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LG ELECTRONICS INC.
TEST REPORT

SCOPE OF WORKs

ACOUSTICAL NOISE LEVEL (PWL) COMPARISON TEST AT '조용조용' COURSE FOR THE NEW CLOTHES DRYER

MODEL NUMBER

(New model) RD20****, W20**** / (Conventional model) RH17VTS

REPORT NUMBER

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TEST REPORT FOR LG ELECTRONICS INC.

Report No.: 211000063SEL-001
Date: 19-November-2021

OBJECTIVE

The test is performed to prove the reduction of acoustical noise level (PWL) at '조용조용' course for the new clothes dryer model from the comparison test at the other test course for the same model and conventional model under the test conditions provided by LG Electronics.

HYPOTHESIS

・Condition 1. New model (RD20VS) at '조용조용' course vs. '표준' course

: The sound power level at '조용조용' course will be lower than 2 dB or more.

・Condition 2. New model (RD20VS) at '조용조용' course vs. Conventional model (RH17VTS) at '표준' course

: The sound power level for the new model (RD20VS) at '조용조용' course will be lower than 3 dB or more.

CONCLUSION

Based on the data collected the Hypothesis is **accepted**:

・Condition 1. New model (RD20VS) at '조용조용' course vs. '표준' course

: The sound power level at '조용조용' course was lower than 2 dB or more.

・Condition 2. New model (RD20VS) at '조용조용' course vs. Conventional model (RH17VTS) at '표준' course

: The sound power level for the new model (RD20VS) at '조용조용' course was lower than 3 dB or more.

James Woo
PROJECT ENGINEER

Alexander Porter
REVIEWER

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SECTION 2 OBJECTIVE

The test is performed to prove the reduction of acoustical noise level (PWL) at '조용조용' course for the new clothes dryer model from the comparison test at the other test course for the same model and conventional model under the test conditions provided by LG Electronics.

Accuracy Needed 5 %
Accuracy and Repeatability should be determined from the multiple samples run as needed for the analysis conducted.

SECTION 3 PARAMETERS

The following parameters are controlled

VALUE	DESCRIPTION	UNITS	METHOD	MU
23	Test room temperature	°C	Thermo-hygrometer	0.5 °C (Approx. 95 %, *k*=2)
220	Voltage	VAC	AC Power supply	0.1 V (Approx. 95 %, *k*=2)
60	Frequency	Hz	AC Power supply	-
3.0	Cotton base load (based on IEC 60456)	kg	Weighing scale	0.02 kg (Approx. 95 %, *k*=2)
4.8	Weight for IMC 60 % of test load	kg	Weighing scale	0.02 kg (Approx. 95 %, *k*=2)

The following parameters are monitored

VALUE	DESCRIPTION	UNITS	METHOD	MU
23	Test room temperature	°C	Thermo-hygrometer	0.5 °C (Approx. 95 %, *k*=2)
220	Voltage	VAC	AC Power supply	0.1 V (Approx. 95 %, *k*=2)
60	Frequency	Hz	AC Power supply	-
3.0	Cotton base load (based on IEC 60456)	kg	Weighing scale	0.02 kg (Approx. 95 %, *k*=2)
4.8	Weight for IMC 60 % of test load	kg	Weighing scale	0.02 kg (Approx. 95 %, *k*=2)
-	Acoustical noise level (PWL)	dB	Free-field Microphone	0.16 dB (Approx. 95 %, *k*=2)

SECTION 4 SAMPLE ACQUISITION

Samples were prepared by LG Electronics Inc.:

MODEL #	DESCRIPTION	SERIAL #	PURCHASE LOCATION	DATE	CONDITION
RD20VS	New model (Dual Inverter Heat Pump Clothes Dryer, 20 kg)	110KWNM18023	Prepared by LG	2021/10/11	Unpackaged & undamaged
		110KWKS18021	Prepared by LG	2021/10/11	Unpackaged & undamaged
RH17VTS	Conventional model (Dual Inverter Heat Pump Clothes Dryer, 17kg)	007KWNM23343	Prepared by LG	2021/10/11	Unpackaged & undamaged

NOTE
1. The models RD20VS, RH17VTS were selected as representative test models.
2. In the model number RD20***, W20*** for the new model, the asterisk * can be 0 to 9 or A to Z or blank depending on the exterior changes.
3. The models RD20*** and W20*** are exactly same in all aspects of mechanical, electrical and operating algorithm only except the installation ways.
   (RD20***: Series or parallel installation, W20***: Series installation only)

SECTION 5 HYPOTHESIS

・Condition 1. New model (RD20VS) at '조용조용' course vs. '표준' course

: The sound power level at '조용조용' course will be lower than 2 dB or more.

・Condition 2. New model (RD20VS) at '조용조용' course vs. Conventional model (RH17VTS) at '표준' course

: The sound power level for the new model (RD20VS) at '조용조용' course will be lower than 3 dB or more.

SECTION 6 EQUIPMENT LIST

#	EQUIPMENT DESCRIPTION	MANUFACTURER'S NAME / MODEL # / SERIAL #	INTERTEK ASSET #	CALIBRATION DATE	CALIBRATION DUE	RANGE USED
1	AC Power supply	AC Power Korea / AFC-1010 / 060060-1	Provided by LG	N/A	N/A	Input: 1Φ 220 VAC 60 Hz Output: 1Φ (0~330) VAC 50/60 Hz
2	Digital power meter	Yokogawa / WT310E / C3UJ10007E	Provided by LG	2020-11-26	2021-11-26	(0~600) V 0.5 Hz ~ 100 kHz
3	Thermo-hygrometer	SEKONIC / ST-50A / HE21-001591	ES891	2021-07-16	2022-07-16	(-20 ~ +50) °C (0 ~ 90) % R.H.
4	Free-field microphone (1)	BRUEL & KJAER / 4190-L-001 / 2801388	Provided by LG	2021-05-17	2022-05-16	(15~148) dB (3.15~20 000) Hz
5	Free-field microphone (2)	BRUEL & KJAER / 4190-L-001 / 2801386	Provided by LG	2021-05-17	2022-05-16	(15~148) dB (3.15~20 000) Hz
6	Free-field microphone (3)	BRUEL & KJAER / 4190-L-001 / 2801384	Provided by LG	2021-05-17	2022-05-16	(15~148) dB (3.15~20 000) Hz
7	Free-field microphone (4)	BRUEL & KJAER / 4190-L-001 / 2801385	Provided by LG	2021-05-17	2022-05-16	(15~148) dB (3.15~20 000) Hz
8	Free-field microphone (5)	BRUEL & KJAER / 4190-L-001 / 2801389	Provided by LG	2021-05-17	2022-05-16	(15~148) dB (3.15~20 000) Hz
9	Free-field microphone (6)	BRUEL & KJAER / 4190-L-001 / 2801387	Provided by LG	2021-05-17	2022-05-16	(15~148) dB (3.15~20 000) Hz
10	PULSE Data acquisition unit	Simcenter / SCM2E02 / 22211103	Provided by LG	N/A	N/A	(0~25.6) kHz
11	Computer aided testing system	Simcenter / Simcenter Testlab 19.1	Provided by LG	N/A	N/A	
12	Anechoic chamber	- / - / -	Provided by LG	N/A	N/A	(W) 4.2 m × (D) 4.2 m × (H) 4.0 m Background noise level: 17 dB
13	Weighing scale for test load	AND / GP-61K / 14727670	Provided by LG	2021-02-10	2022-02-10	(0~60) kg
14	Test load	Cotton base load (based on IEC 60456)	Provided by LG	N/A	N/A	-
Note: The equipment measurement uncertainty is stated in the Parameter.						

SECTION 7 TECHNICAL STAFF

#	Staff Name	Area of Expertise
1	Seongjin, Seo	Specialist Engineer / Washing Machine RD/ED Division
2	Haedong, Lee	Specialist Engineer / Washing Machine RD/ED Division
Note: Complete training records for staff are available upon request		

Testing was conducted at:
LG Electronics Inc. Washing Machine Division
Address: 84, Wanam-ro, Seongsan-gu, Changwon-si, Gyeongsangnam-do, 51554, Korea
Witnessed by Intertek Staff: James Woo

SECTION 8 TEST PROCEDURE

1. Test conditions

Item	Requirements	Measured
Supply voltage	(220 ± 1) V	(219.9 ~ 221.2) V
Frequency	(60 ± 1) Hz	(59.9 ~ 60.0) Hz
Ambient temperature	(23 ± 2) °C	(23.3 ~ 23.6) °C
Relative humidity	(50 ± 5) %	(45.3 ~ 45.7) %
Weight of test loads/ Initial test load condition	IEC Cotton test load: 3.0 kg / IMC 60 % : 4.8 kg	
Test program	▪ New model (RD20VS): '표준' and '조용조용' ▪ Conventional model (RH17VTS): '표준'	

2. Test method

1) Install the test unit on assigned measuring area in the anechoic chamber.
2) 6 Microphones are installed apart from the test sample shown as Figure 1.

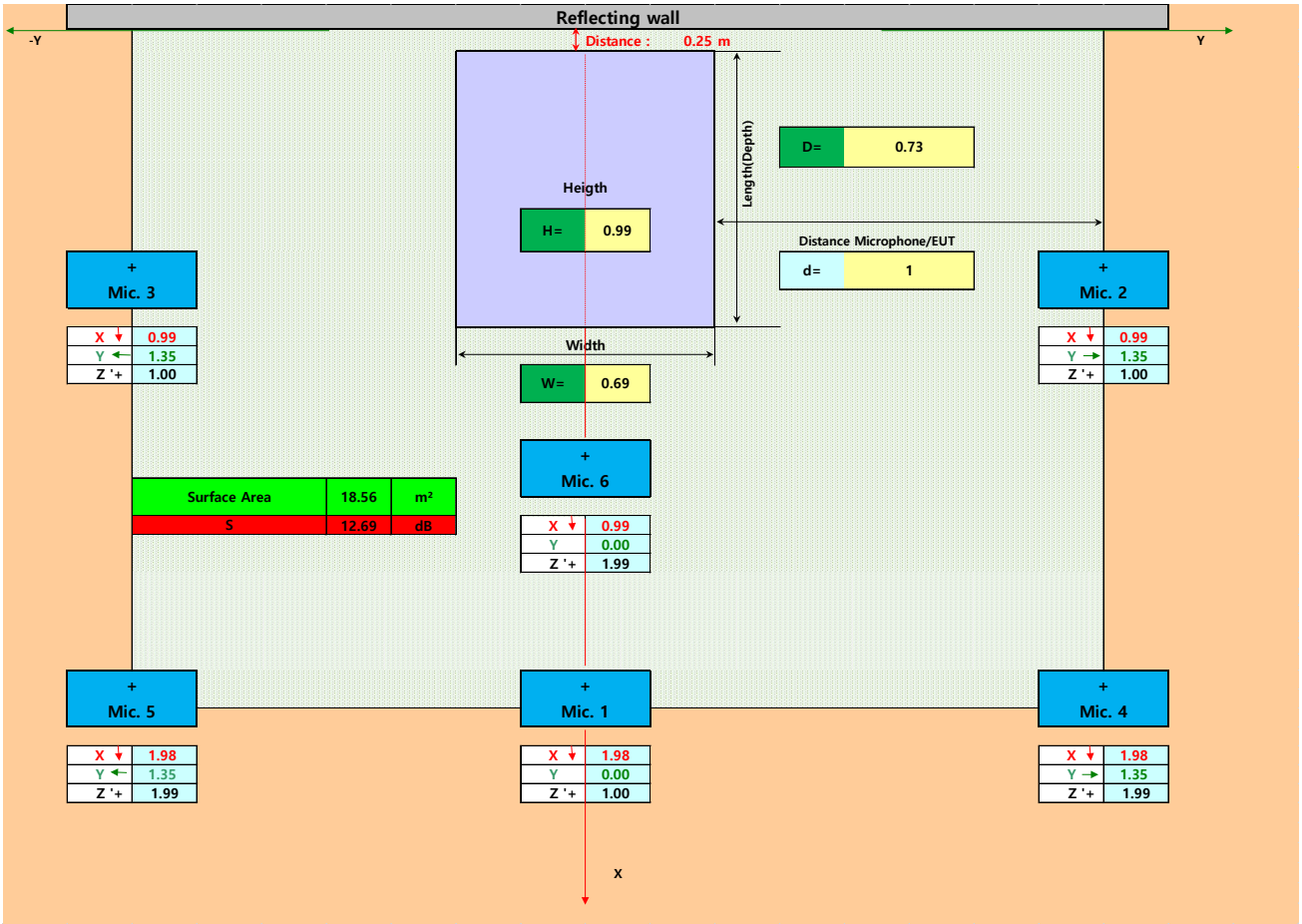


Figure 1. - Microphone positions

Note) The standard ISO 3744 is referenced for the microphone positions

3) Dampen the test load by agitating it in water then, extract water from the wet test loads by spinning.

4) Make a final mass adjustment, such that the moisture content is set at 60 % by adding water uniformly distributed among all of the test loads in a very fine spray using a spray bottle.

5) Load the test loads by grasping them in the center, shaking them to hang loosely, and then dropping them in the dryer at random.

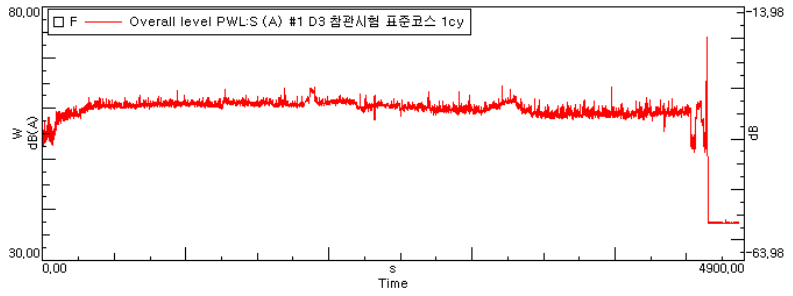
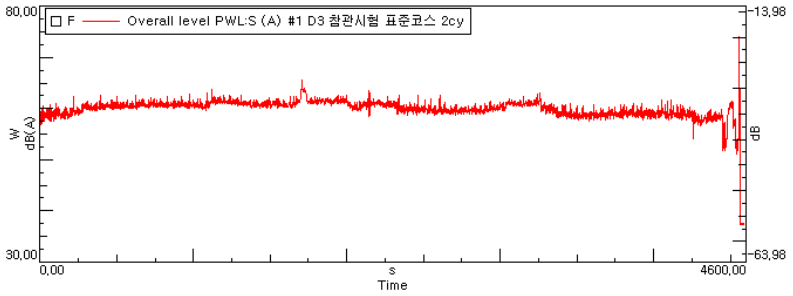
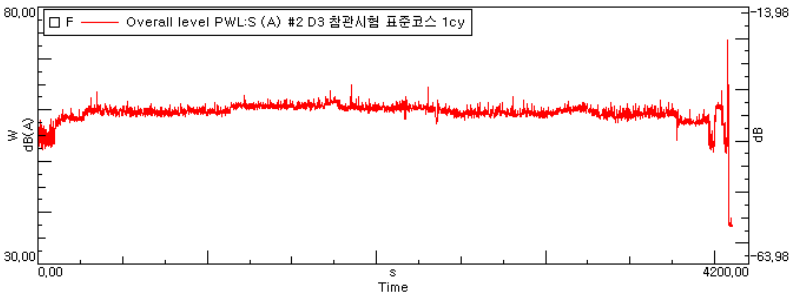
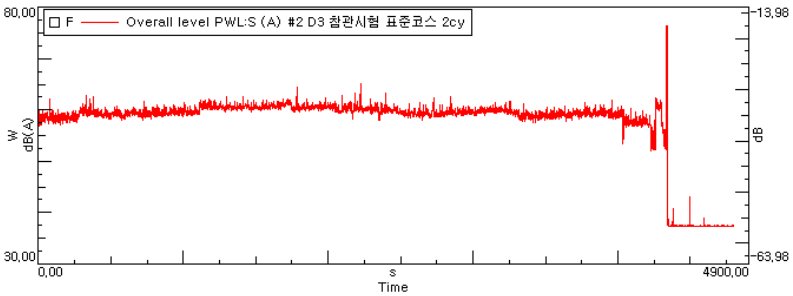
6) Set the dryer at the defined test course.

7) Data shall be recorded for whole operating cycle and the sound power level shall be determined from initiation of operating cycle to the end of the cycle.

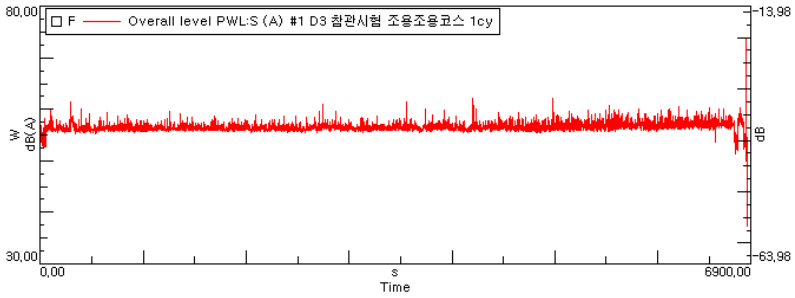
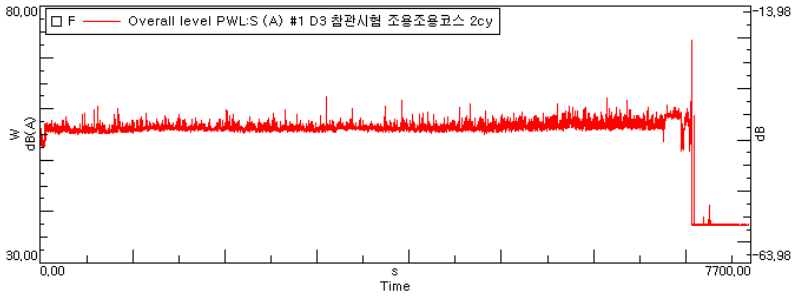
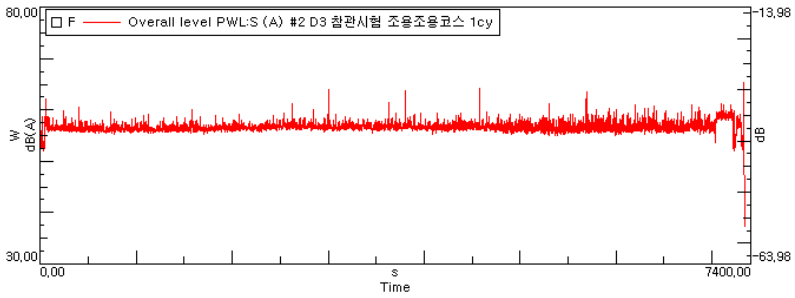
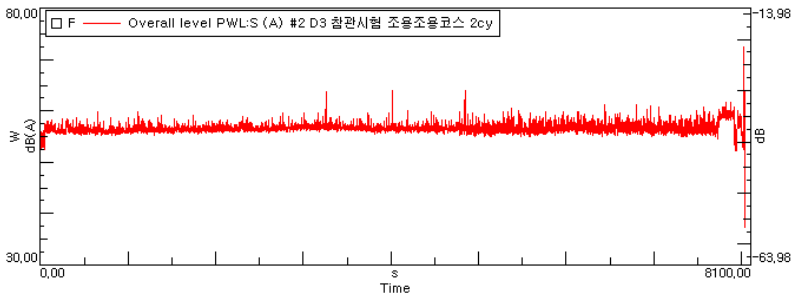
8) Repeat a test at the same test course but assure the inner tub fully cooled down before starting again. Also, the water tank shall be empty and inner/outer filters need to be cleaned before starting test.

SECTION 9 TEST RESULTS

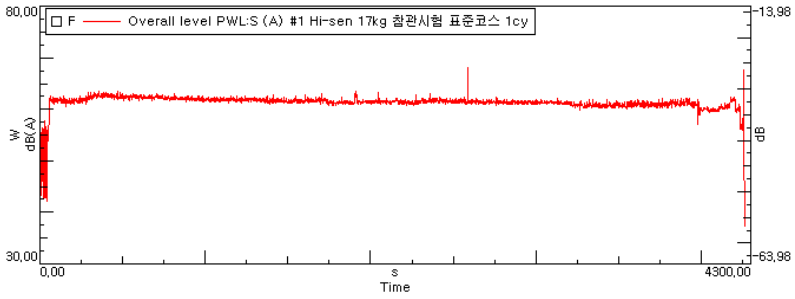
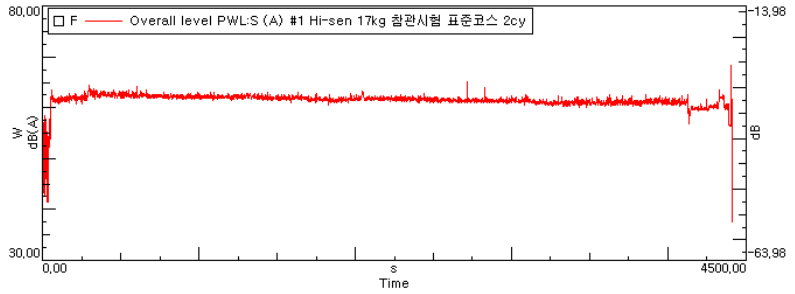
New model (RD20VS)

Test program	Sample No.	Test run No.	Test graph	PWL (dB)
표준	1	1		60.1
		2		60.1
	2	1		59.7
		2		59.6

New model (RD20VS)

Test program	Sample No.	Test run No.	Test graph	PWL (dB)
조용 조용	1	1		56.6
		2		56.5
	2	1		56.7
		2		56.7

Conventional model (RH17VTS)

Test program	Sample No.	Test run No.	Test graph	PWL (dB)
표준	1	1		61.4
		2		61.6

SECTION 10 TEST SUMMARY

PWL (dB)

Model	New model (RD20VS)				Conventional model (RH17VTS)
Test program	표준		조용조용		표준
Sample #	Sample #1	Sample #2	Sample #1	Sample #2	Sample #3
1st run	60.1	59.7	56.6	56.7	61.4
2nd run	60.1	59.6	56.5	56.7	61.6
Average	60.1	59.7	56.5	56.7	61.5
Total average	**59.9**		**56.6**		**61.5**

Measurement uncertainty: 1.6 %

SECTION 11 CONCLUSION

Based on the data collected the Hypothesis is **accepted**:

・Condition 1. New model (RD20VS) at '조용조용' course vs. '표준' course

: The sound power level at '조용조용' course was lower than 2 dB or more.

・Condition 2. New model (RD20VS) at '조용조용' course vs. Conventional model (RH17VTS) at '표준' course

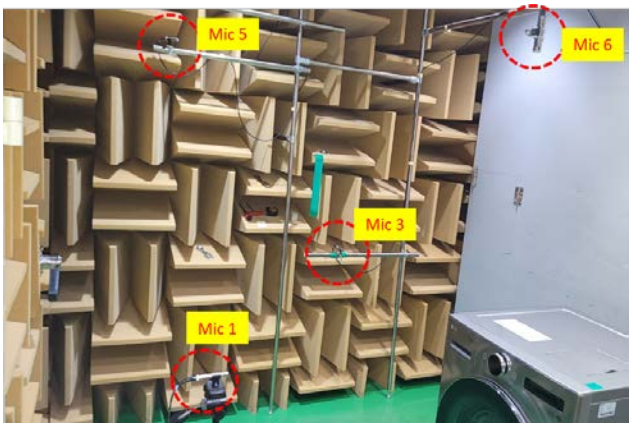
: The sound power level for the new model (RD20VS) at '조용조용' course was lower than 3 dB or more.

The test is for information only, the data is supplied to the client without conclusion. Final evaluation to be conducted by the client.

Appendix I. Photos

New model

Conventional model



Set-up Left view

Set-up Right view