



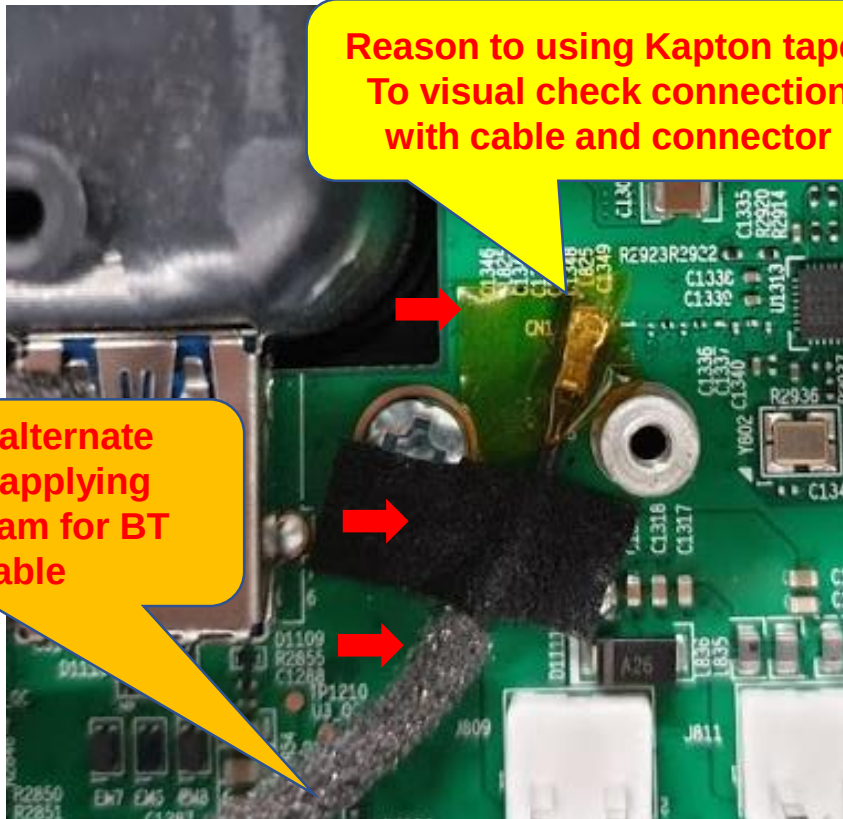
ALT additional comment:
It's okay.

- **Bluetooth antenna cable and connector** (Owner: Foxconn)

- Apply Non-woven fabric tape for BT antenna cable
- Apply Kapton tape to fixing connector
- Apply Polyurethane foam for BT antenna cable
: To avoid vibration BT cable
- Appliance: DVT build

Test condition	
SPK input voltage	8.94V
Input source	Woofer Left

Example picture





130Hz / 220Hz

- **Grill Fabric vibration(Owner: Inkel)**
 - Apply glue for tight fix fabric
: To avoid fabric vibration between grill
 - Appliance: DVT build

Test condition	
SPK input voltage	8.94V
Input source	Woofer_Left : 130Hz Woofer_Right : 220Hz

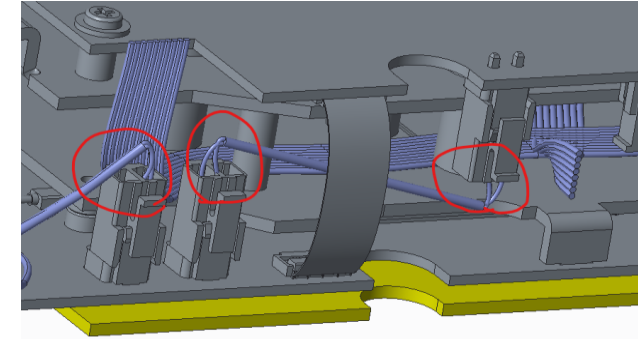
Example picture



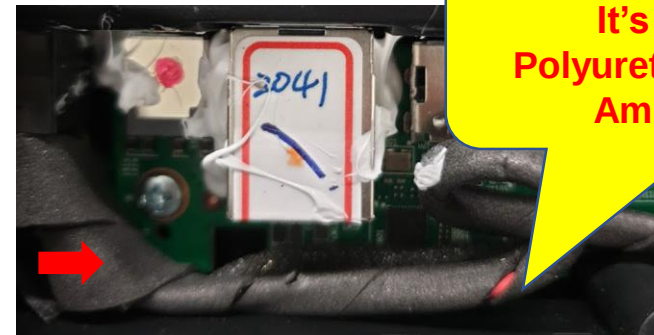


- **Power connector + Wire module** (Owner: Foxconn)
 - Apply quick-drying chemicals all of power connector and wire module
: To avoid vibration with connector and cable
 - Appliance: DVT build
- **Power Cable and Case Bottom Interference** (Owner: Foxconn)
 - Apply Polyurethane foam for Amp power cable
 - Apply EVA foam gasket for DC Power cable
: To avoid vibration with cable and bottom case
 - Appliance: DVT build

Test condition	
SPK input voltage	8.94V
Input source	Woofer_Left



Example picture



ALT additional comment:
It's okay to using
Polyurethane foam as like
Amp power cable

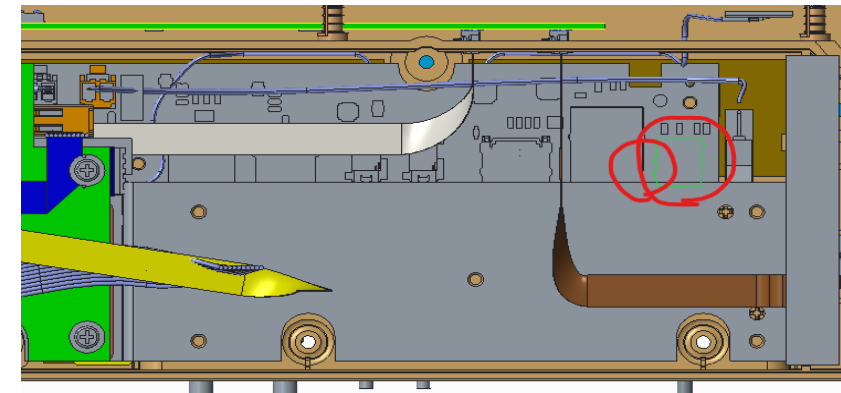
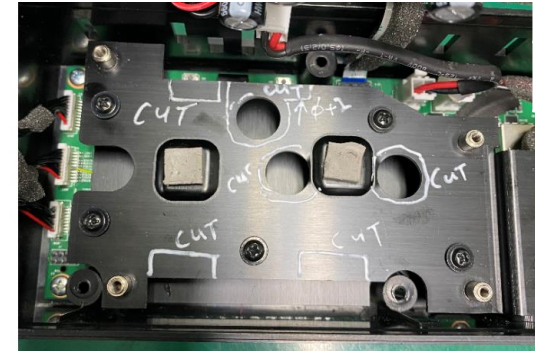
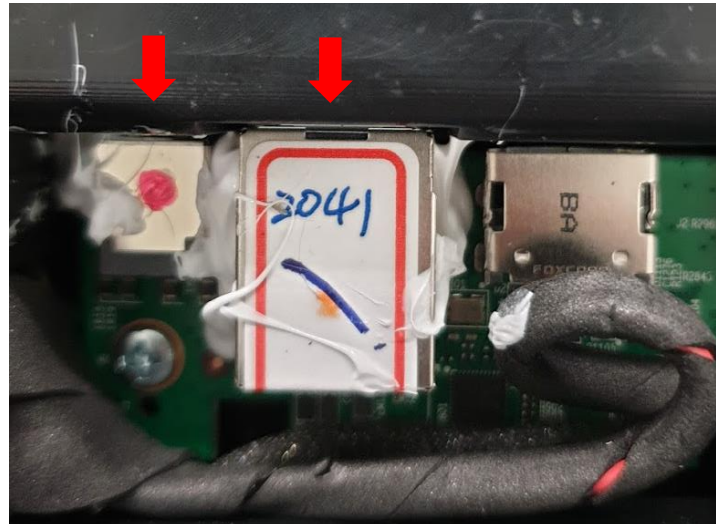
- **Interference between PCBA parts and thermal parts**(Owner: Foxconn)

- Additional cutting of heat sink
: To avoid Interference with PCBA and thermal parts
: connector side cutting area is only for EVT
- Appliance: DVT build

- **DC jack in main board**(Owner: Foxconn)

- Apply quick-drying chemicals on the connector(DC Jack/RJ-45)
: To avoid vibration connector
- Appliance: DVT build

Example picture



Test condition	
SPK input voltage	8.94V
Input source	Woofer_Left

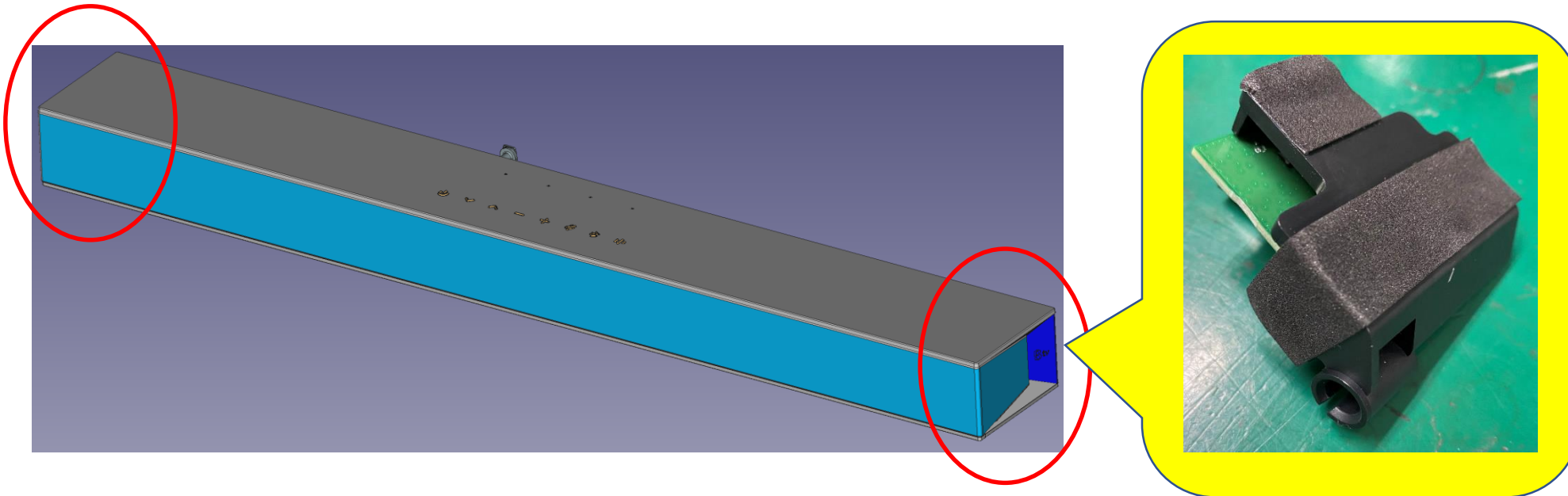


170Hz

- **Side LED bracket**(Owner: Foxconn)

- Apply EVA foam gasket
: To avoid vibration with bracket and bottom case
- Appliance: DVT build
- EVA foam gaskets will be supplied by Inkel

Test condition	
SPK input voltage	8.94V
Input source	Woofer_Left



Example picture



320Hz / 390Hz

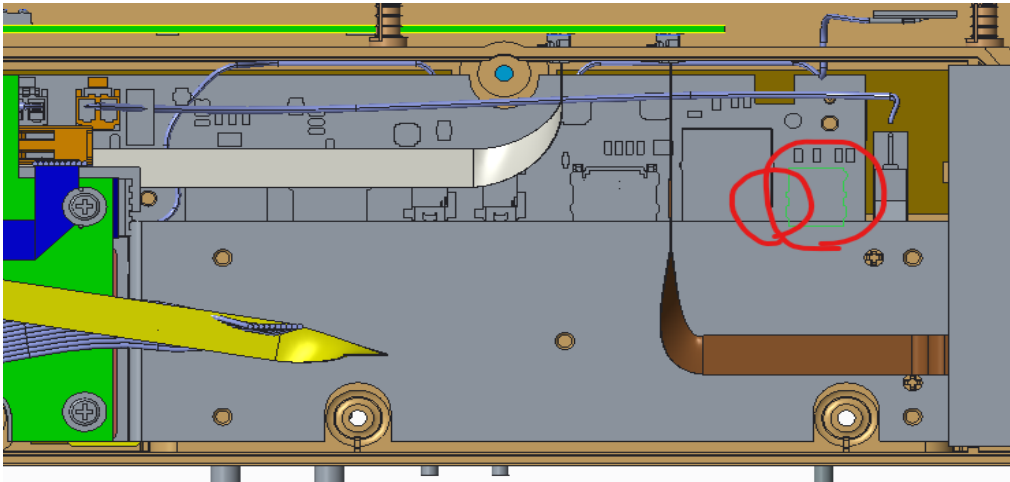
- **Main Board DC jack with Ethernet connector** (Owner: Foxconn)

- Apply quick-drying chemicals on the connector
 - : To avoid vibration with DC jack and Ethernet connector
 - : Same as 150Hz
- Appliance: DVT build

Test condition

SPK input voltage	8.94V
Input source	Woofer_Left : 320Hz Woofer_Right : 390Hz

Example picture



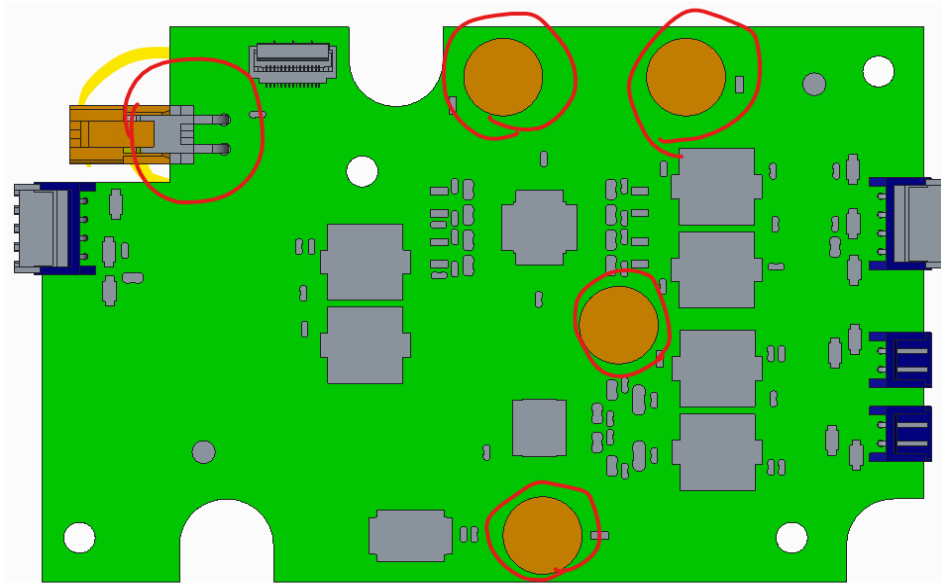


350Hz

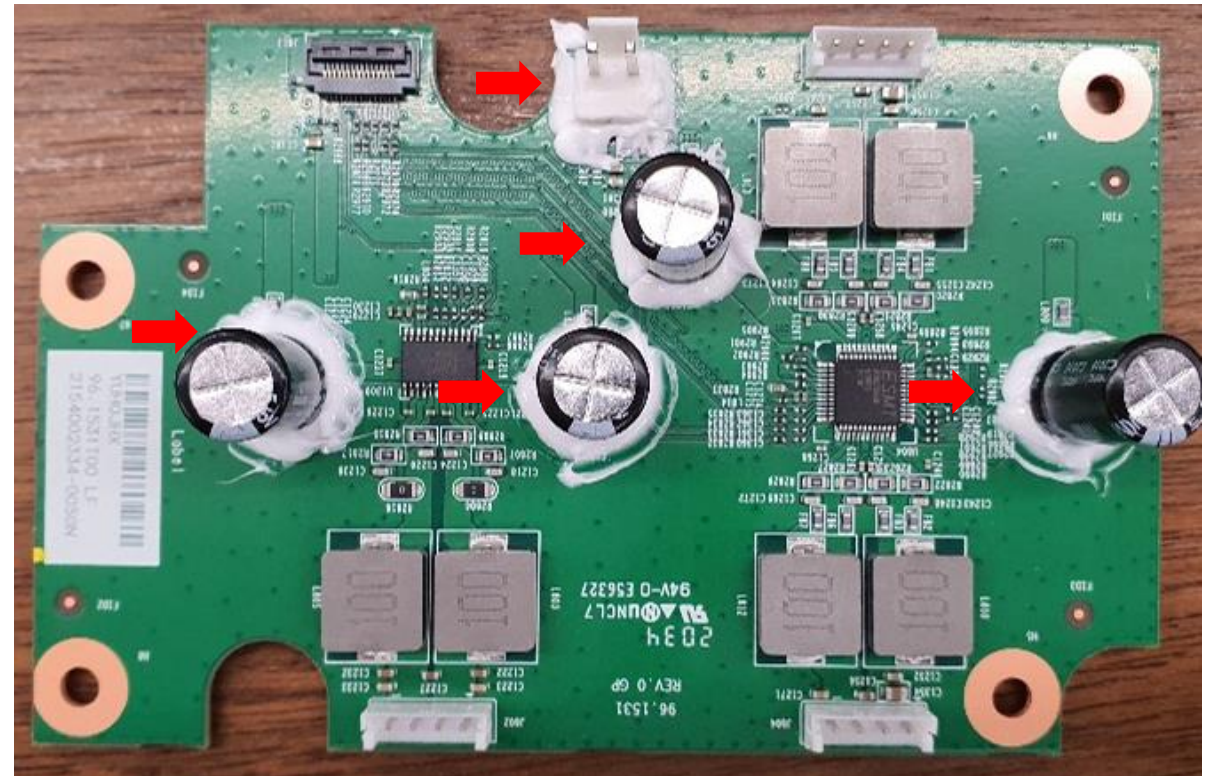
- **AMP board components vibration**(Owner: Foxconn)

- Apply quick-drying chemicals on the connector
: To avoid vibration with board
- Apply quick-drying chemicals on E-Caps
: To avoid vibration with board
- Appliance: DVT build

Test condition	
SPK input voltage	8.94V
Input source	Woofer_Left



Example picture

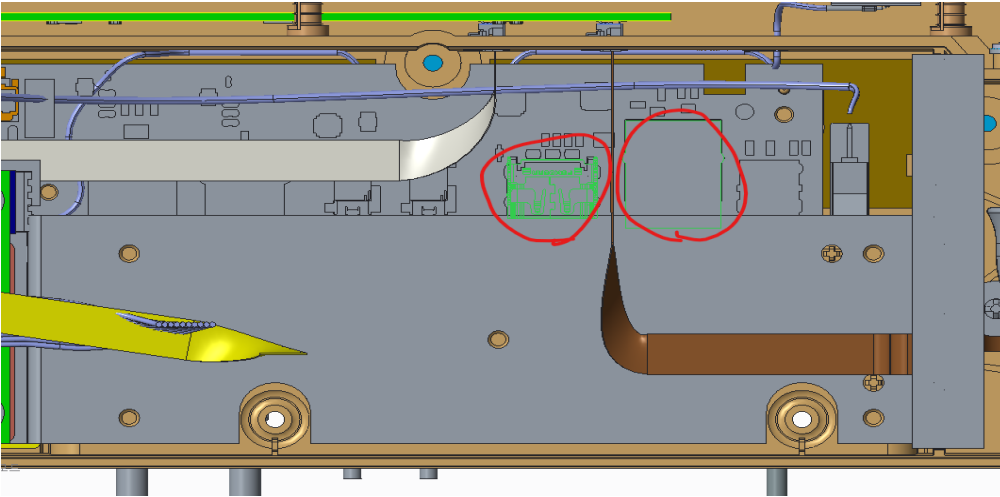


- Main Board Ethernet connector with HDMI connector (Owner: Foxconn)

- Apply quick-drying chemicals on the connector
: To avoid vibration with Ethernet connector and HDMI Connector
- Appliance: DVT build

Test condition

SPK input voltage	8.94V
Input source	Woofer_Left



Example picture



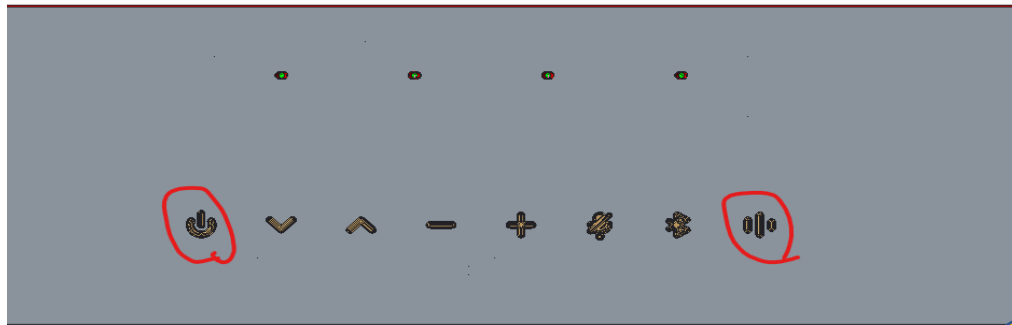


● Button Knob vibration(Owner: Inkel): Power key and Sound field key

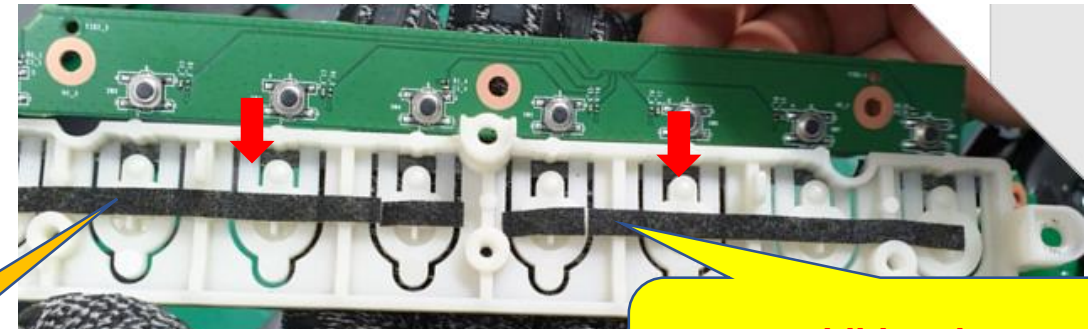
- Apply non-woven fabric tape between button knob and Top housing.
: To avoid vibration with key knob and key button on button board
- Appliance: DVT build

Test condition

SPK input voltage	8.94V
Input source	Woofer Left



Example picture

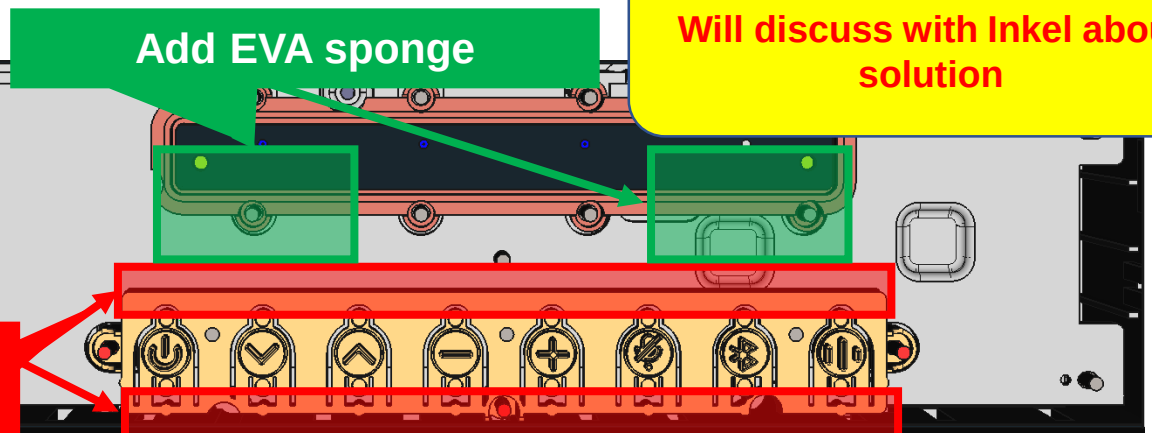


FII commented gap(button knob and button) is almost 0.1mm, but non-woven fabric tape is almost 0.25mm. So, button should be malfunction or not pressed.

Add EVA sponge

ALT additional comment:
Will discuss with Inkel about solution

Apply non-woven fabric tape



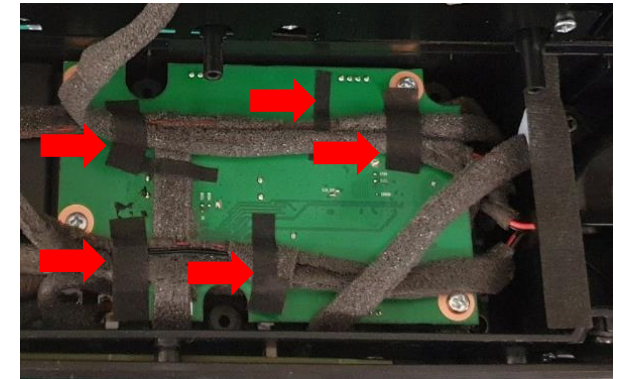
Action item



1. All of cables need to apply Polyurethane foam.

- If not in cable specification of Polyurethane foam supplied by Foxconn, need to be apply before DVT assembly.
- SPK cables use Polyurethane foam 3T sheet
: reference PU foam data sheet will be update

Example picture



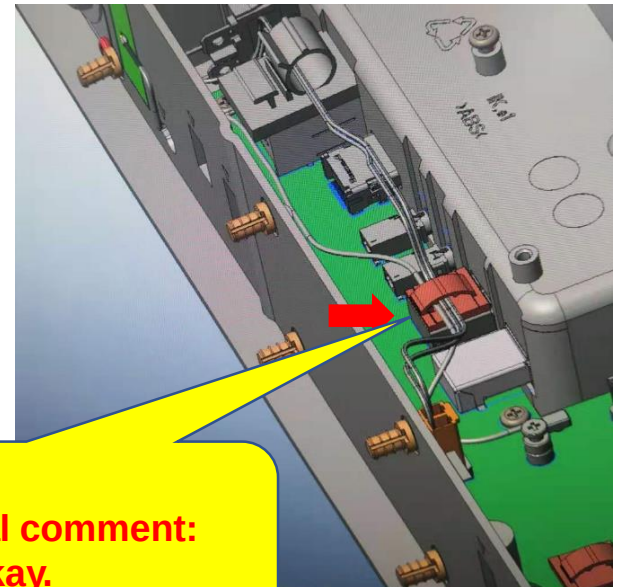
2. Factory have to prepare to fact quick-drying chemicals

- Need to check the list of subsidiary materials approved by the factory
: Other sound product manufacturing line may use this item.
- This document improvement used this silicon. Also Inkel use this silicon
: GB-508W_[En_TDS__rev20111108]

Fill Proposal &
Conclusion

3. Factory have to prepare to non-woven fabric tape for cable fix to assembly

- Need to check the list of subsidiary materials approved by the factory
: Other sound product manufacturing line may use this item.
- Please refer to the below picture.



ALT additional comment:
It's okay.

Subsidiary materials information (Reference data)



No.	Items	Unit	Specification	Comment
1	Apparent density	Kg/m ³	119.6	
2	Spring hardness	-	47	
3	Tensile strength	MPa	1.19	
4	Elongation	%	90	



Non-woven fabric

1. Part Name: OB40HB-2
2. Weight(g/m²): 55.0 ± 5
3. Thickness(cm): 0.25 ± 0.04
4. Materials
 - Viscose Rayon 42%
 - PET 28%
 - Water-soluble acrylic binder 21%
 - Carbon black 9%
5. Tensile strength(Kg/30cm)
 - MD 7.0 Kg ±2.0
 - CD 2.0 Kg ±1.0
6. Tensile elongation(%)
 - MD 10.0 Kg ±5.0
 - CD 10.0 Kg ±5.0
7. Ventilation: 180 ±20 cm² /cm² /S

POLYURETHANE FOAM



Items	Unit	Specification	Test Result	Test Methods	Comment
Apparent density	Kg/m ³	20 ± 2	19.92	JIS K 7222	
Hardness(I.L.D. 25%)	kgf/314cm ²	11 ± 2	12.85	JIS K 6400-2(D)	
Tensile strength	kgf/cm ²	Over 0.6	1.222	JIS K 6400-5	
Elongation	%	Over 100	148.59	JIS K 6400-5	
Tear strength	kgf/cm	Over 0.6	0.937	JIS K 6400-5	
Combustibility	mm/min	Under 100	SE	FMVSS 302	

項 目 ITEM	單 位 UNIT	規 格 值 SPEC. VALUES	檢 驗 方 法 TEST METHOD
I.組成 Composition:			
1.基材 Backing:		Polyimide Film	
厚度 Thickness	mm	0.025	ASTM D-1000
基重 Base Weight	g/m ²	-	ASTM D-1000
2.粘膠 Glue:		Silicone Adhesive	
3.離型材料 Liner:		-	
II.物性與化性 Physical & Chemical Properties:			
1.總厚度 Total Thickness:	mm	0.065±10%	ASTM D-1000
2.總基重 Total Weight:	g/m ²	-	ASTM D-1000
3.180°剝離粘著力 180° Peel Adhesion			
對鋼板 To Steel:	kgf/25mm	0.65-0.95	ASTM D-1000
4.初期力 Tack:	#14/cm	1-5	PSTC-6
5.剝離力 Unwind Force:	gf/25mm	600-1300	ASTM D-1000
6.保持力 Holding Power:	min	-	PSTC-7
(25mm*25mm*2kg)			
7.抗張強度 Tensile Strength:	kgf/25mm	9 ↑	ASTM D-1000
8.伸長率 Elongation:	%	50 ↑	ASTM D-1000
9.耐熱性 Heat Resistance:		PASS	
(200°C*2hrs)			
10.耐燃性 Flammability :	sec	60 ↓	UL 510A
11.耐溶劑性 Solvent Resistance :	min	30 ↑	
12 破壞電壓 Dielectric Breakdown :	KV	5.2 ↑	
13 其他 Other:			

