

SWAN Acoustic Test Requirement for Mass Production

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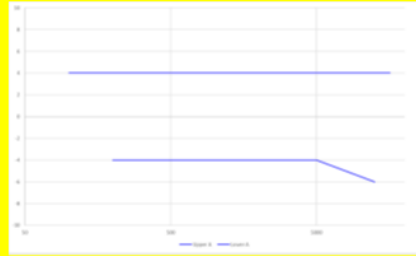
- Acoustic Test Item and Criteria for mass production

Function	Test item	Measuring distance*	Specification*	Criteria*	Comment
Speaker	FRF	50CM	100Hz~10KHz(1/12 Octave)	TBD	Speaker output can be controlled each channel by computer
	Rub & Buzz		100Hz ~ 2KHz	TBD	
	R/L Balance		1KHz	TBD	
MIC	FRF	50CM	100Hz~10KHz(1/12 Octave)	TBD	MIC input can be controlled for each channel by computer
	Sensitivity		1KHz	TBD	
	Balance		1KHz	TBD	

- All of test specification and criteria will be fixed before Mass Production by customer
- it will be defined base on EVT/DVT test result.
- FXN R&D team have to discussed with ALT about test specification and criteria
- The BFX-UA300 Manufacturing Specification will be include this acoustic test items and criteria

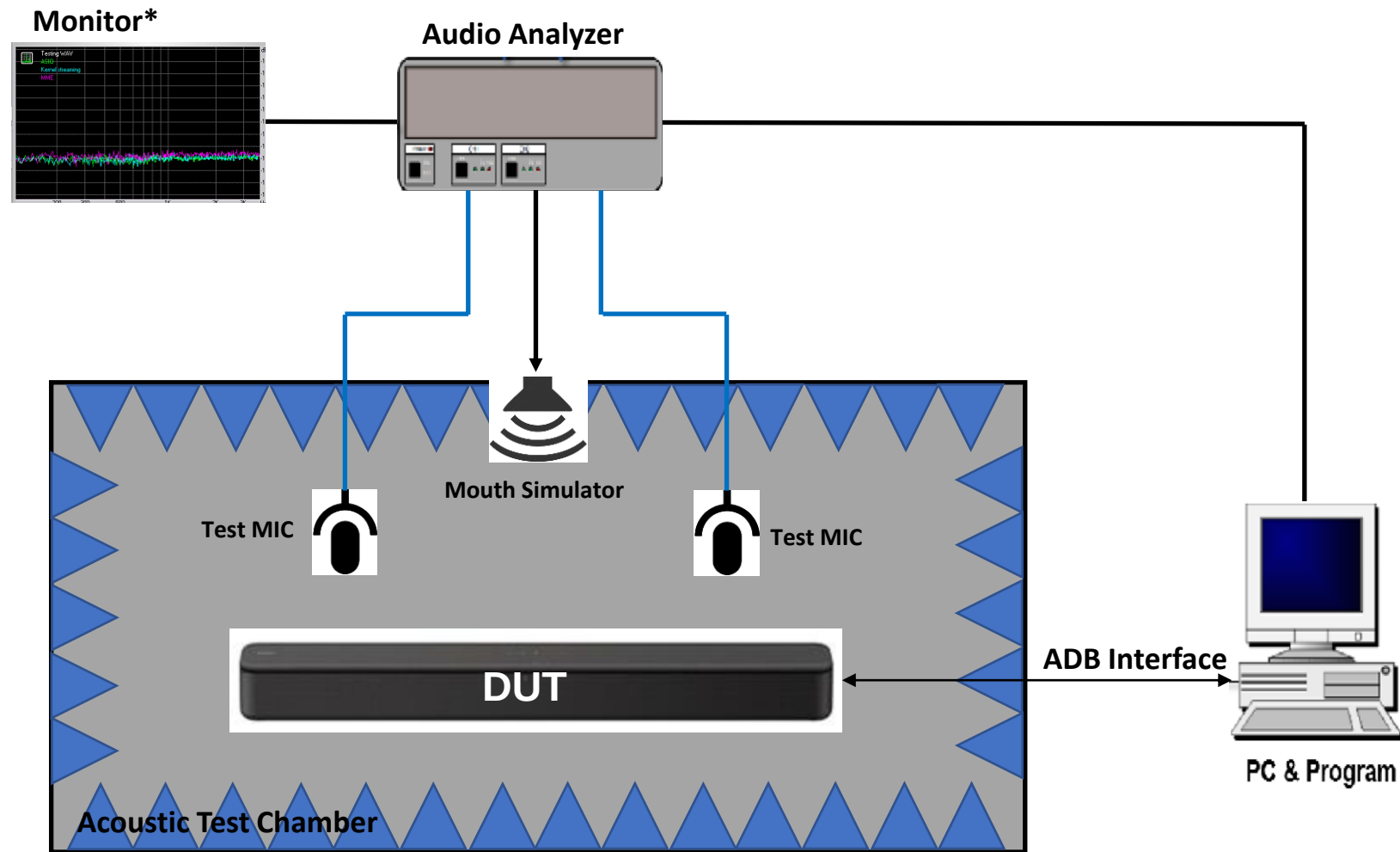
* This item may changed by customer requirement

● Acoustic Test Item and Criteria for RFP

	Item	Criteria	Description																		
mic/spk quality evaluation	Mic Frequency response	No dip within 8KHz @ 100~10KHz. Mic peak 8KHz Δ  <table><tr><th></th><th>Upper A</th><th>Lower A</th></tr><tr><td>100</td><td>4</td><td></td></tr><tr><td>200</td><td>4</td><td>-4</td></tr><tr><td>5000</td><td>4</td><td>-4</td></tr><tr><td>12500</td><td>4</td><td>-6</td></tr><tr><td>16000</td><td>4</td><td></td></tr></table>		Upper A	Lower A	100	4		200	4	-4	5000	4	-4	12500	4	-6	16000	4		Measurement of microphone frequency characteristics at 94dB SPL in front of 1m measuring speaker
	Upper A	Lower A																			
100	4																				
200	4	-4																			
5000	4	-4																			
12500	4	-6																			
16000	4																				
	Mic.Harmonic Distortion	Total harmonic distortion is within 4% at 1kHz of 94dB SPL	check distortion at 94dB SPL in front of 1m measuring speaker																		
	Spk.Frequency Response	Keep flatness From F0 to 20KHz.  <table><tr><th></th><th>Upper A</th><th>Lower A</th></tr><tr><td>300</td><td>3</td><td>-6</td></tr><tr><td>500</td><td></td><td>-3</td></tr><tr><td>8000</td><td></td><td>-3</td></tr><tr><td>12000</td><td>3</td><td>-6</td></tr></table>		Upper A	Lower A	300	3	-6	500		-3	8000		-3	12000	3	-6	Measurement microphone 1m front rating and 1W output speaker frequency characteristics check			
	Upper A	Lower A																			
300	3	-6																			
500		-3																			
8000		-3																			
12000	3	-6																			
	Spk.Harmonic Distortion	within 50% THD @ 20Hz~70Hz within 20% THD @ 70Hz~400Hz within 5% THD @ 400Hz~20KHz	conduct THD with 80DB SPK, 1m in front of measurement mic																		

- This Mic and Speaker quality evolution items are limited to development evaluation items.
- Below test items included in mass production MIC test items.
 - Mic Sealing and Mic Isolation

- Setup Diagram



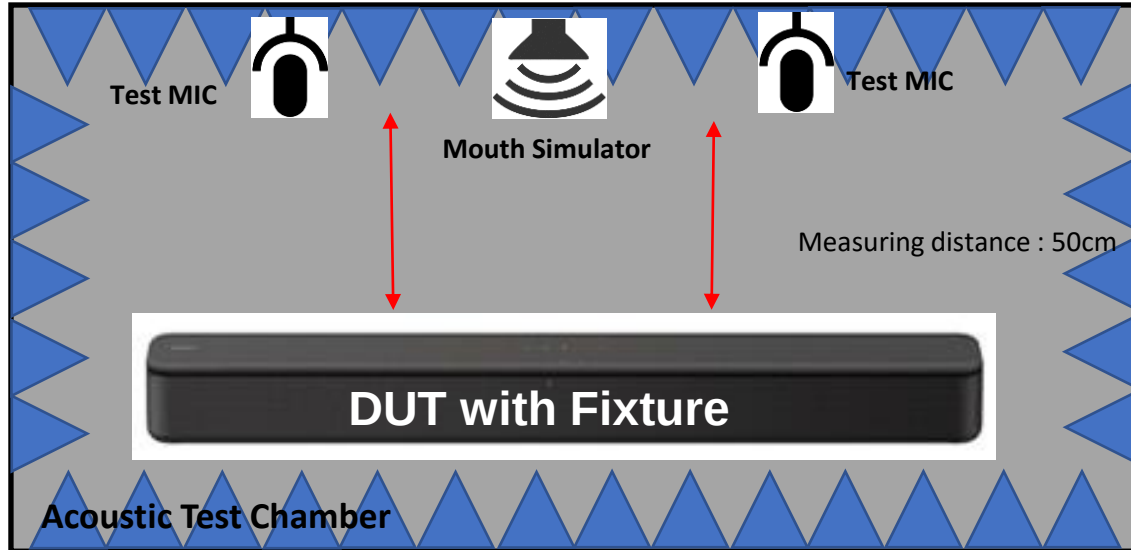
*Monitor is option for debug.

- **Test Equipment list**

Item	Part Name	Specification
Audio Analyzer*	Speaker Test Measurement	FRF/THD/Rub & Buzz/Balance
Audio Analyzer*	MEMS Audio Analyzer	FRF/THD/Balance
Test Chamber	Anechoic Box(Compact/Portable Type)	Shielding rate < 30dB
Microphone	½" Microphone& Preamplifier	Frequency Response: 6.3 ~ 125000Hz
Speaker	Mouth Simulator	3" Speaker, 8 ohm
Cable and Accessories		
Fixture for placement		
Golden Sample(DUT)	BFX-UA300	for Acoustic test station calibration

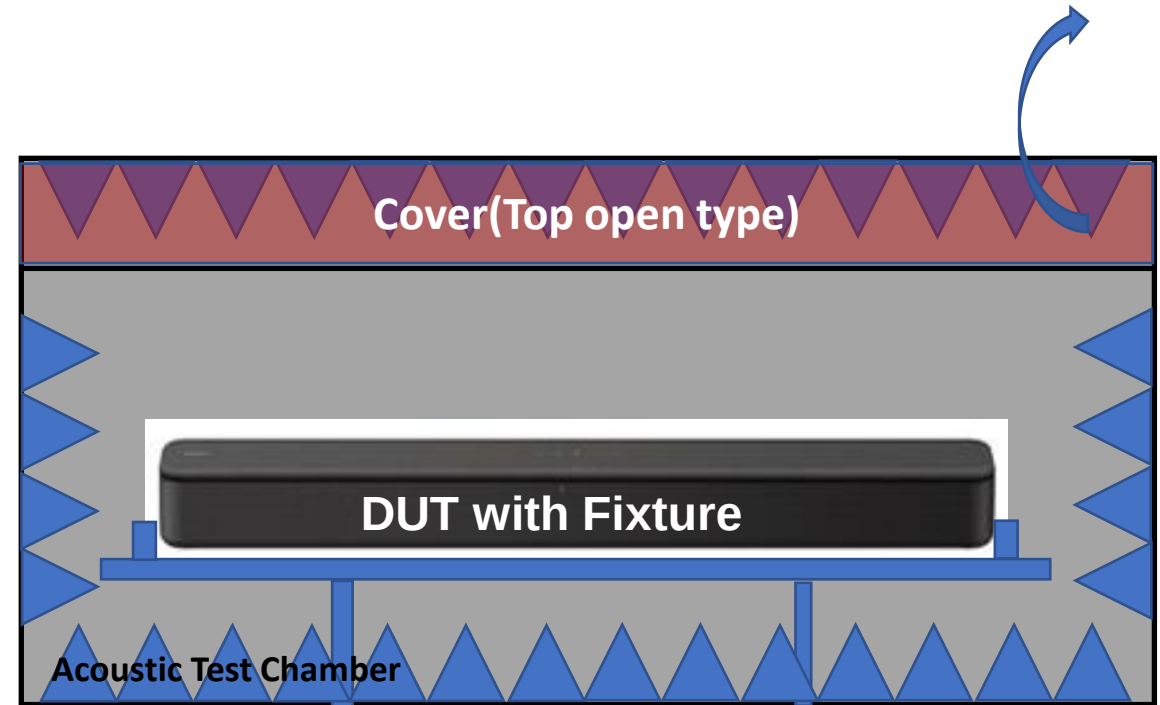
- Audio Analyzer: Can use test equipment selected by Foxconn
 - Reference audio analyzer maid BAKO from Korea company
 - <http://www.bako.co.kr/speakers/bk2120a.htm>
- Golden sample: only use calibration(Calibration cycle should be included Manufacturing Specification)

- **Concept of Acoustic Chamber: Top open type**



[Top View]

1. **Mouth Simulator:** To be placed Front of center on DUT
2. **Test MIC:** : To be placed Front of left/right on DUT
3. **Fixture:** To use only placement fix
4. **Acoustic Box:** Acoustic Shielding rate < 30dB



[Center View]

1. Test Structure Proposal

Your test structure proposal can be covered Acoustic Test Item requirements.

Please add below test items.

Speaker

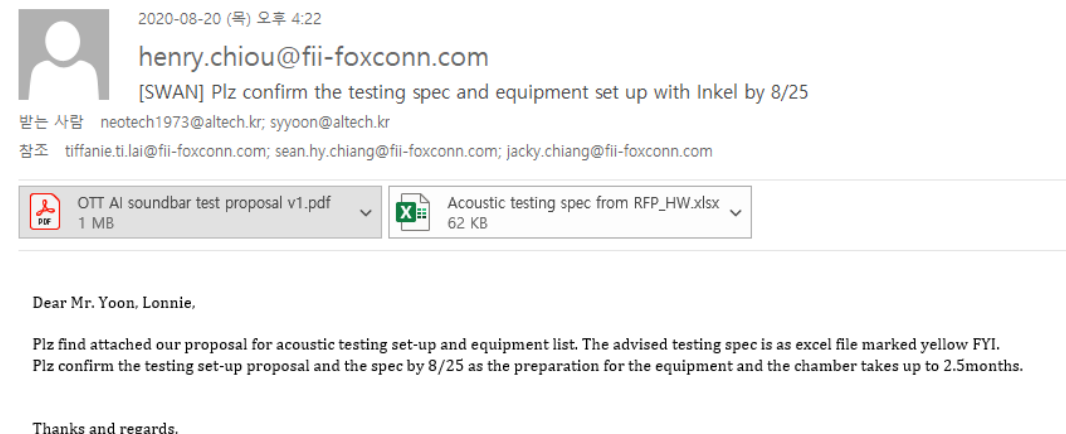
Rub & Buzz

R/L Balance

Mic

Sensitivity

Balance



2. Acoustic Chamber Automated Operation

That's a good suggestion.

The Acoustic Chamber Automated Operation for SWAN is determined by Foxconn itself at mass production.

But the equipment investment (NRE) for Acoustic Chamber Automated Operation of SWAN paid by ALT is not acceptable.

Please make the test proposal based on manual operation acoustic chamber

- Calculate the production capacity based on 1 line manual operation acoustic chamber
- After DVT production result, Let's start the discussion to meet the monthly capacity for SWAN mass production quantities.

- Concept of Acoustic Chamber Concept_2): Manual drawer type



*** Example Image**



Thank you.

