

Swan_soundbar_DVT_MIC_sesaling test



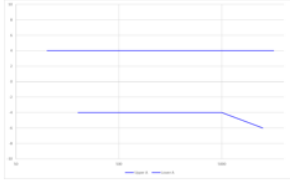
ALT Co., Ltd.

Issued Date 2021.04.02

Ver.1.0

Issued by SH, SON

• MIC sealing spec by RFP

기능정의	요구사항 정의	관리 주파수 대역	요구사항 상세	측정조건
Microphone (Single 기준)	*Frequency Response		관리 주파수 대역 내에서 8kHz 이하는 deep 구간이 없어야 함 Mic peak 8kHz △ 으로 발생/관리 	측정용 스피커 1m 정면 94dB SPL 에서 마이크 주파수 특성 확인 (SS)
	*Sealing	100 Hz ~ 10kHz	관리 주파수 대역 내에서 Mic hole open/closed시 RMS값 차이 25dB △ 관리 주파수 대역 내에서 8kHz 이하는 솟는 구간이 없어야 함	측정용 스피커 1m 정면 94dB SPL 에서 신호 재생 (SS) 후 녹음. Mic hole 밀폐 후 재 녹음.
	*Total Harmonic Distortion		관리 주파수 대역 내에서 total harmonic distortion 4% ▽	측정용 스피커 1m 정면 94dB SPL 에서 마이크 harmonic 왜곡도 확인 (SS)

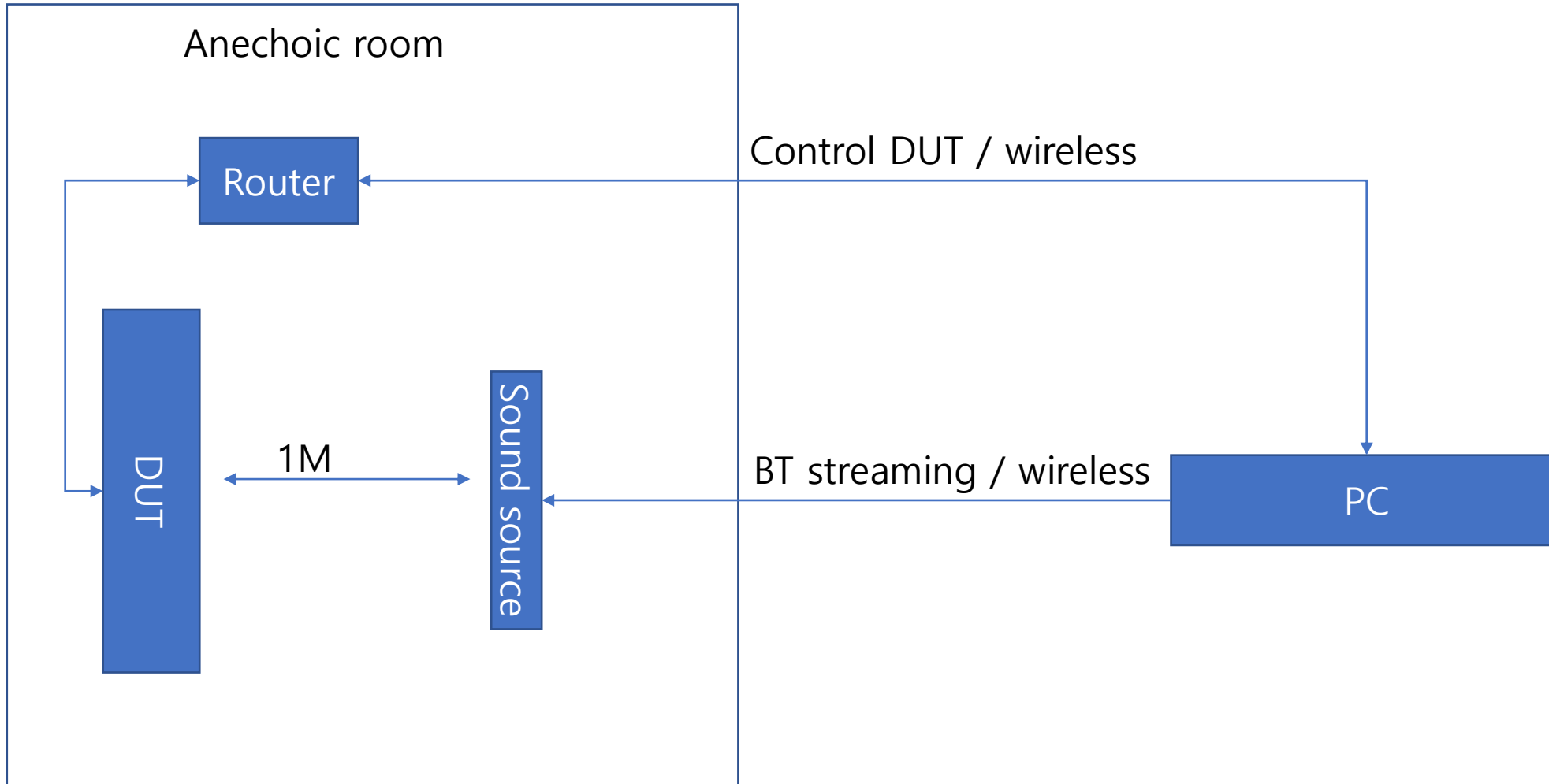
• ADL/ADD spec by RFP

Mic. / Spk. 배치 평가 (정성적 평가)	Mic.Direction	사용자 방향 배치 추천. 불가능할 시 중립 방향.	H/W 디자인의 방향성 보유 여부 에 따라 결정
	Mic.Distance	3 cm ~ 12 cm 이내	너무 멀거나 가까우면 음성인식 전처리 성능 저하
	Mic. Hole	ADL/ADD < 4	Hole 깊이가 얇고 지름이 클수록 좋음. 가급적 3 내외 추천
	Mic. / Spk.	Speaker로부터 최대한 멀리 Mic. 배치	AEC의 성능에 큰 영향

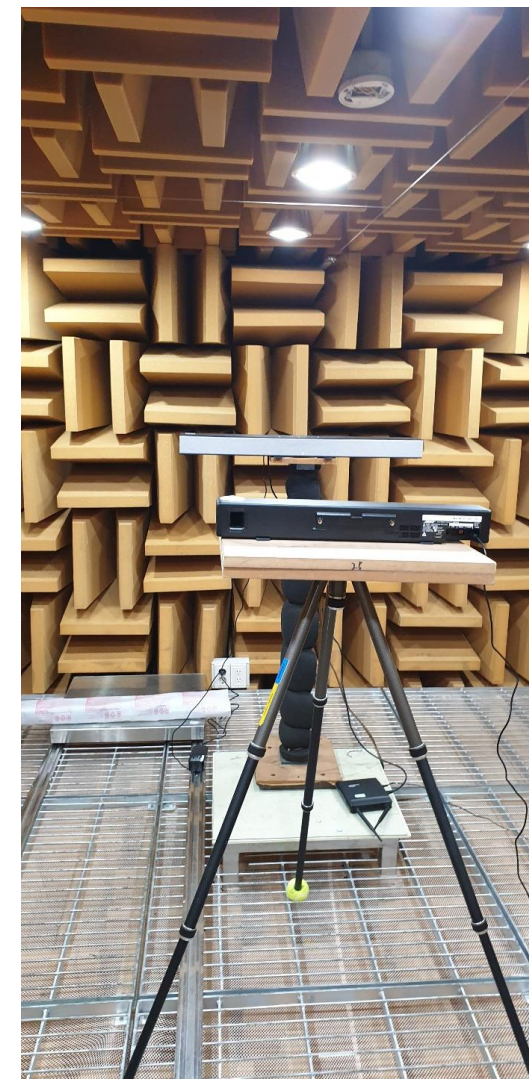
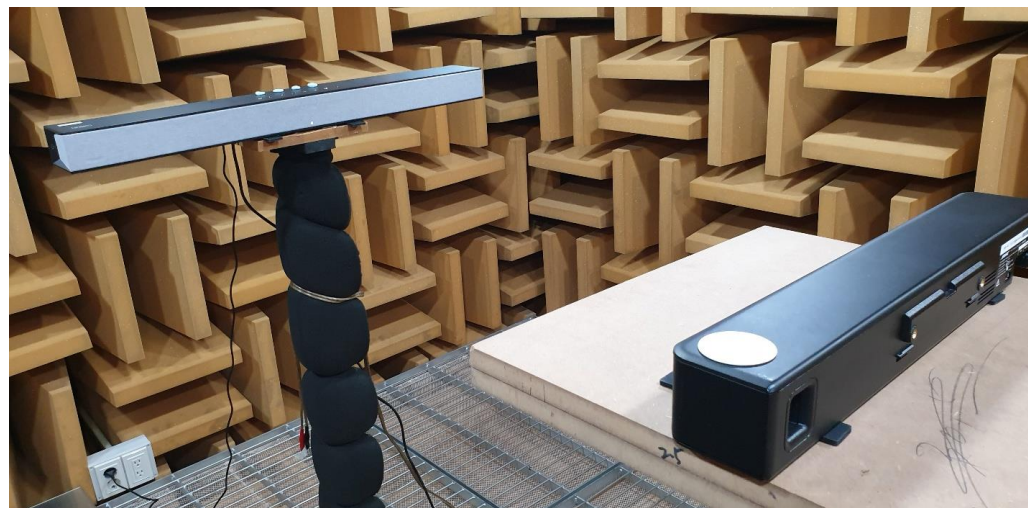
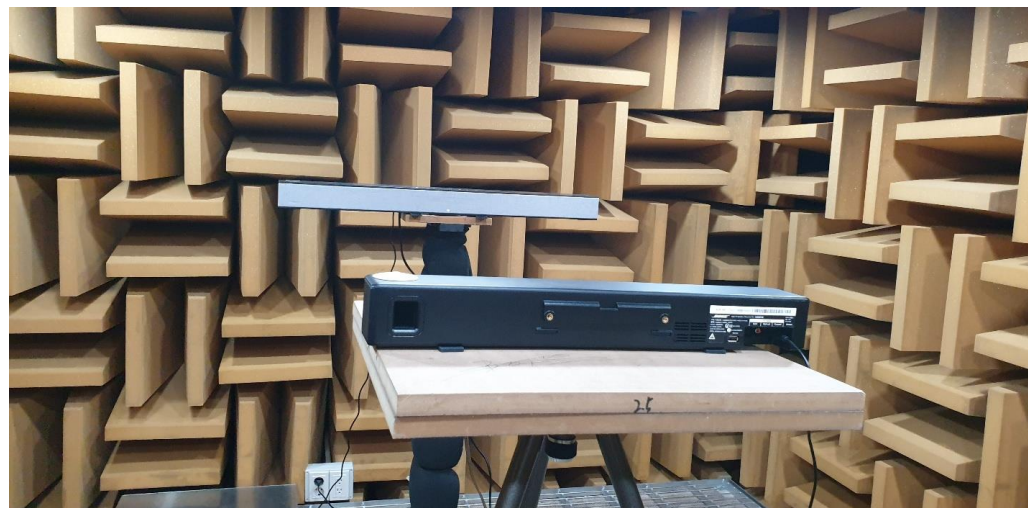
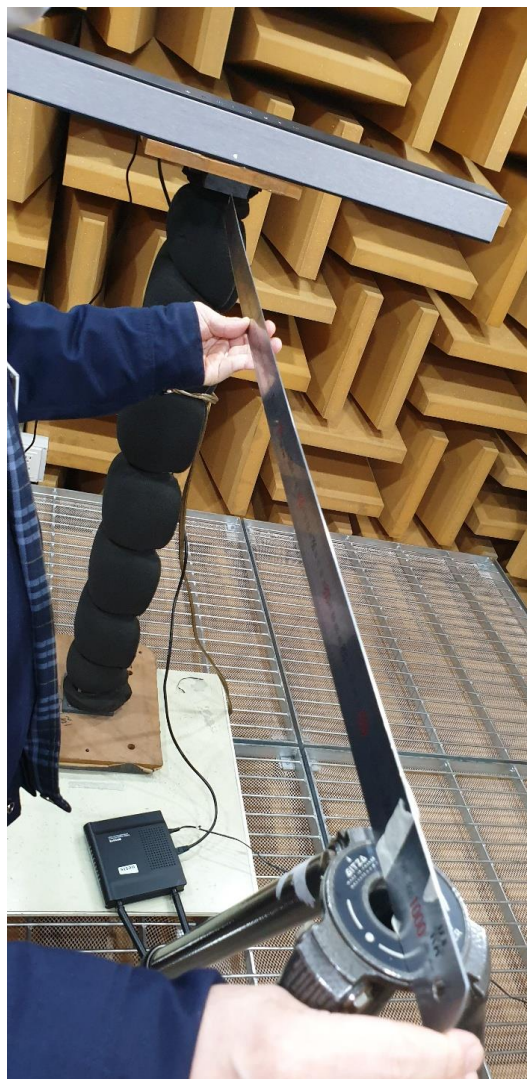
DVT design

ADL		4.5	ADD		1.50
	Top housing	1.8		Hole diameter	1.50
	Silicon	1.1			
	PCB	1.6			
현재					
ADL/ADD		3			

- Test Diagram



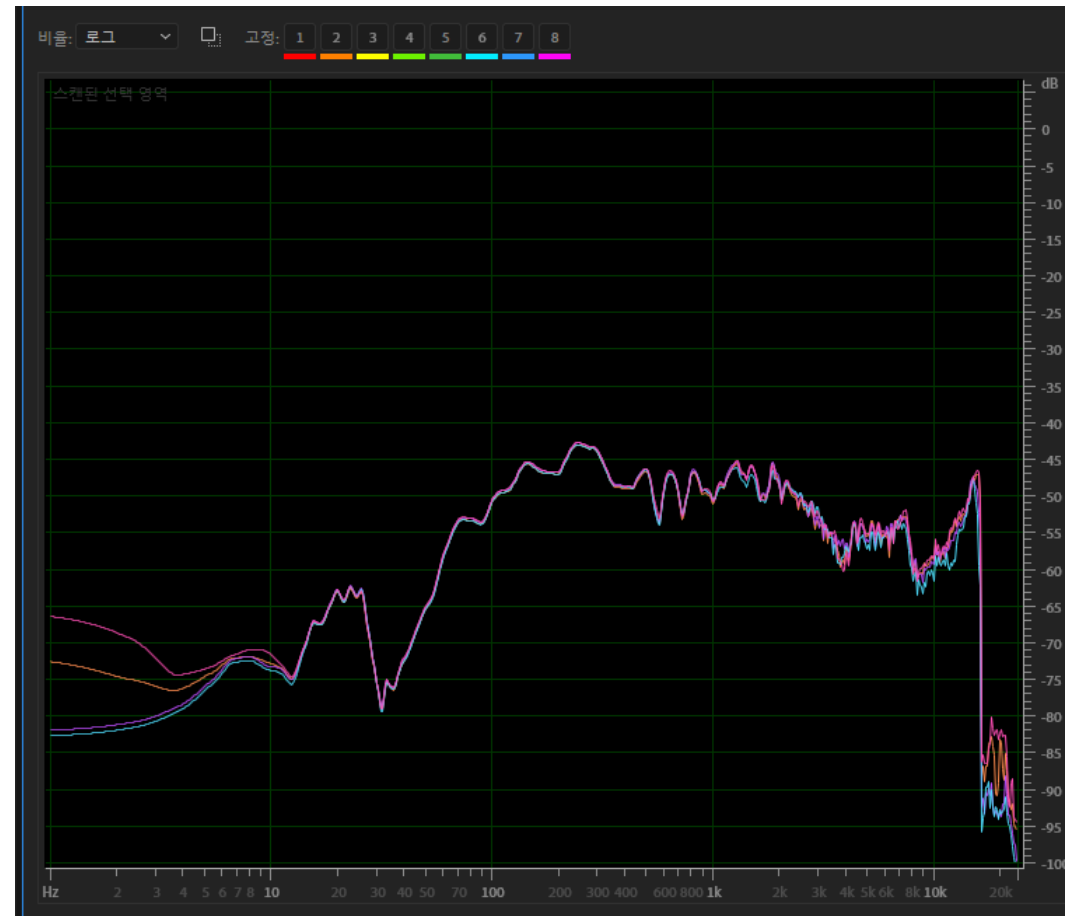
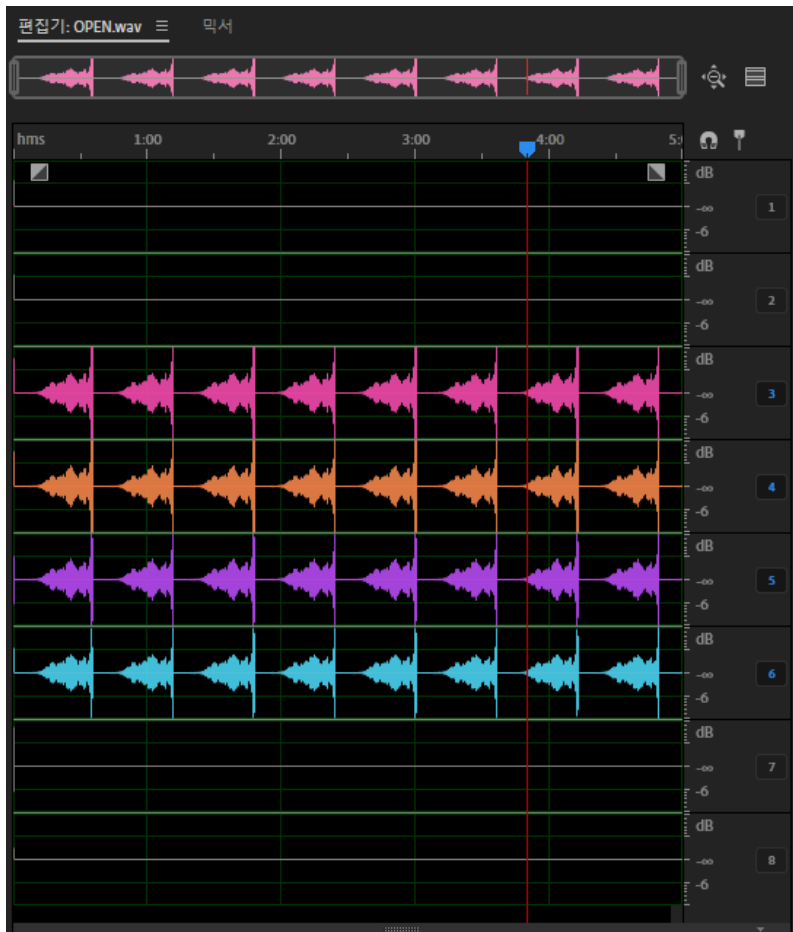
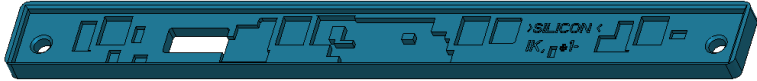
- Test Pictuer



- Test info for simple test
 - Date : 2021.03.29 14:00~
 - SW version : V19.522.49
 - Location : Inkel Anechoic room
 - Test stream : Youtube 20-20,000hz Audio Sweep
 - https://www.youtube.com/watch?v=PAsMlDptjx8&ab_channel=SonicElectronix
- Test conditions
 - Audio source : Youtube play using Bluetooth
 - Audio play : SoundBAR (Bose Solo TV speaker)
 - Audio Source / Play : max volume
 - Recording SWAN MIC and playback
- Test Flow
 - Play audio source (Sweep) -> recording SWAN, opened mic hole
 - Play audio source (Sweep) -> recording SWAN, closed mic hole
 - Compare raw recording file using adobe Audition
- Test command

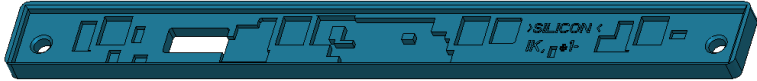
```
adb shell
$ su
# setenforce 0
# dmesg -n 1
# echo "0 0 0 0" > /proc/sys/kernel/printk
# service call bluetooth_manager 8
# tinycap /sdcard/test.wav -D 0 -d 0 -c 4 -r 48000 -b 32 -p 384 -n 32 -T 120
```

- DVT new mic silicon + SPONGE_MIC_SILICON 1.1t



MIC hole open

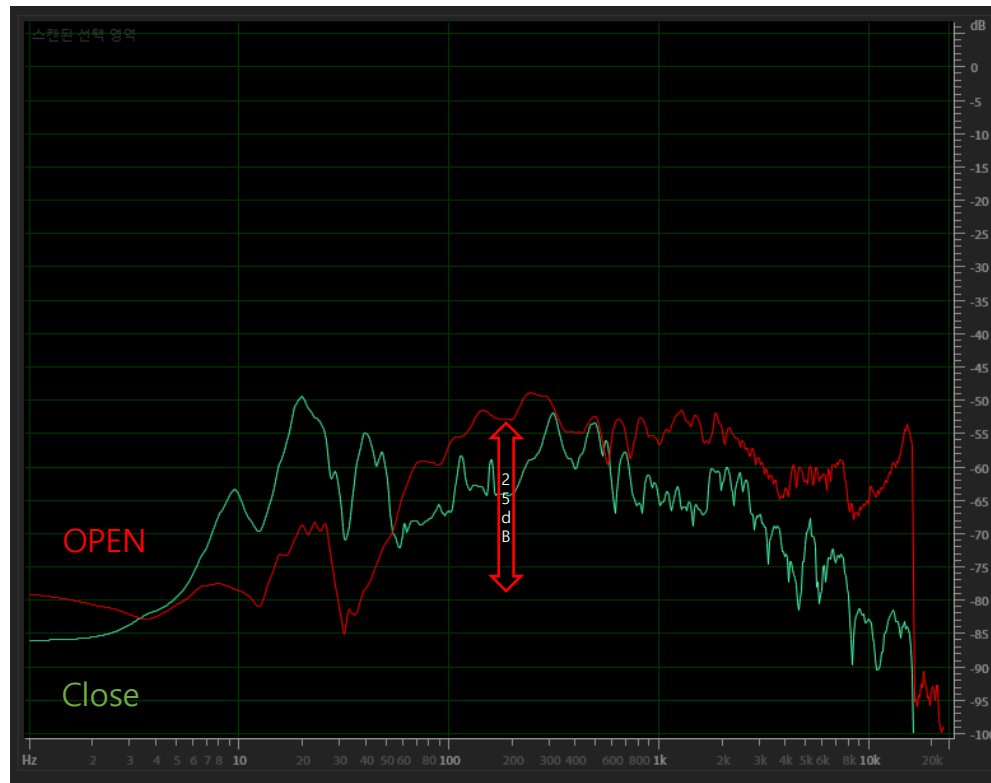
- DVT new mic silicon + SPONGE_MIC_SILICON 1.1t : PCBA label



- 4CH average

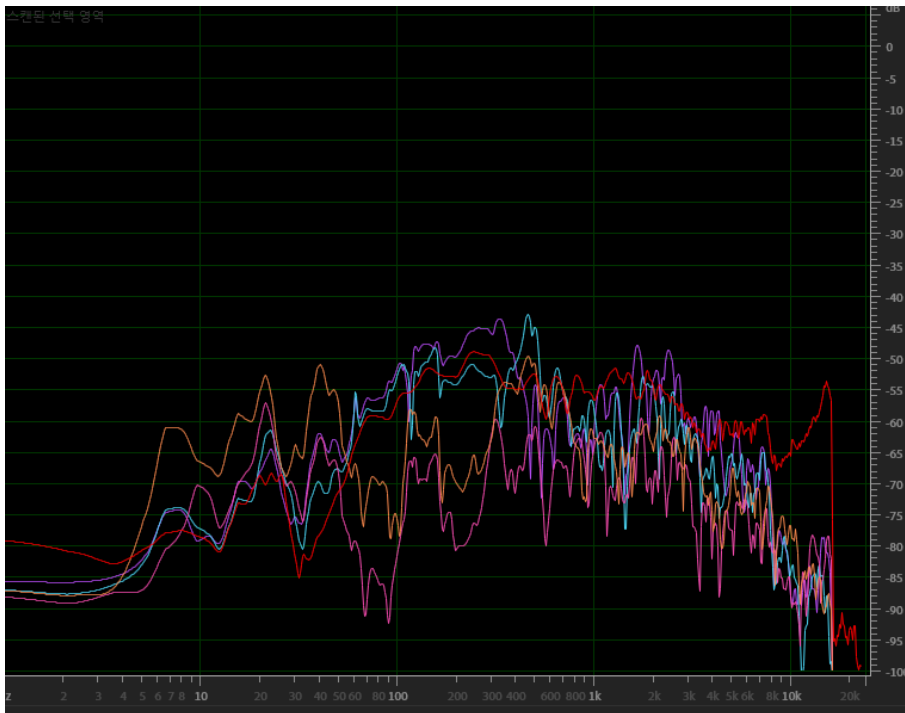


PCBA Label Bottom side

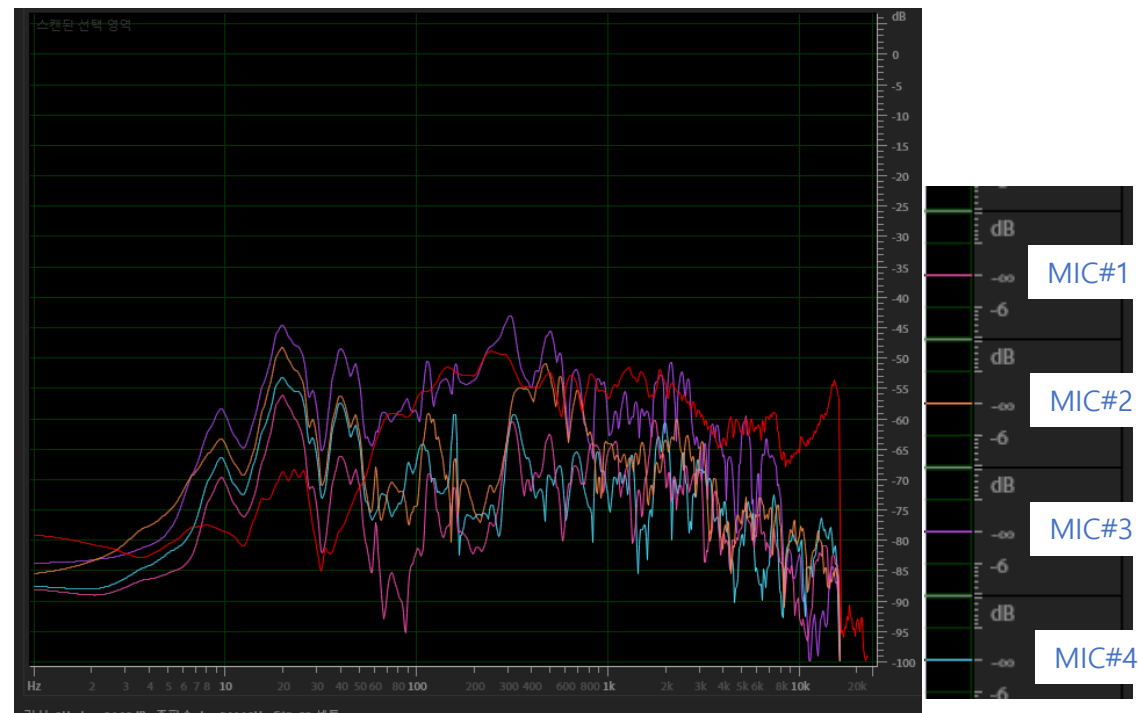


PCBA Label removed

- PCBA label move to top side or apply Lasor label
 - The label affects sealing performance
 - @200Hz, about -10db difference between label and remove label

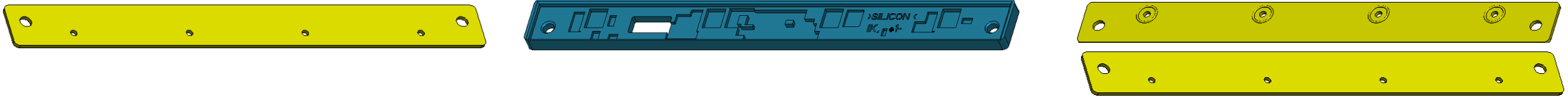


PCBA Label Bottom side

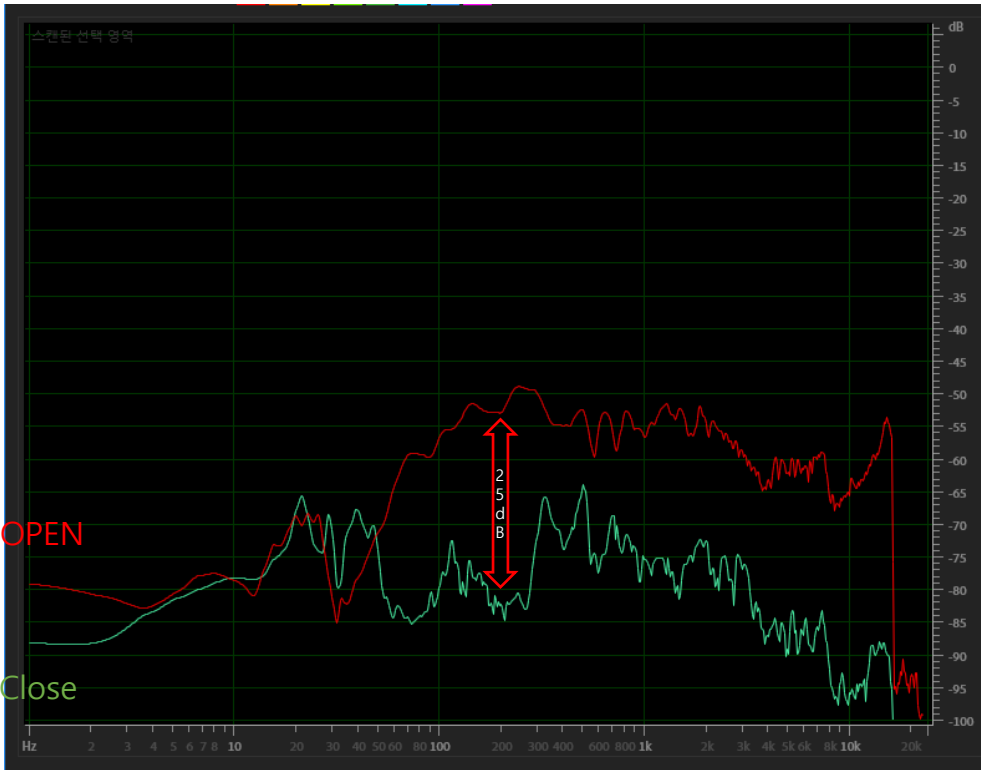


PCBA Label removed

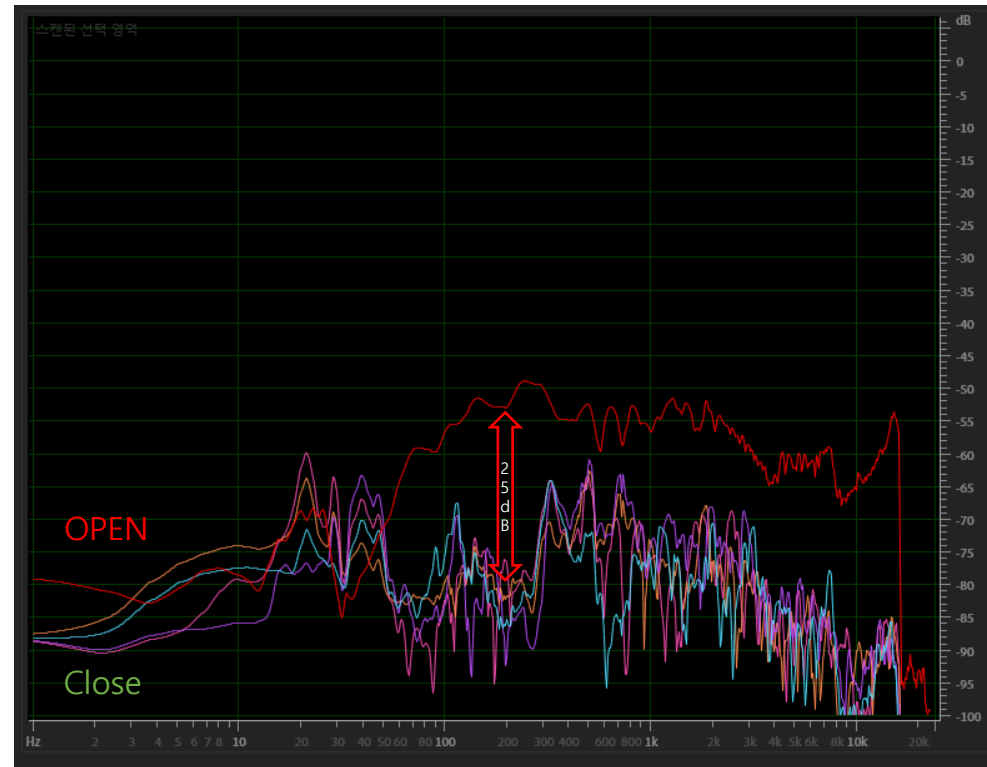
- 0.5T + DVT new mic silicon + new SPONGE_MIC_SILICON 1.1t



- Some of frequency (300hz, 500hz, 700hz) are not meet the requirement
- The other range has no sealing margin

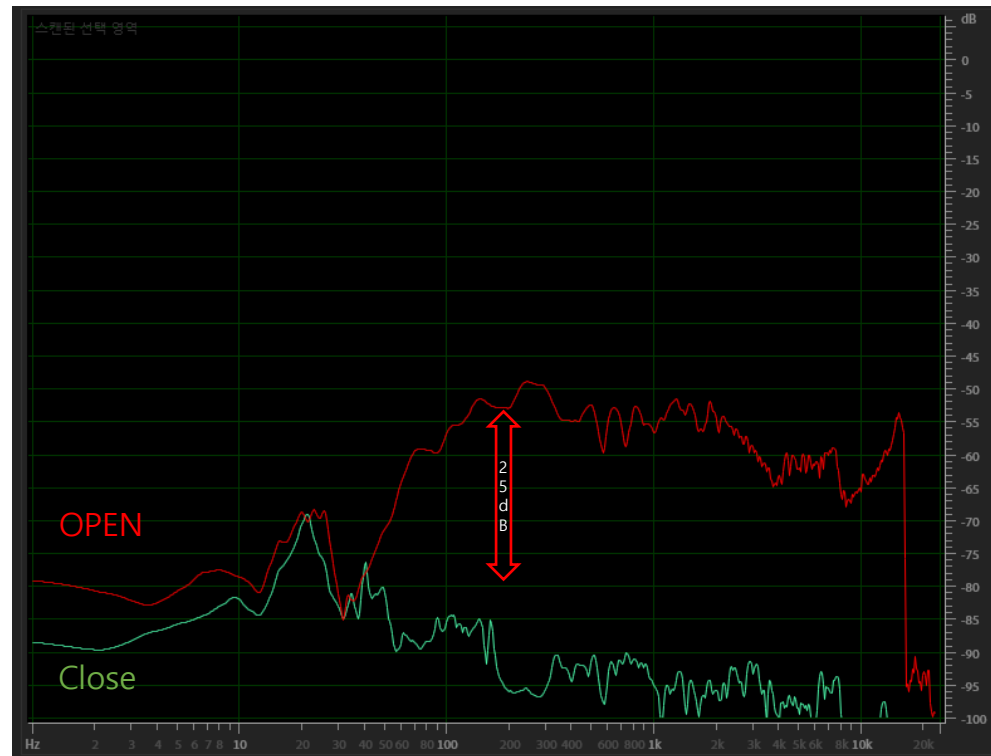
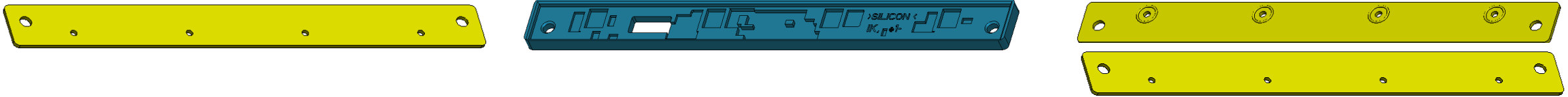


MIC hole open



MIC hole closed

- 1.0T + DVT new mic silicon + new SPONGE_MIC_SILICON 1.1t



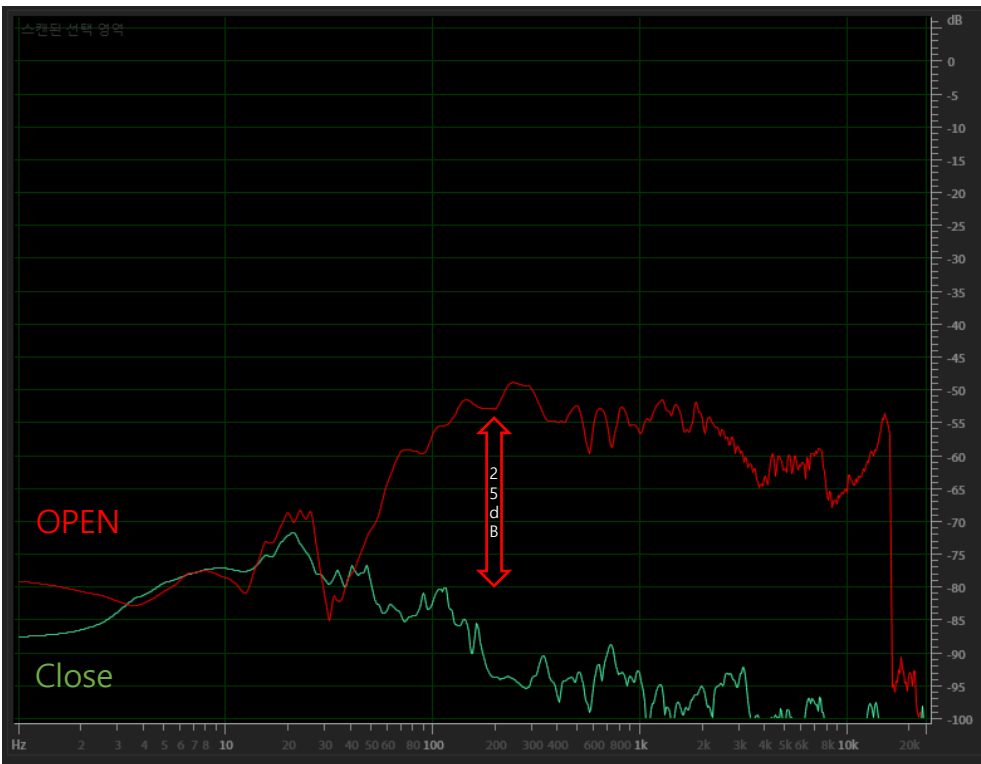
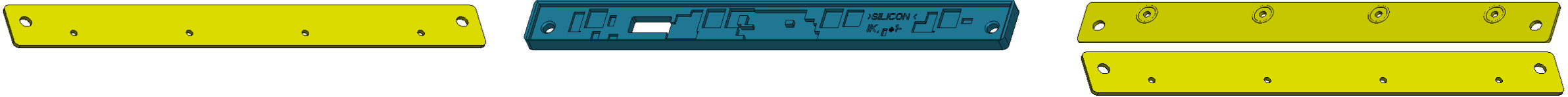
MIC hole open



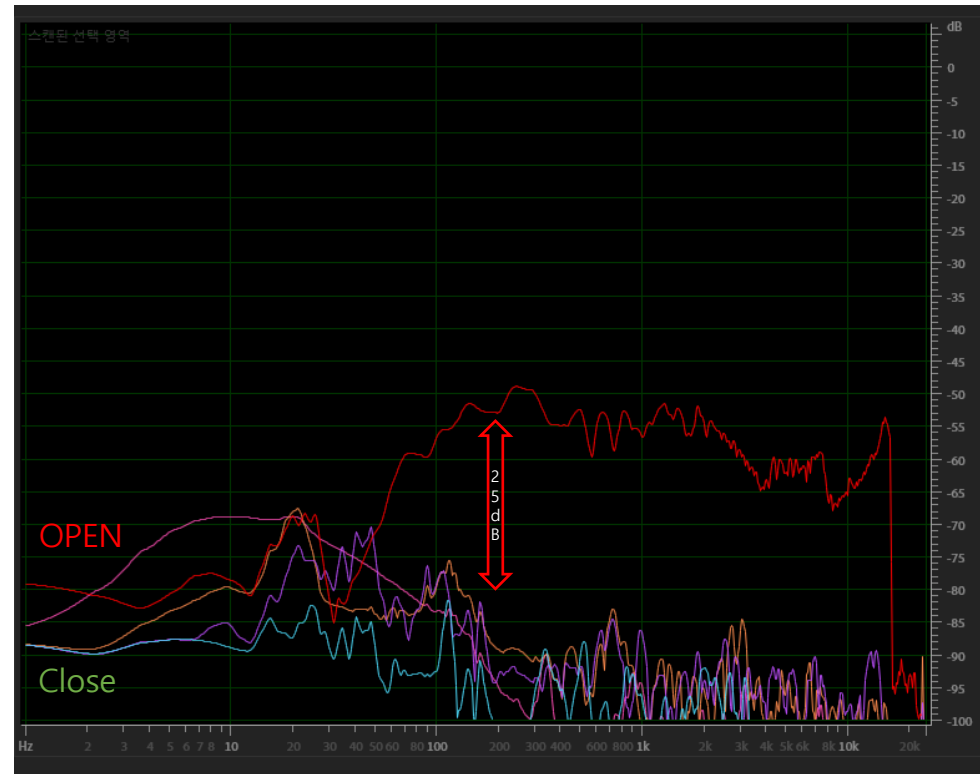
MIC hole closed

- All of frequency range has sealing margin : -25dB
- top cover deformation is occurred

- 1.5T + DVT new mic silicon + new SPONGE_MIC_SILICON 1.1t



MIC hole open



MIC hole closed

- All of frequency range has sealing margin : -30dB over
- top cover deformation is severed

- Next Plan

- DVT3 design

- +0.5t thickness silicon MIC back side and 1.1t Sponge MIC silicon - o-ring on the PCB side
 - Will verify before DVT3 assembly



Top housing

MIC PCB side

- Korea lab test : Fii tested top housing
- Finalized Mic sealing conditions : rubber design

- End of Documents