

Subjects: Emergency Vehicle Sirens
Reference standard: SAE J1849 – FEB 2020
Report number: NBVTC-0114-2025-002FC, Date: January 14, 2025

COMPLIANCE TEST REPORT

ACCORDING TO SAE J1849 – FEB 2020

Emergency Vehicle Sirens

COVER PAGE




Subjects: Emergency Vehicle Sirens
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SUMMARY OF TEST RESULT

TEST DESCRIPTION		TEST RESULTS	
Test Item	Reference Standard	PASS	FAIL
Physical Inspection	/	✓	---
Entire Acoustical Test	/	✓	---
Vibration Test	J575 – APR 2021	✓	---
Corrosion Test	J575 – APR 2021	✓	---
Dust Test	J575 – APR 2021	✓	---
Moisture Test	J994 – SEP 2014	✓	---
IP 69K Test	ISO 20653:2013	✓	---
Durability Test	/	✓	---
Extreme Temp. Test	/	✓	---
EMC	J1113-21 – MAY 2013 (ISO 11452-2:2019)	✓	---

*Note: ---

NAME AND SIGNATURE : Namseon, Chun

TITLE : Test Engineer
CONTACT INFO. : namseon.chun@gmail.com / +86-18667838919
DATE : January 14, 2025



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TEST DETAILS

APPLICANT'S NAME : **SISTEMAS Y SERVICIOS DE COMUNICACION SA DE CV**
ADDRESS : **AVENIDA 20 DE NOVIEMBRE # 805**
COLONIA CENTRO CHIHUAHUA, CHIHUAHUA CP 31000
TELEFONO : 614-415-2525

NO. OF DEVICES TESTED : 5 Sets
RATED VOLTAGE AND WATTAGE : DC 12V, $I_{max} = 16A$
REMARK : None

PRODUCT DETAILS:

	Siren amplifier	Controller	Speaker
Type or model no.	X100F	/	XS100
Mounting orientation	/	/	Vertical
Identification code	EVS1	/	EVS2
Rated voltage and current	DC 12V, I_{Max} 16A (Input range: DC 11–16V)	/	/

TEST PLACE:

Ningbo Vehicle Testing Co., Ltd.

6F, Building D, No.1001, Tanjiang North Road, Shounan Street,
Yinzhou District, Ningbo City, Zhejiang Province, P.R.China (P.C. 315194)

Zhejiang Fangyuan Test Group Co., Ltd. (CNAS L0116)

No.300, Xiasha Road, Hangzhou Economic and Technological Development Zone,
Hangzhou, Zhejiang, China

UL-CCIC Company Limited (CNAS L2065)

No.2, Chengwan Road, Suzhou Industrial Park, Suzhou, Jiangsu, China

Wenzhou Quality and Technology Testing Research Institute (CNAS L0888)

Testing Building, National Quality Supervision and Testing Center for Footwear (Wenzhou),
1st Period of Shoe Capital, Fengmen Street, Lucheng District, Wenzhou, Zhejiang, China

TEST DATE: : December 11, 2024 – January 14, 2025



SECTION 1) PHYSICAL INSPECTION

TEST COMPONENT : See page 3. Test details
VARIANT(S) : None
MARKINGS :
- CONTROLLER : N/A
- AMPLIFIER : See section 7
- SPEAKER : See section 7



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SECTION 2) ENTIRE ACOUSTICAL TEST

Temp: 20 ~ 23 °C [18°C ~ 30°C]

RH: 50 ~ 60 % [max. 80%]

Atmospheric pressure: 1005 mbar [950 ~ 1050mbar]

Test voltage: 13.60 V [13.6 V ± 0.2 V (12V system)]

SPL measurement distance: 3.00 m [3.00 m ± 0.02 m]

Microphone height from the ground: 1.20 m

	Sound Level Meter	Microphone	Calibrator	Remarks
Manufacturer	Hangzhou Aihua Intelligent Technology Co., Ltd.			
Type	AWA6290M	AWA14423	AWA6221A	
Serial no.	/ (KJ134)	/ (KJ134)	1001088 / (KJ132-1)	
Date of cal.	2024.03.08 – 2026.03.07	2024.03.08 – 2026.03.07	2024.11.11 – 2025.11.10	
Compliance standard*	ANSI S1.4 IEC 61672 Class 1	IEC 61094-4 WS2F/ WS3F	ANSI S1.40-2006 IEC 60942 Class 1	

Type of chamber: Semi-anechoic room

Size: 4.5m x 4.5m x 3.5m

Calibration standard: JJF 1147-2006 (Equivalent to ISO 3745:2003)

Cut-off frequency: 80 Hz



Table B1 - SPL measurements - Siren #1

Measurement Angle (Degrees from Device Axis)	A-Weighted SPL (dB re 20 µPa) Measured with the Fast Time Setting				A-Weighted SPL (dB re 20 µPa) Measured with a Long-Term Time Setting			
	Wail		Yelp		Wail		Yelp	
	Measured	Required	Measured	Required	Measured	Required	Measured	Required
0	121.4	≥ 118	118.3	≥ 117	116.6	≥ 115	117.3	≥ 115
10	121.5	≥ 117	118.2	≥ 116	116.5	≥ 114	117.2	≥ 114
20	120.9	≥ 116	117.5	≥ 115	115.7	≥ 113	116.5	≥ 113
30	119.5	≥ 115	116.0	≥ 114	114.3	≥ 112	115.1	≥ 112
40	117.7	≥ 113	114.1	≥ 112	112.5	≥ 110	113.2	≥ 110
50	115.3	≥ 111	111.6	≥ 110	110.3	≥ 108	110.8	≥ 108
-50*	115.0	≥ 111	110.7	≥ 110	109.2	≥ 108	109.6	≥ 108
-40*	117.1	≥ 113	112.7	≥ 112	111.3	≥ 110	111.8	≥ 110
-30*	118.9	≥ 115	114.8	≥ 114	113.3	≥ 112	113.9	≥ 112
-20*	120.3	≥ 116	116.6	≥ 115	114.9	≥ 113	115.6	≥ 113
-10*	121.2	≥ 117	117.7	≥ 116	116.0	≥ 114	116.7	≥ 114

*Note: A negative sign is used to denote angles measured with the device axis rotated clockwise from its initial zero-degrees orientation.

**SPL values that contain a five or greater in the first place to the right of the decimal shall be rounded upward.

	Wail mode		Yelp mode	
	Measured	Required	Measured	Required
Cycling period (s)	4.965	2.0s ~ 6.0s	0.305	0.24s ~ 0.40s
Minimum fundamental frequency (Hz)*	647	≥ 500 Hz	649	≥ 500 Hz
Maximum fundamental frequency (Hz)*	1696	≤ 2000 Hz	1696	≤ 2000 Hz
DC current (amps)	7.72	N/A	8.54	N/A

Was the wail perceived as continuous in frequency with no clearly audible discrete steps between frequencies: Yes / ~~No~~

Was the yelp perceived as continuous in frequency with no clearly audible discrete steps between frequencies: Yes / ~~No~~

DC current (amps) measured in the power cable (for informational purposes only, no performance requirements): see above A

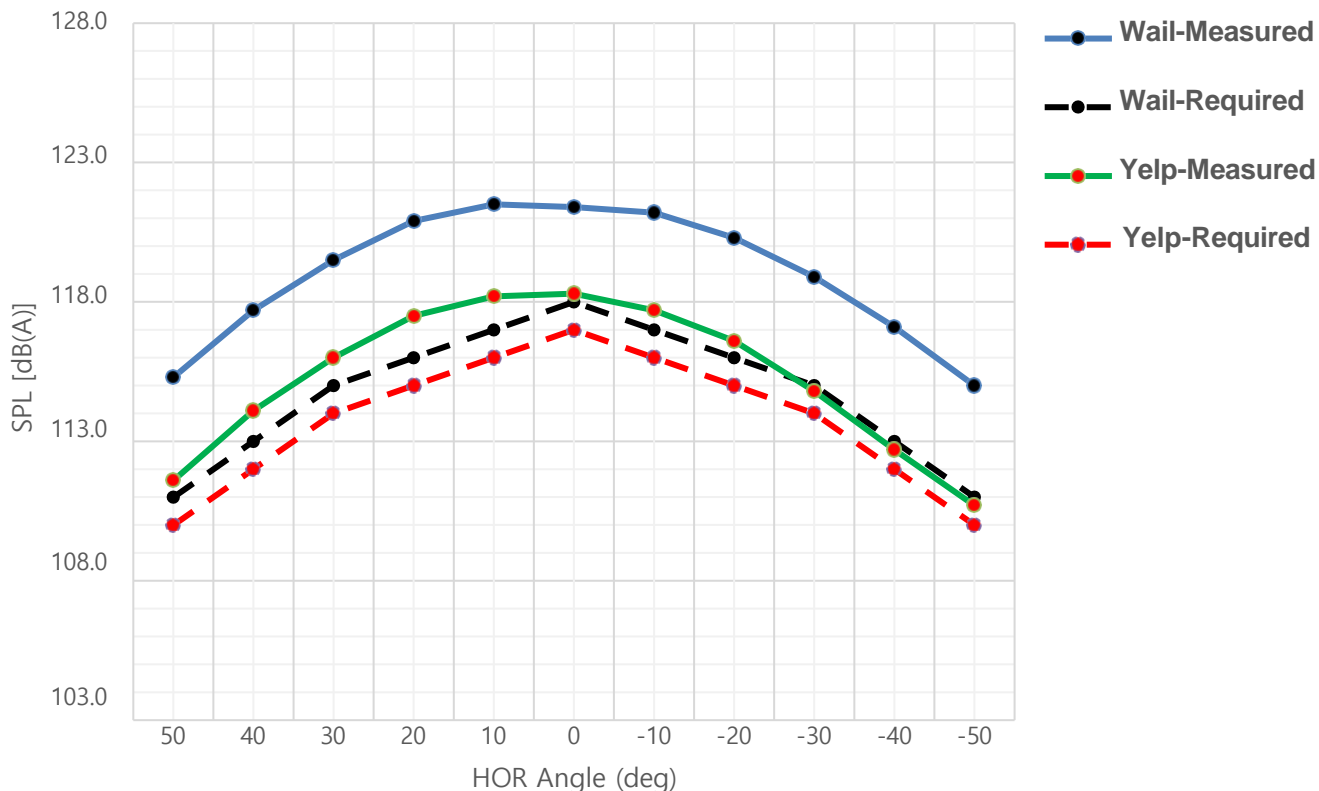
*Its range shall be at least one octave, and it shall be perceived as being continuous in frequency with no clearly audible discrete steps between frequencies. (para 6.1.2.1. & 6.1.2.2.)

Remark: The siren system has been tested with 1 (one) speaker connected to the amplifier.

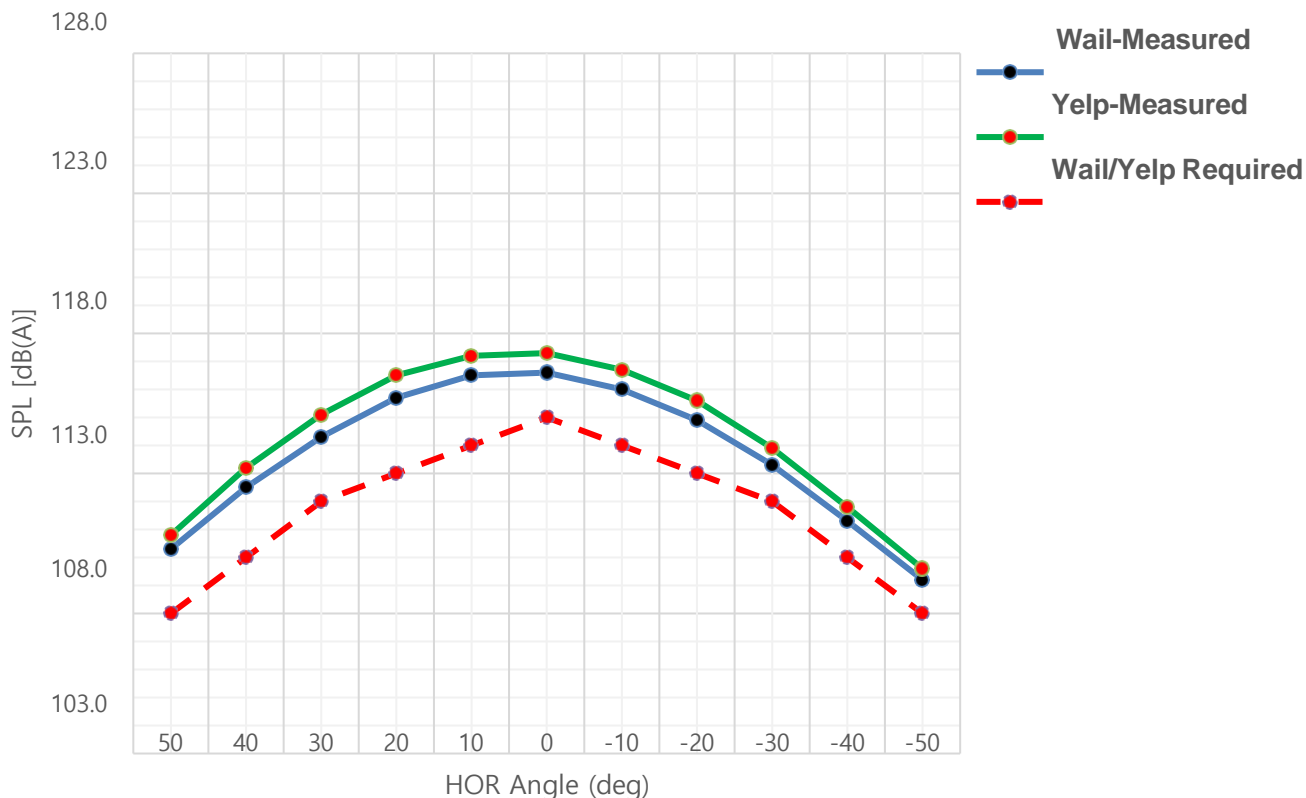




SPL Hor. distribution (Fast Time Setting)



SPL Hor. distribution (Long-Term Time Setting)



SECTION 3) ELECTROMAGNETIC COMPATIBILITY TEST

Table B2A - SPL measurements - Siren #2

Measurement Angle (Degrees from Device Axis)	A-Weighted SPL (dB re 20 µPa) Measured with the Fast Time Setting				A-Weighted SPL (dB re 20 µPa) Measured with a Long-Term Time Setting			
	Wail		Yelp		Wail		Yelp	
	Measured	Required	Measured	Required	Measured	Required	Measured	Required
0 (before electromagnetic compatibility tests)	121.9	≥ 118	118.4	≥ 117	116.8	≥ 115	117.2	≥ 115
0 (after electromagnetic compatibility tests)	121.3	≥ 119	118.4	≥ 115	116.4	≥ 114	116.9	≥ 114

6.1.1 SPL Requirements

When measured in accordance with 5.1, the SPL produced by Siren #1 shall meet all of the minimum requirements listed in Table 1. The SPL produced by Siren #2 through Siren #5, which are tested only at the measurement angle of 0 degrees, shall meet the corresponding SPL requirement before any other tests (e.g., vibration) are performed, **and shall not be reduced by more than 3 dB after these other tests are complete.** When comparing the measured SPL values to the SPL requirements, the measured values **shall be rounded to the nearest integer decibel value.** For the purpose of this comparison, measured SPL values that contain a five or greater in the first place to the right of the decimal shall be rounded upward.



Subjects: Emergency Vehicle Sirens
Reference standard: SAE J1849 – FEB 2020
Report number: NBVTC-0114-2025-002FC, Date: January 14, 2025

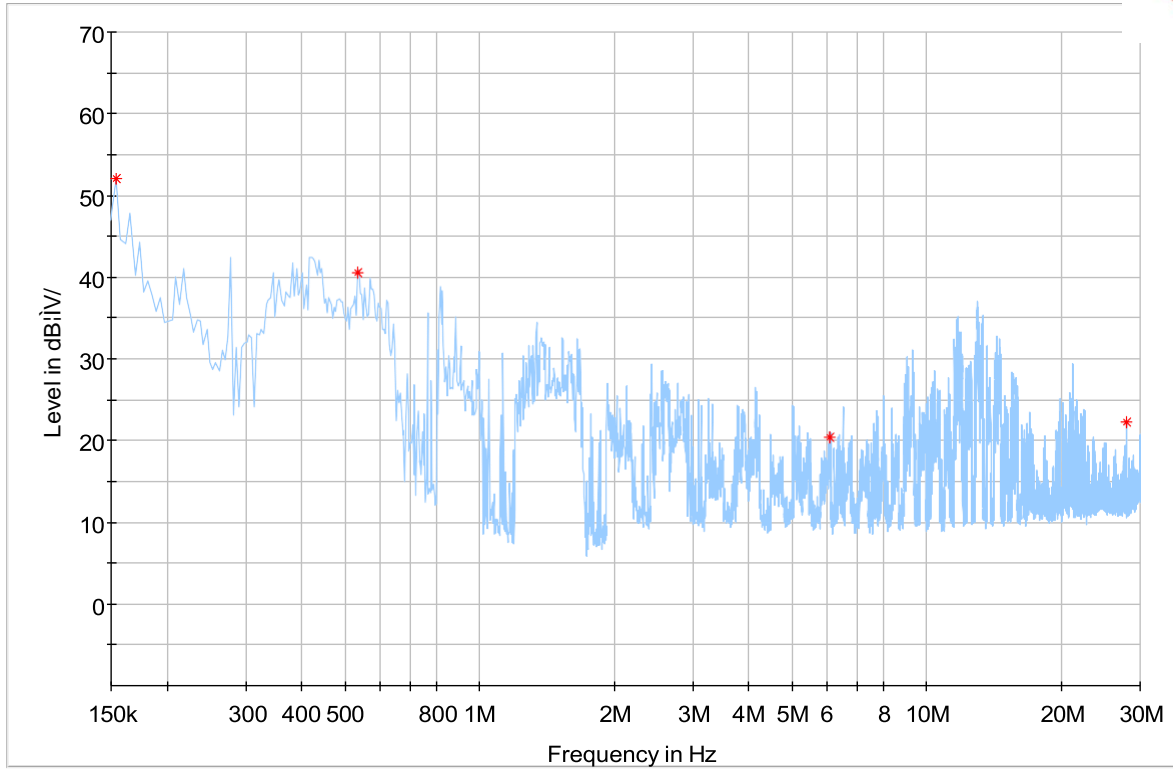
Table B2B - Radiated emissions/disturbances

Frequency Band (MHz) Wail mode CISPR25:2002	Narrowband Electric Field Level Measured with Peak Detector (dB re $\mu\text{V/m}$)	Broadband Electric Field Level Measured with Quasi-Peak Detector (dB re $\mu\text{V/m}$)	Remarks
0.15-0.3	51.99	27.44	
0.53-2.0	40.53	35.40	
5.9-6.2	20.41	21.98	
30-54	46.63	40.42	
68-108	47.14	47.34	

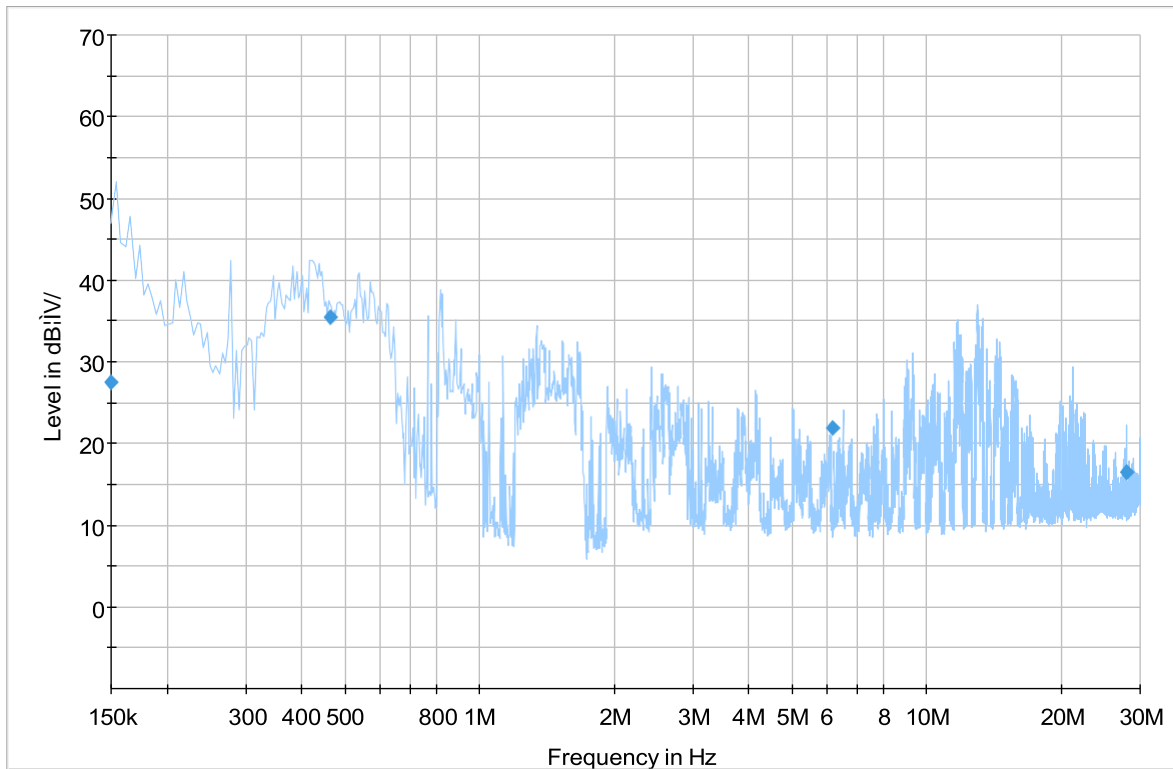




RE-0.15MHz-30MHz-V-PK

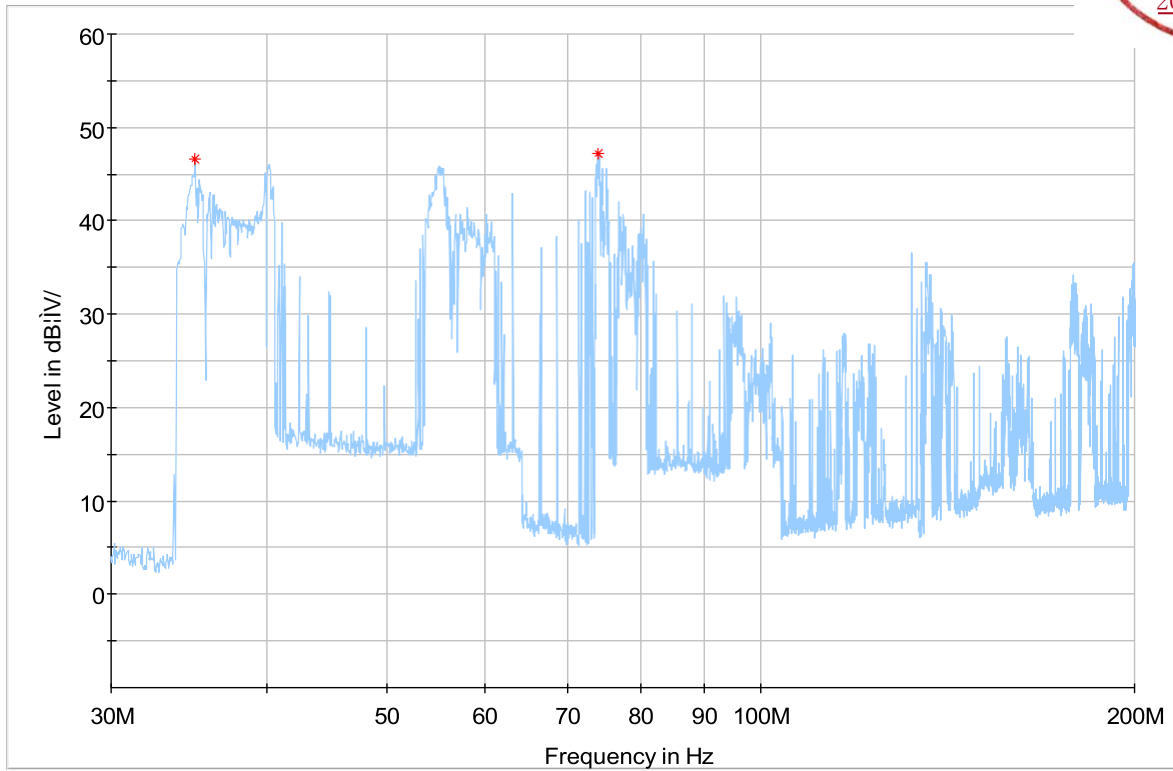


RE-0.15MHz-30MHz-V-QP

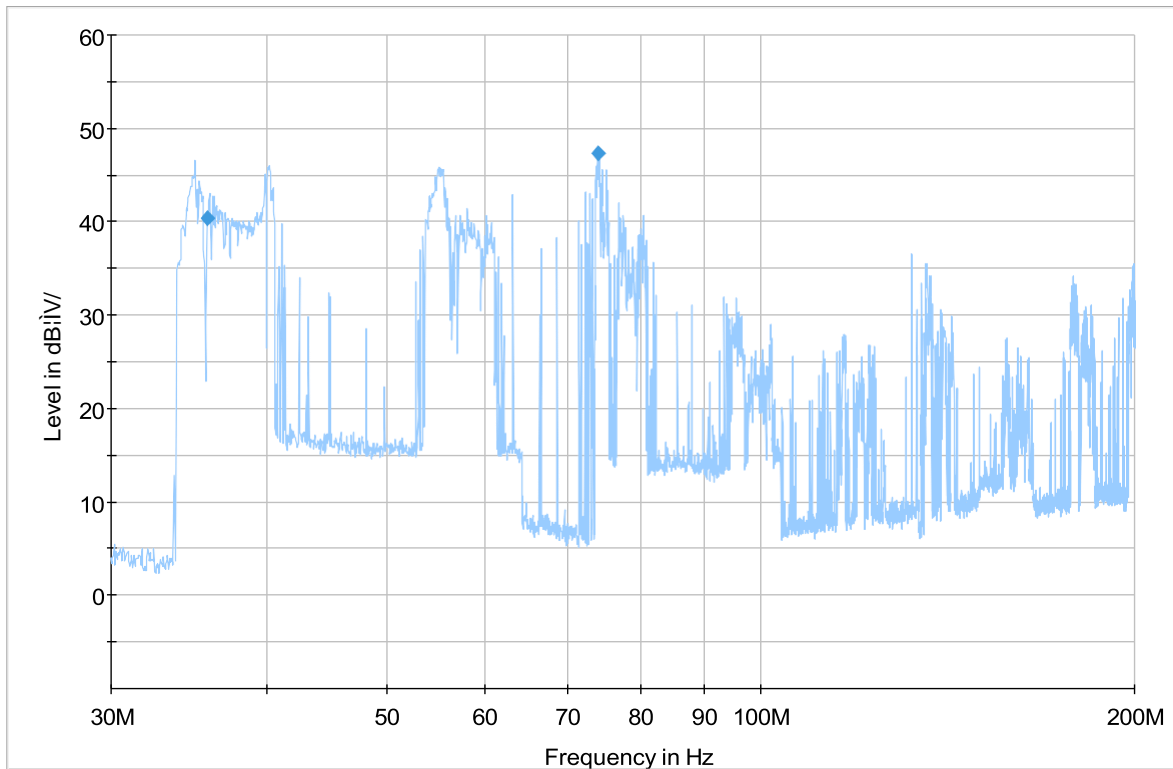




RE-30MHz-108MHz-V-PK

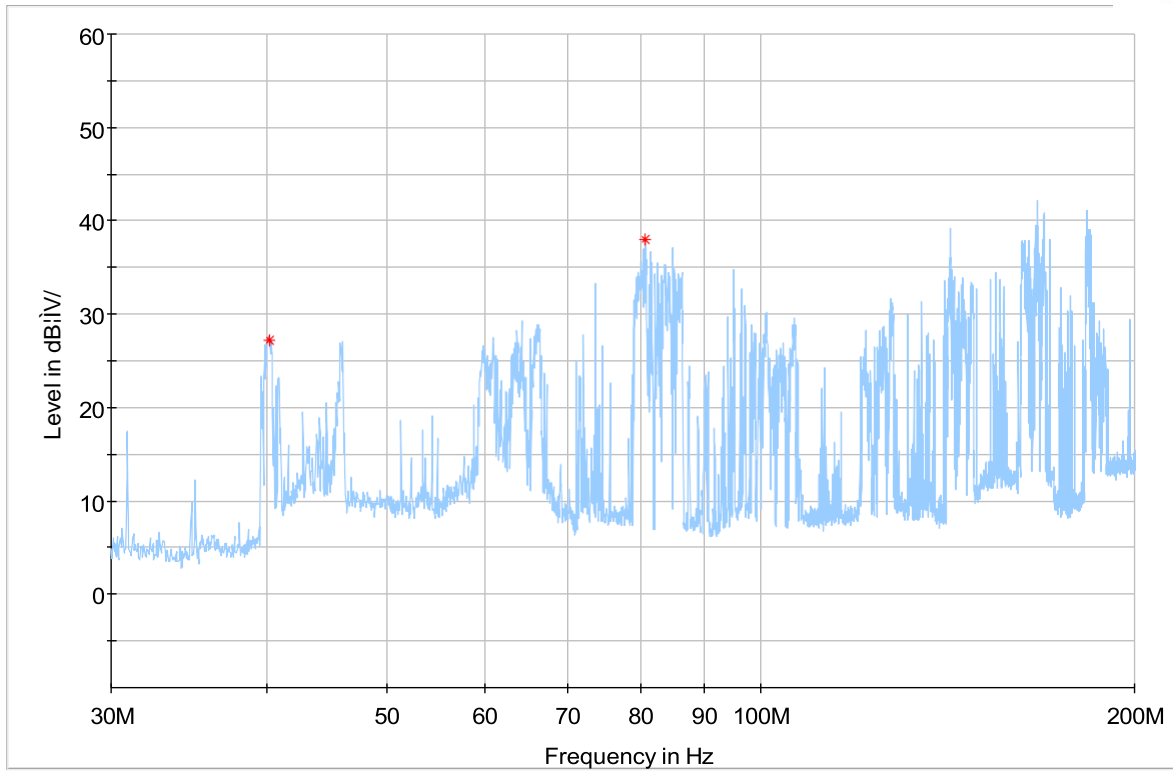


RE-30MHz-108MHz-V-QP

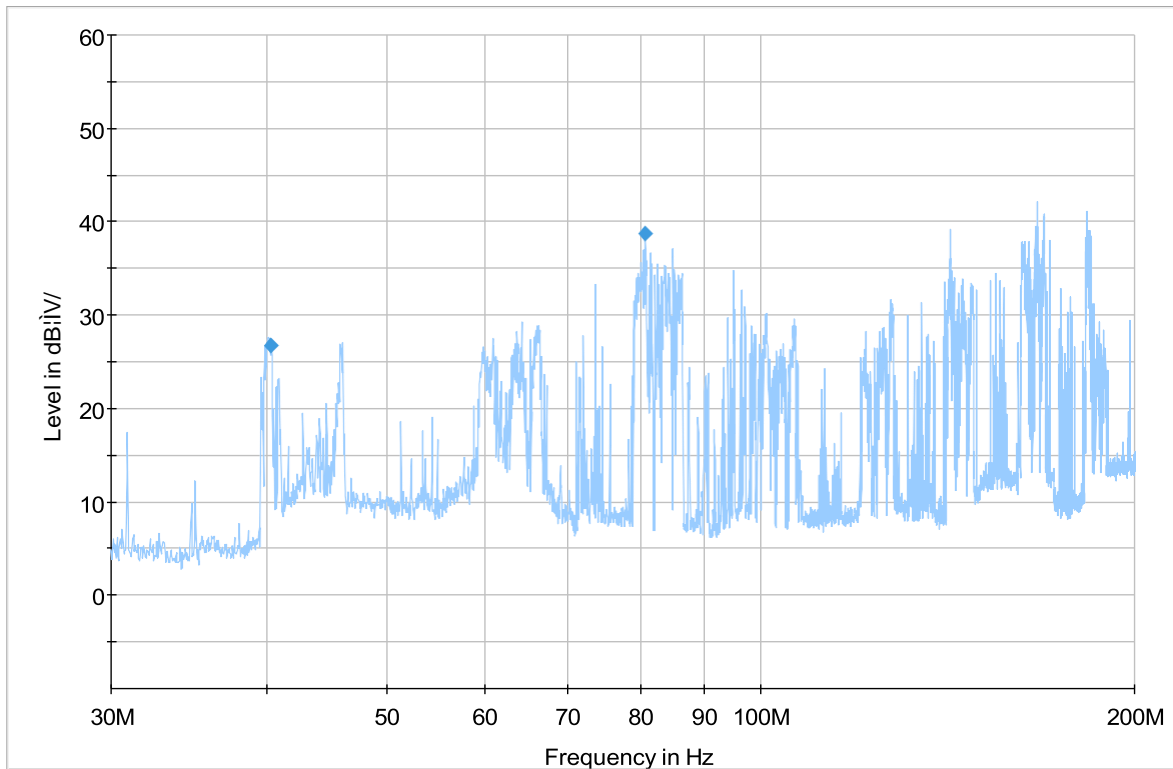




RE-30MHz-108MHz-H-PK



RE-30MHz-108MHz-H-QP



Subjects: Emergency Vehicle Sirens
Reference standard: SAE J1849 – FEB 2020
Report number: NBVTC-0114-2025-002FC, Date: January 14, 2025



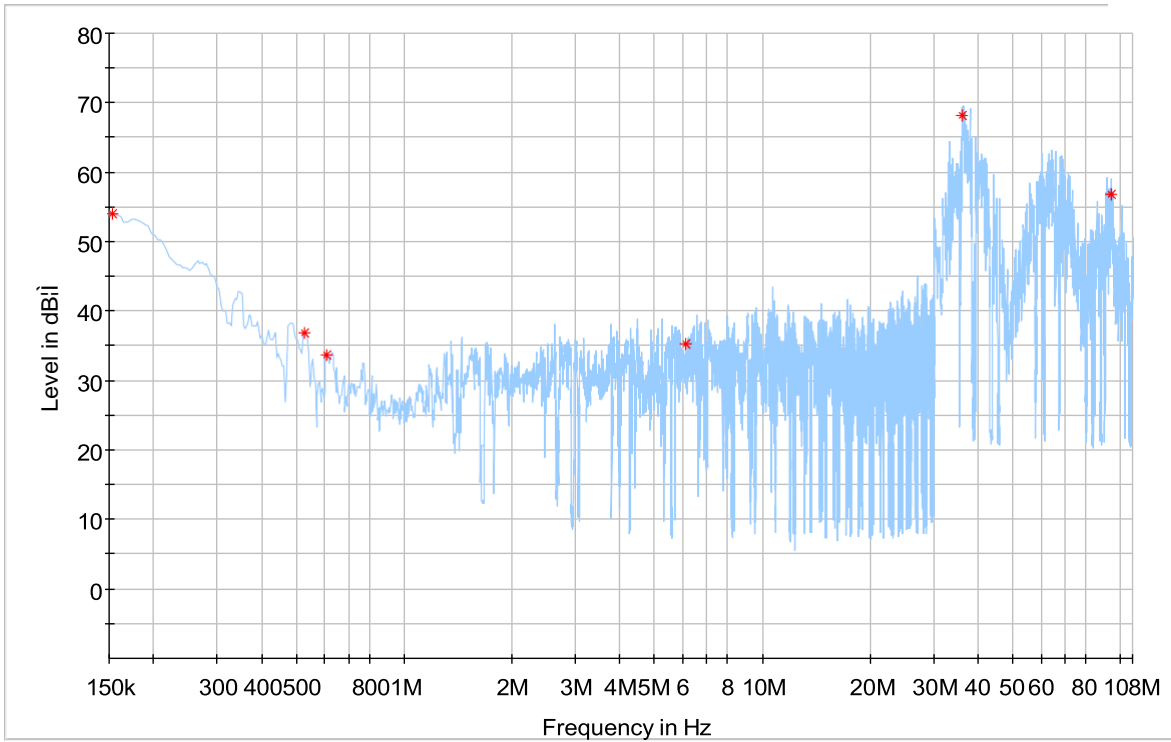
Table B2C - Conducted emissions/disturbances on power input leads

Frequency Band (MHz)	Narrowband Electric Field Level Measured with Peak Detector on Positive Terminal (dB re $\mu\text{V}/\text{m}$)	Broadband Electric Field Level Measured with Quasi-Peak Detector on Positive Terminal (dB re $\mu\text{V}/\text{m}$)	Narrowband Electric Field Level Measured with Peak Detector on Negative Terminal (dB re $\mu\text{V}/\text{m}$)	Broadband Electric Field Level Measured with Quasi-Peak Detector on Negative Terminal (dB re $\mu\text{V}/\text{m}$)	Remarks
Wail mode CISPR25:2002					
0.15-0.3	53.90	53.41	56.44	52.52	
0.53-2.0	36.88	31.99	32.41	29.68	
5.9-6.2	35.30	30.14	36.80	27.19	
30-54	68.13	57.52	63.90	57.97	
68-108	56.83	43.70	57.64	43.07	



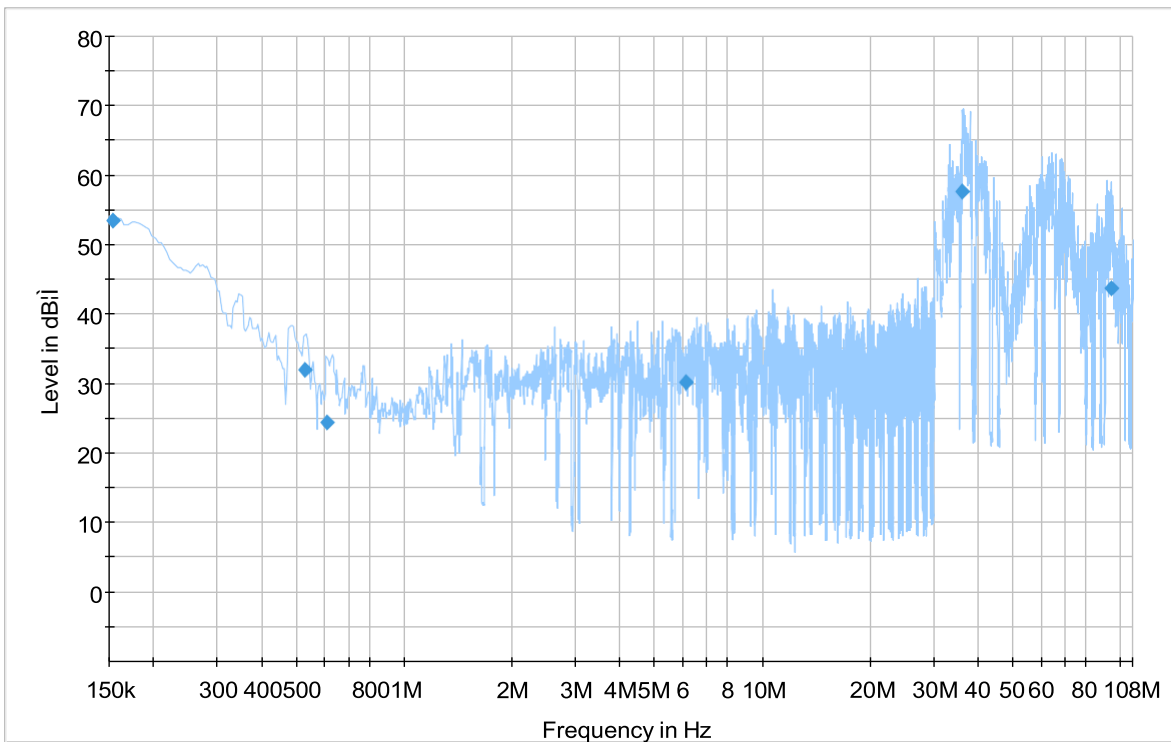
CE-0.15MHz-108MHz-P-PK

Full Spectrum



CE-0.15MHz-108MHz-P-QP

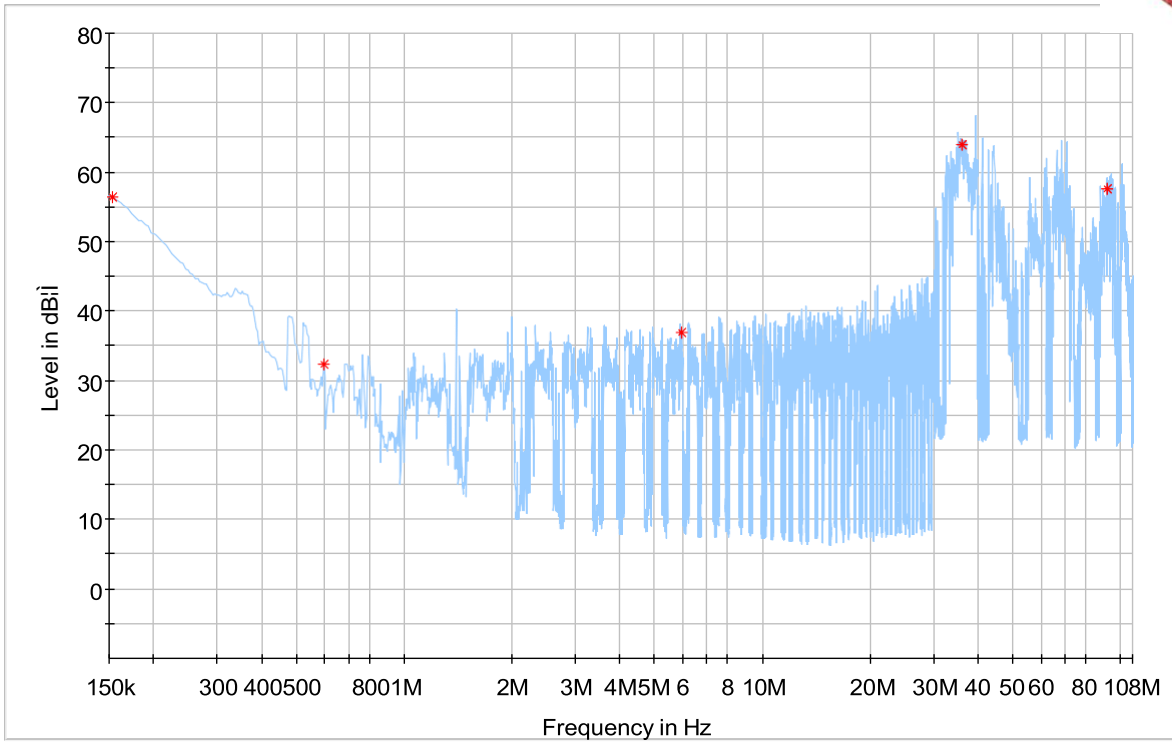
Full Spectrum





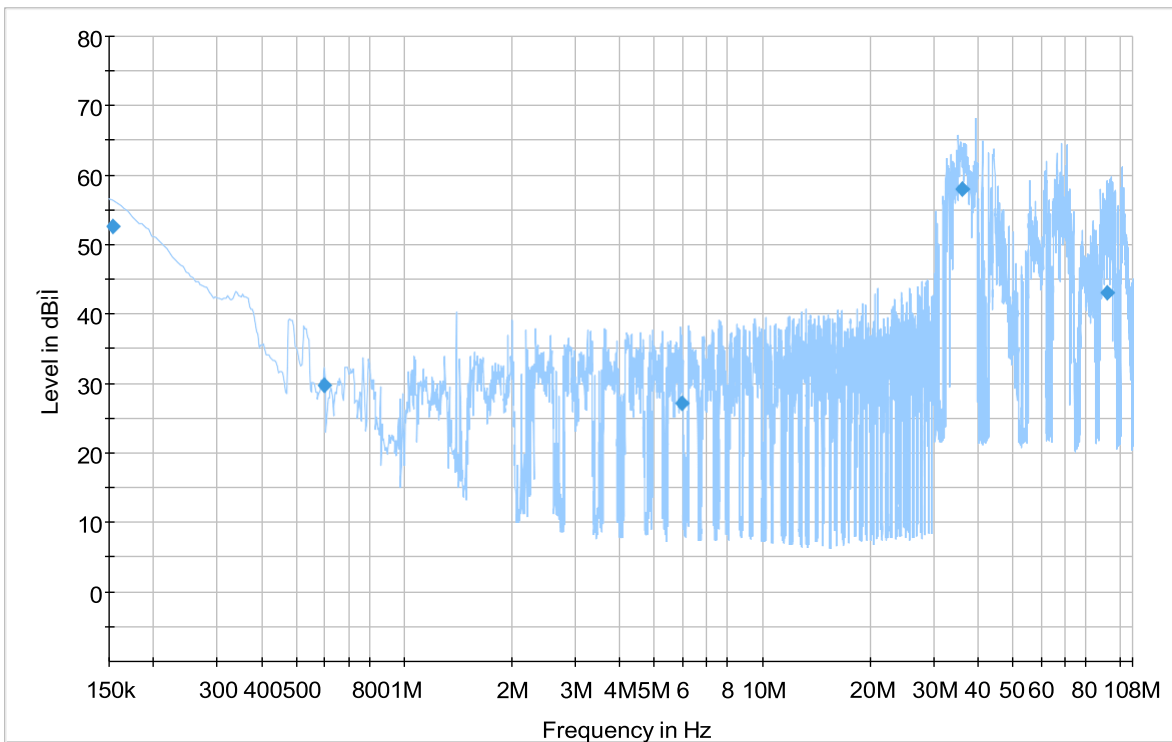
CE-0.15MHz-108MHz-N-PK

Full Spectrum



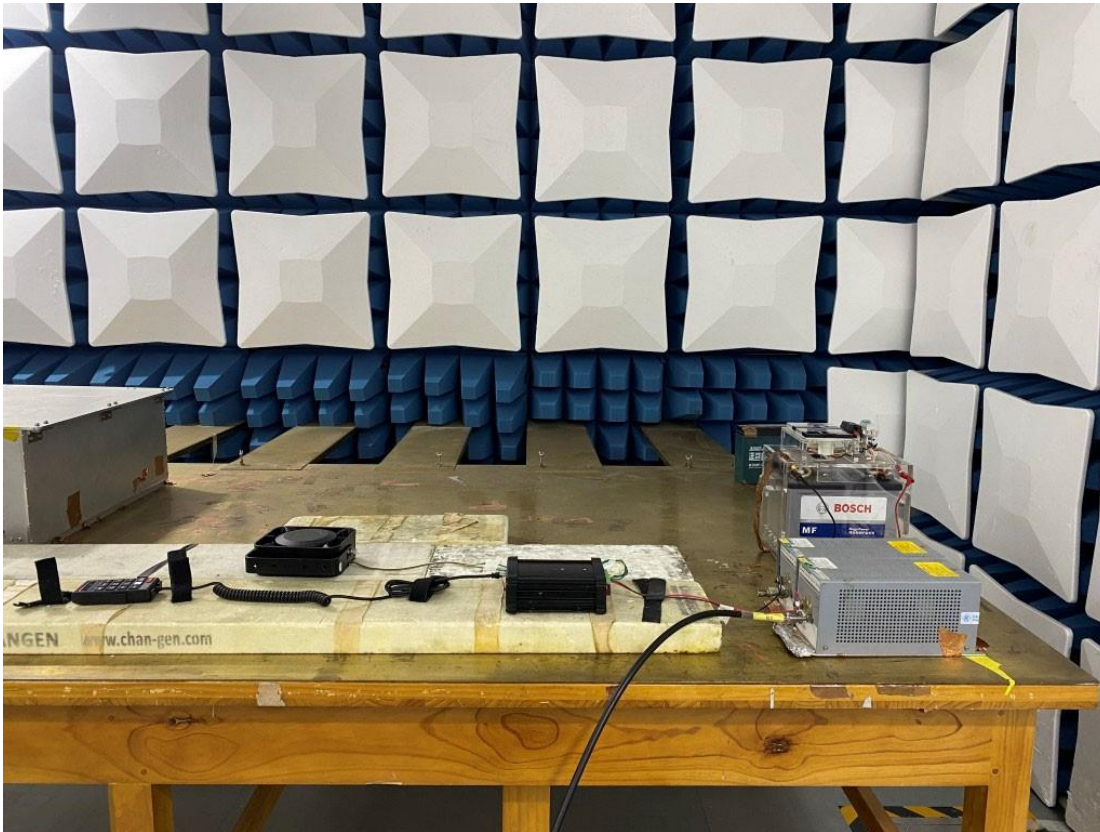
CE-0.15MHz-108MHz-N-QP

Full Spectrum

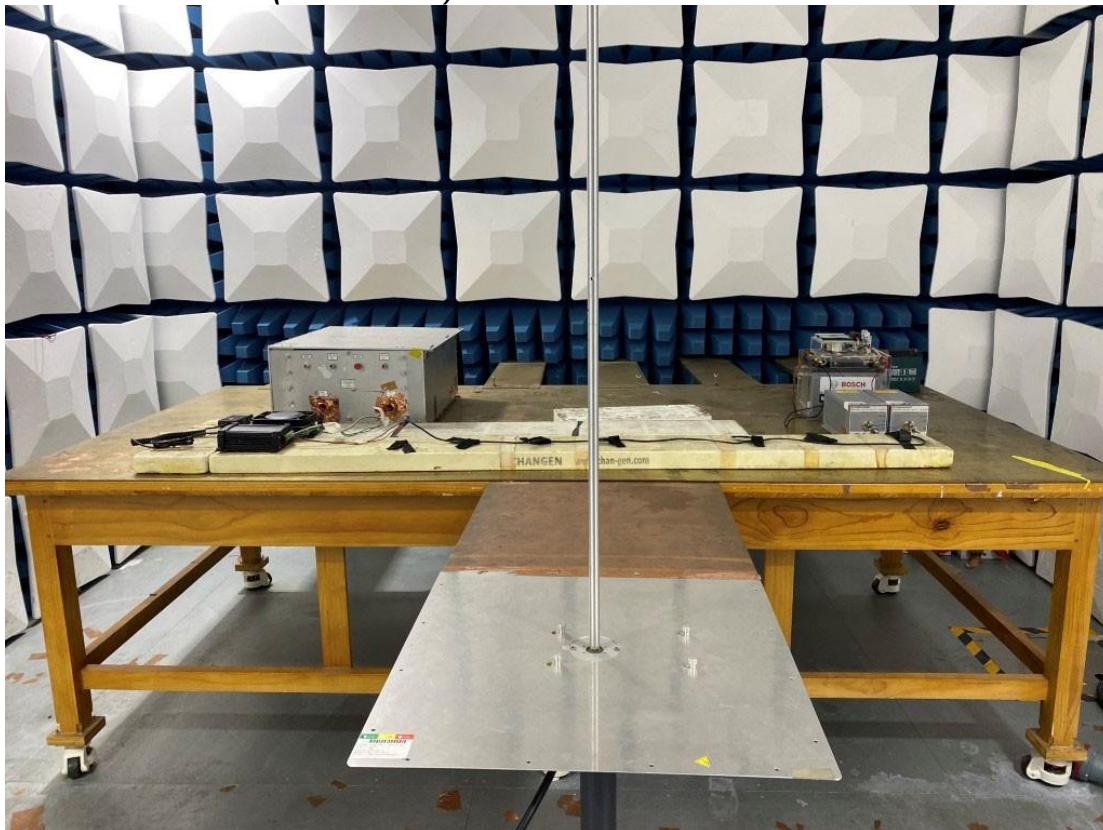




CONDUCTED EMISSION

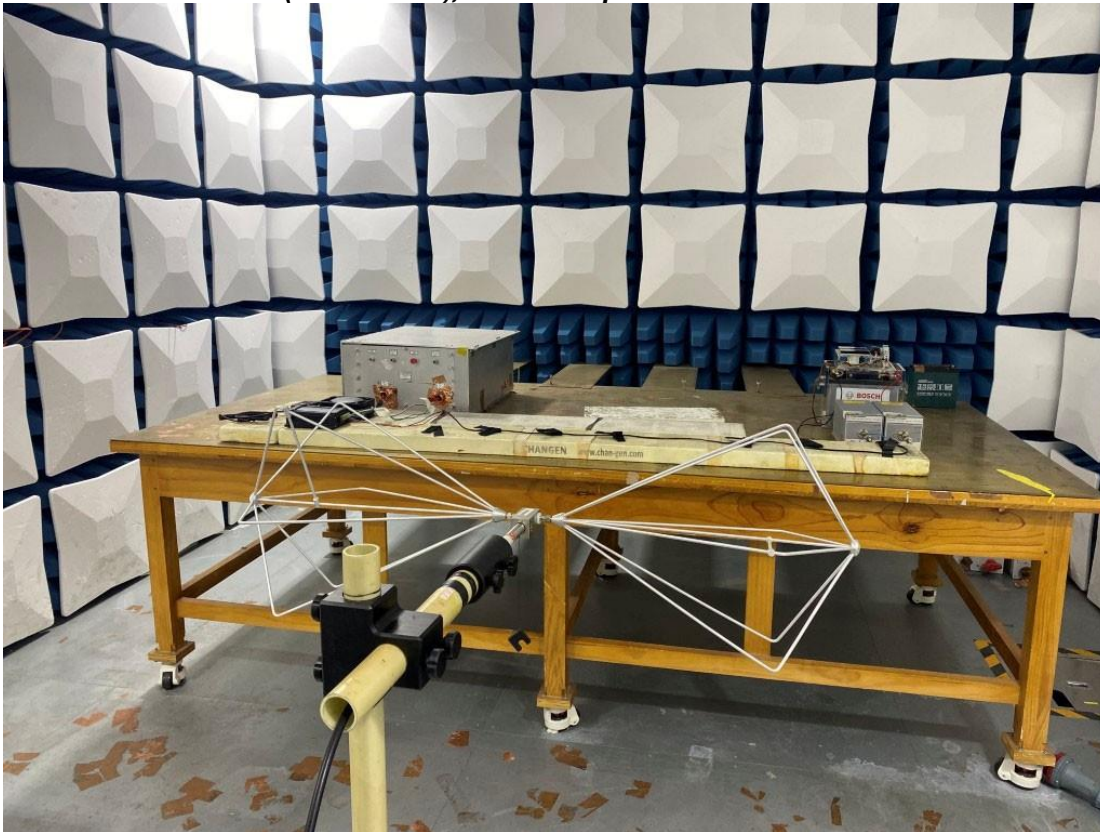


RADIATED EMISSION (0.15 – 30MHz)

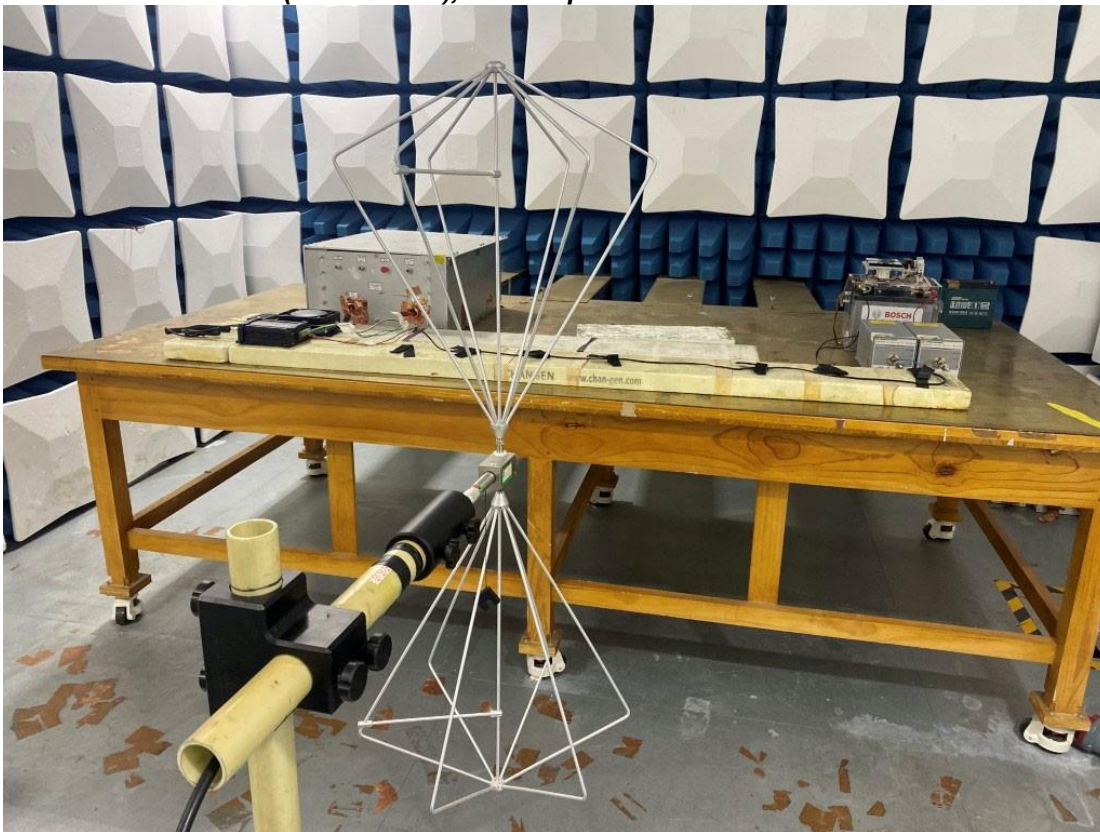




RADIATED EMISSION (30 - 108MHz), Horizontal polarization



RADIATED EMISSION (30 - 108MHz), Vertical polarization



Subjects: Emergency Vehicle Sirens
Reference standard: SAE J1849 – FEB 2020
Report number: NBVTC-0114-2025-002FC, Date: January 14, 2025

Radiated Electromagnetic Immunity Test Results

Wail mode, SAE J1113-21. Sweep the field in frequency from 26 to 1000 MHz at an amplitude of 10 V/m.

Amplitude (V/m) of the test field at which a change in the wail signal is observed: n/a
Frequency (MHz) of the test field at which a change in the wail signal is observed: n/a
Describe the change observed in the wail signal: n/a

See test details.

5.6 Radiated Electromagnetic Immunity Test

This test is required for all electronic siren amplifiers.

In the wail mode, Siren #2 shall be subjected to the radiated electromagnetic immunity test specified in SAE J1113-21. Sweep the field in frequency from 26 to 1000 MHz at an amplitude of 10 V/m.

Continue to perform sweeps over this frequency range, but increment the field amplitude by 10 V/m each time before a new sweep is started until a change in the wail signal is observed. Record the field amplitude and frequency at which the change is observed and describe the change. A passive resistive load, which is a non-inductive resistor with a resistance within $\pm 1\%$ of the nominal impedance of the speaker used in the siren system, may be substituted for the siren loudspeaker. In this case, there shall be an alternative means to monitor the amplifier output for failure (e.g., monitor speaker or current probe).

Amplifiers that are an integral part of a speaker shall also be tested.

Test result summary:

Test sample has no degradation of its performance (Status I) during exposure to BCI with injection current 100mA within frequency band between 26MHz and 400MHz.

Scan step 5MHz at frequency band 26MHz - 200MHz, 10MHz at frequency band 200MHz – 400MHz.

Test sample has no degradation of its performance (Status I) during exposure to radiated free field immunity with field strength 50V/m rms within frequency band 400MHz - 1000MHz.

- AM(Amplitude Modulation) at frequency band 400MHz – 800MHz.
- PM(Pulse Modulation) type 1 at frequency band 800MHz – 1000MHz.





ISO 11452-1;2015

A.3.1 Function performance status

This element defines the expected performance objectives for the function of the device under test subjected to the test conditions. The four function performance status of the function (expected behaviour of the function observed during test) are listed below.

NOTE This element is applicable to every single individual function of a DUT and describes the operational status of the defined function during and after a test.

The minimum functional status shall be given in each test. An additional test requirement may be agreed upon between supplier and vehicle manufacturer.

— Status I

The function performs as designed during and after the test.

— Status II

The function does not perform as designed during the test but returns automatically to normal operation after the test.

— Status III

The function does not perform as designed during the test and does not return to normal operation without a simple driver/passenger intervention such as turning off/on the DUT or cycling the ignition switch after the disturbance is removed.

— Status IV

The function does not perform as designed during and after the test and cannot be returned to proper operation without more extensive intervention such as disconnecting and reconnecting the battery or power feed. The function shall not have sustained any permanent damage as a result of the testing.

	Frequency range	Antenna polarization	Field strength	BCI (at 150mm)
Test 1	26MHz to 1000MHz	Vertical	30V/m rms	60mA
Test 2	26MHz to 1000MHz	Horizontal	30V/m rms	60mA
Test 3	26MHz to 1000MHz	Vertical	50V/m rms	100mA
Test 4	26MHz to 1000MHz	Horizontal	50V/m rms	100mA

Note: Reference to UN-R10

6.8.2. ESA immunity type approval limits

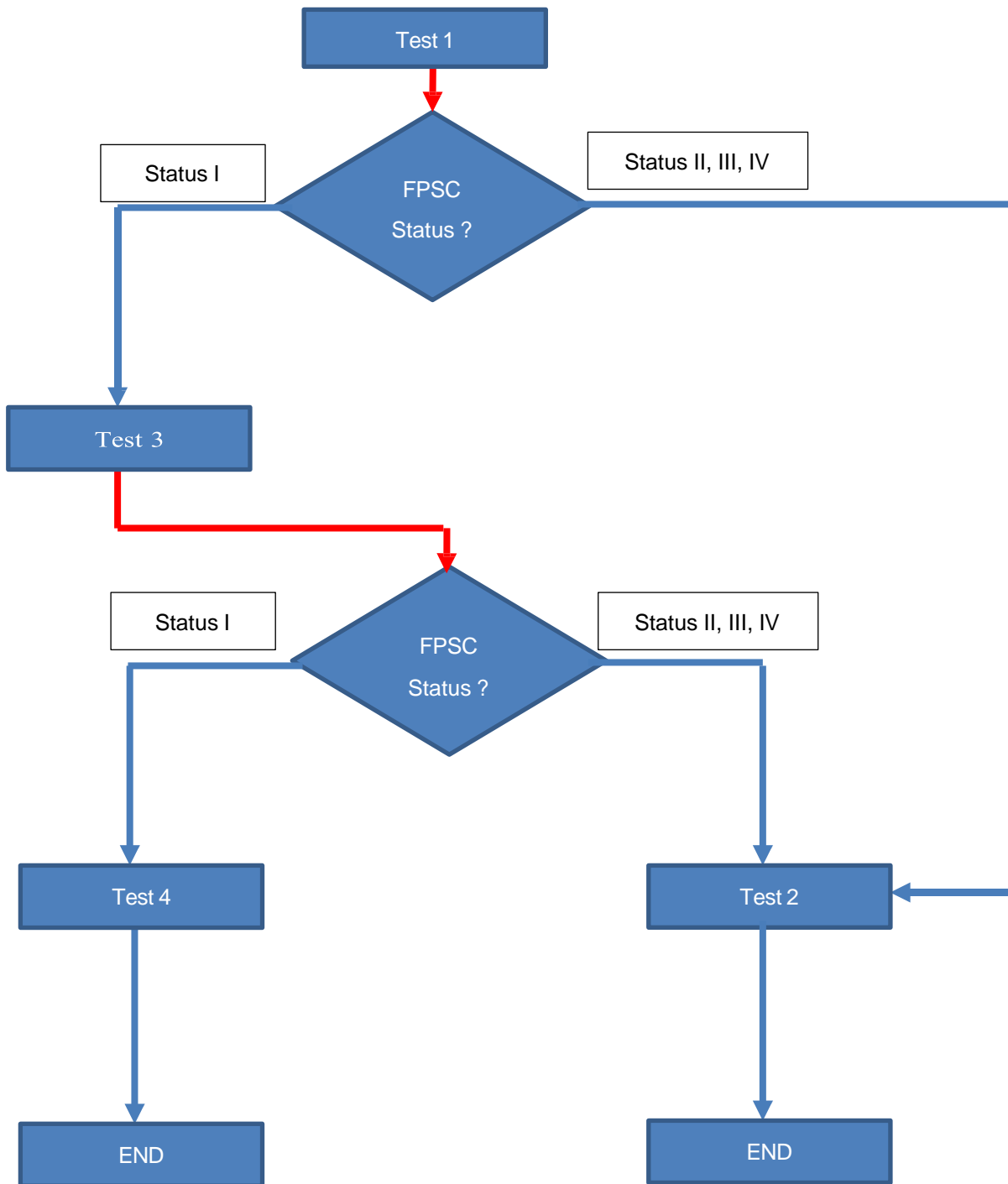
6.8.2.1. If tests are made using the methods described in Annex 9, the immunity test levels shall be 60 volts/m root-mean-square (rms) for the 150 mm stripline testing method, 15 volts/m rms for the 800 mm stripline testing method, 75 volts/m rms for the Transverse Electromagnetic Mode (TEM) cell testing method, **60 mA rms for the bulk current injection (BCI) testing method and 30 volts/m rms for the free field testing method in over 90 per cent of the 20 to 2,000 MHz frequency band.** and to a minimum of 50 volts/m rms for the 150 mm stripline testing method, 12.5 volts/m rms for the 800 mm stripline testing method, 62.5 volts/m rms, for the TEM cell testing method, 50 mA rms for the bulk current injection (BCI) testing method and 25 volts/m rms for the free field testing method over the whole 20 to 2,000 MHz frequency band.

Annex 9, para.

4.3.2. Test methodology

The test shall be performed according to ISO 11452-4 on a test bench with the following characteristics:

- BCI test method with substitution method and injection **probe positioned at 150 mm distance to the ESA**



Test Plan

Test 1 → Test 2 → END

Test 1 → Test 3 → Test 2 → END

Test 1 → Test 3 → Test 4 → END





Subjects: Emergency Vehicle Sirens
Reference standard: SAE J1849 – FEB 2020
Report number: NBVTC-0114-2025-002FC, Date: January 14, 2025



SECTION 4) VIBRATION, CORROSION, DUST, AND MOISTURE TEST

Table B3 - SPL measurements - Siren #3

Measurement Angle (Degrees from Device Axis)	A-Weighted SPL (dB re 20 μPa) Measured with the Fast Time Setting				A-Weighted SPL (dB re 20 μPa) Measured with a Long-Term Time Setting			
	Wail		Yelp		Wail		Yelp	
	Measured	Required	Measured	Required	Measured	Required	Measured	Required
0 <i>(before vibration, corrosion, dust, and moisture tests)</i>	122.2	≥ 118	119.3	≥ 117	117.4	≥ 115	118.1	≥ 115
0 <i>(after vibration, corrosion, dust, and moisture tests)</i>	121.4	≥ 119	118.6	≥ 116	116.7	≥ 114	117.5	≥ 115

Did the vibration test cause any cracking or rupture of parts that would affect the mounting of the siren on a vehicle?
Yes/ No

6.1.1 SPL Requirements

When measured in accordance with 5.1, the SPL produced by Siren #1 shall meet all of the minimum requirements listed in Table 1. The SPL produced by Siren #2 through Siren #5, which are tested only at the measurement angle of 0 degrees, shall meet the corresponding SPL requirement before any other tests (e.g., vibration) are performed, **and shall not be reduced by more than 3 dB after these other tests are complete.** When comparing the measured SPL values to the SPL requirements, the measured values **shall be rounded to the nearest integer decibel value.** For the purpose of this comparison, measured SPL values that contain a five or greater in the first place to the right of the decimal shall be rounded upward.



SECTION 5) DURABILITY TEST

Table B4 - SPL measurements - Siren #4

Measurement Angle (Degrees from Device Axis)	A-Weighted SPL (dB re 20 μ Pa) Measured with the Fast Time Setting				A-Weighted SPL (dB re 20 μ Pa) Measured with a Long-Term Time Setting			
	Wail		Yelp		Wail		Yelp	
	Measured	Required	Measured	Required	Measured	Required	Measured	Required
0 (before durability)	122.4	≥ 118	119.6	≥ 117	117.8	≥ 115	118.5	≥ 115
0 (after durability)	120.7	≥ 119	118.1	≥ 117	116.3	≥ 115	117.0	≥ 116

6.1.1 SPL Requirements

When measured in accordance with 5.1, the SPL produced by Siren #1 shall meet all of the minimum requirements listed in Table 1. The SPL produced by Siren #2 through Siren #5, which are tested only at the measurement angle of 0 degrees, shall meet the corresponding SPL requirement before any other tests (e.g., vibration) are performed, **and shall not be reduced by more than 3 dB after these other tests are complete.** When comparing the measured SPL values to the SPL requirements, the measured values **shall be rounded to the nearest integer decibel value.** For the purpose of this comparison, measured SPL values that contain a five or greater in the first place to the right of the decimal shall be rounded upward.



SECTION 6) EXTREME TEMPERATURE TESTS

Table 5A - SPL measurements - Siren #5

Measurement Angle (Degrees from Device Axis)	A-Weighted SPL (dB re 20 µPa) Measured with the Fast Time Setting				A-Weighted SPL (dB re 20 µPa) Measured with a Long-Term Time Setting			
	Wail		Yelp		Wail		Yelp	
	Measured	Required	Measured	Required	Measured	Required	Measured	Required
0 (before extreme temperature tests)	122.7	≥ 118	120.0	≥ 117	118.1	≥ 115	118.8	≥ 115
0 (after extreme temperature tests)	122.2	≥ 120	119.5	≥ 117	117.6	≥ 115	118.4	≥ 116

6.1.1 SPL Requirements

When measured in accordance with 5.1, the SPL produced by Siren #1 shall meet all of the minimum requirements listed in Table 1. The SPL produced by Siren #2 through Siren #5, which are tested only at the measurement angle of 0 degrees, shall meet the corresponding SPL requirement before any other tests (e.g., vibration) are performed, **and shall not be reduced by more than 3 dB after these other tests are complete.** When comparing the measured SPL values to the SPL requirements, the measured values **shall be rounded to the nearest integer decibel value.** For the purpose of this comparison, measured SPL values that contain a five or greater in the first place to the right of the decimal shall be rounded upward.



Table B5B - High temperature test data

	Measured Voltage or Frequency	
	Measured	Required
AC voltage at the speaker terminals with the siren in the yelp mode measured at ambient laboratory temperature before the temperature soak	27.9 VAC rms	/
AC voltage at the speaker terminals with the siren in the yelp mode measured at the end of the temperature soak*	27.8 VAC rms	23.72 ~ 32.09*
Minimum fundamental frequency (Hz) of the wail at the end of the temperature soak	647	≥ 500Hz
Maximum fundamental frequency (Hz) of the wail at the end of the temperature soak	1690	≤ 2000Hz

*The amplifier output voltage measured in these conditions must be within ±15% of the voltage measured at the ambient laboratory temperature.

Table B5C - Low temperature test data

	Measured Voltage or Frequency	
	Measured	Required
AC voltage at the speaker terminals with the siren in the yelp mode measured at ambient laboratory temperature before the temperature soak	27.8 VAC rms	/
AC voltage at the speaker terminals with the siren in the yelp mode measured at the end of the temperature soak*	27.75 VAC rms	23.63 ~ 31.97*
Minimum fundamental frequency (Hz) of the wail at the end of the temperature soak	645	≥ 500Hz
Maximum fundamental frequency (Hz) of the wail at the end of the temperature soak	1690	≤ 2000Hz

*The amplifier output voltage measured in these conditions must be within ±15% of the voltage measured at the ambient laboratory temperature.



SECTION 7) PHOTOGRAPHS OF TEST SAMPLE



- END OF TEST REPORT -

Test Location Information			
Name	UL-CCIC Company Limited		
Address	No.2, Chengwan Road, Suzhou Industrial Park, Suzhou 215122 China		
Client Information			
Name	SISTEMAS Y SERVICIOS DE COMUNICACION SA DE CV		
Address	AVENIDA 20 DE NOVIEMBRE # 805 COLONIA CENTRO CHIHUAHUA, CHIHUAHUA CP 31000 TELEFONO : 614-415-2525		
Report Information			
Report Number	4791592889.1_2		
Report Date	2025-01-13		
Standard References	Customer's Requirement.		
Product Information*			
Type	Siren amplifier	Controller	Speaker
Product Model	X100F	/	XS100
Mounting Orientation	/	/	Vertical
Electronic Parameter	DC 12 V, I _{max} = 16 A (Input range: DC 11–16V)	/	/
Project Handler/Engineer			
Name/Signature	Roger Xu <i>Roger Xu</i>		
Review			
Name/Signature	Chris Yi <i>Chris Yi</i>		

*Note provided by customer: If the amplifier and controllers are separate components, each component shall be labeled as a part of a system and the identification code shall be marked on each component.

General Information

Information conveyed by this Report applies only to the test sample(s) actually tested. UL LLC did not select the sample(s), determine whether the sample(s) was representative of production sample(s), nor was UL provided with information relative to the formulation or identification of component materials used in the test sample(s).

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List of Tests	Test Result
Vibration Test	See Page 6
Salt Spray Test	See Page 9
Dust Test	See Page 12
IPX9K Test	See Page 15

Table 1 “List of tests”

Appendix	Page
Detailed Testing Data	5-15
Instrument Reference List	16

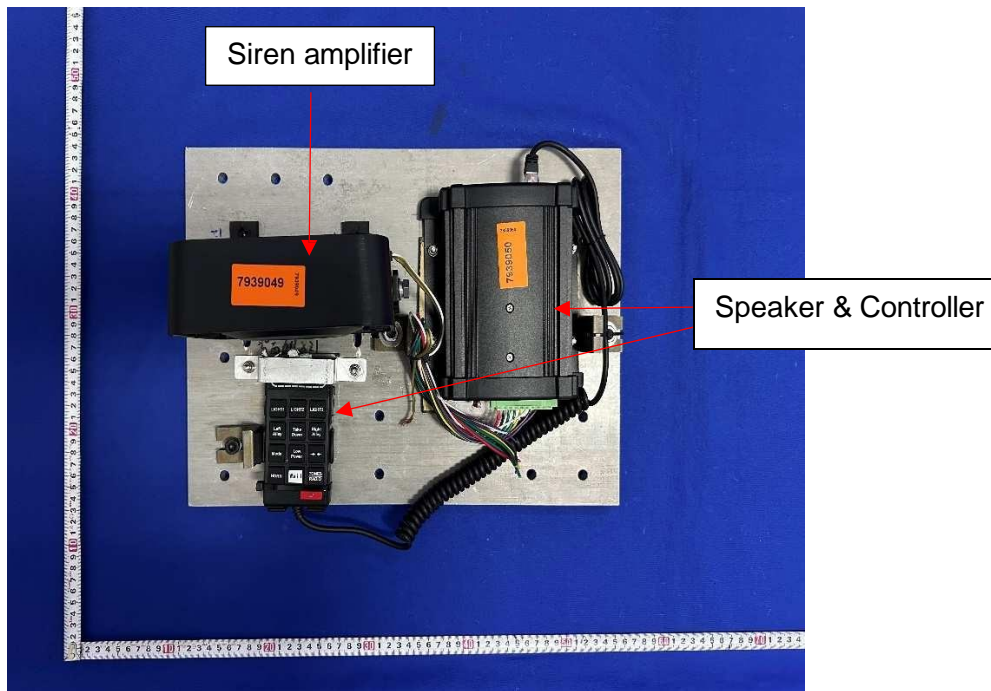
Table 2 “Appendix”

Remark
<ol style="list-style-type: none">1. The testing was conducted by Suzhou Longce Testing Technology Service Co., Ltd. located in Building 19, 1378 Xinzhuang Avenue, Xinzhuang Town, Changshu City.2. The corresponding report number of datasheet is LCJC202412118YW001.



Sample Identification			
Sample No.	Sample Identification Number	Date Received	Product Description /Serial Number
1	7939049	2024-12-19	Siren amplifier/X100F
2	7939050	2024-12-19	Speaker/XS100 Controller

Photos of Characteristics



Remark

The four tests in this report are sequential tests. The sample includes a siren amplifier, a controller and a speaker. The salt pray test, dust test and IPX9K test are applied on the siren amplifier only according to the customer's request.

Table 3 "Sample identification list"

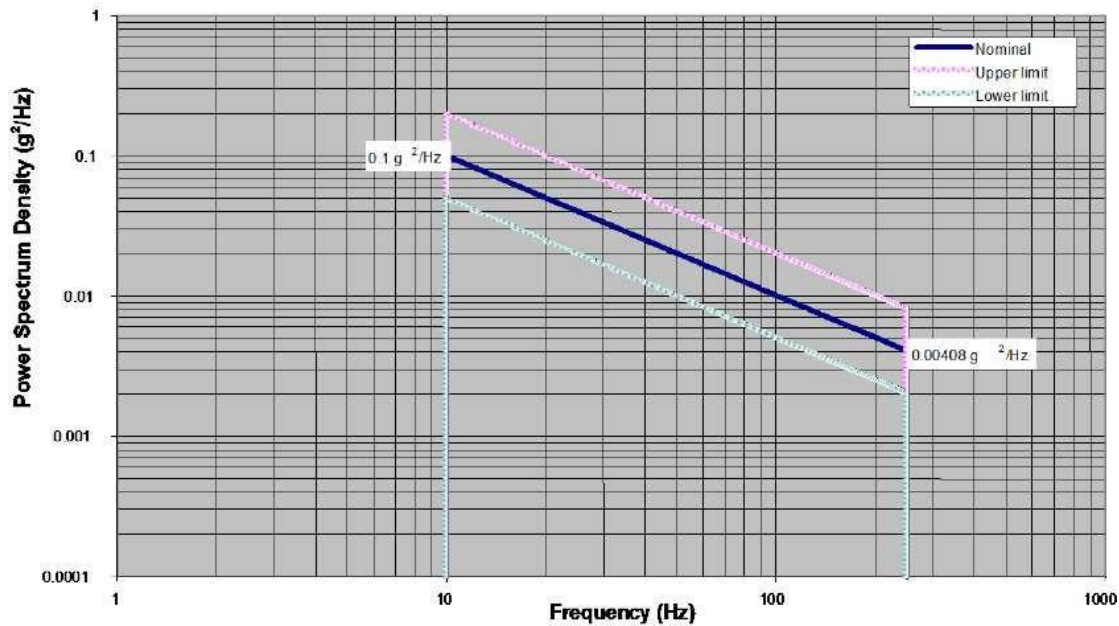
Detailed Test Data			
Tested by:	Wei Jiacheng/Coulson Li	Sample Tested:	2024-12-19

Vibration Test

Description and Setup

Test procedure per SAE J575-202101 4.2 Vibration test:

1. Frequency Varied from 10 to 250Hz.
2. G-load Power Spectrum Density see Figure 3 for both passenger cars and light trucks.
3. Test on the vertical axis of the device as it is mounted on the vehicle.
4. Six hours at room ambient temperature (total 6 hours).
5. The tolerance limit shall be $\pm 3\text{dB}$.
6. The RMS value shall be 1.81g for passenger cars and light trucks.



SAE J575 Fig 3. G-load PSD profile for passenger cars and light trucks

Laboratory Environmental Conditions:

Ambient Temperature, °C	24.4	Relative Humidity, %	51.8
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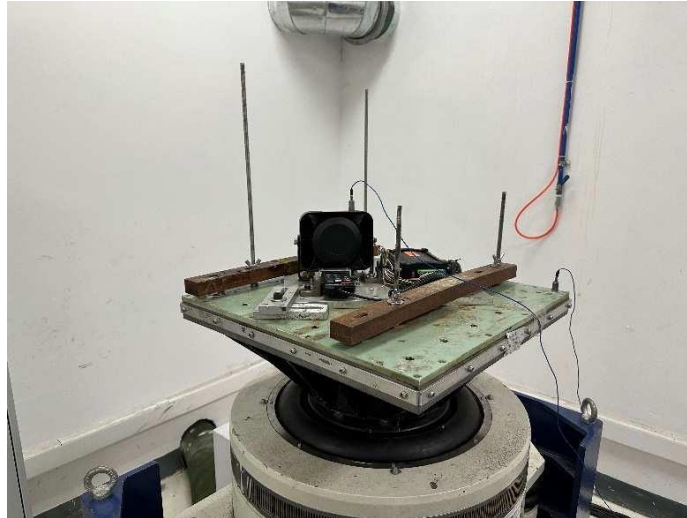
Test Result(s)

Sample ID	Test Result(s)
7939049	There is no damage to the enclosure or loosening of any part of the sample.
7939050	There is no damage to the enclosure or loosening of any part of the sample.

Test Photo(s)



Test Setup



Test Profile



Detailed Test Data			
Tested by:	Marin Liu	Sample Tested:	2024-12-20~2024-12-30

Salt Spray Test
 Description and Setup

- The specimen shall be exposed for 240 hours to salt spray in accordance with the Standard Method of Salt-Spray (Fog) Testing, ASTM B117-03.
- The salt solution shall be prepared by dissolving 5 parts by weight of salt in 95 parts by weight of either distilled water or water containing not more than 200 parts per million of total solids. The salt shall be sodium chloride which is substantially free of nickel and copper and which contains, when dry, not more than 0.1 percent of sodium iodide and not more than 0.3 percent of total impurities.
- The compressed air supply to the nozzle(s) for atomizing the salt solution shall be free of oil and dirt and shall be maintained between 83 and 124 kPa (between 12 and 18 psi).
- The temperature of the salt spray chamber shall be maintained between 33°C and 37°C. The nozzle(s) shall be directed or baffled so that none of the spray can impinge directly on the enclosure being tested.
- The chamber shall be closed and the spray operated continuously, except for the short daily interruption necessary to inspect, rearrange, or remove the test specimens, to check and replenish the solution in the reservoir, and to make necessary recordings.
- Test conditions:
 Concentration of solution collected: (5±1) %NaCl
 (conforming to Type IV water in specification D1193)
 Chamber temperature: (35±2) °C.
 Quantify of fog: (1.0~2.0) mL/(80cm²/hour)
 PH of collected solution at 23±3 °C: 6.7
- After the test, specimens may be gently washed or dipped in clean running water not warmer than 38°C to remove salt deposits from their surface, and then immediately dried. Corrosion products, other than rust, may be removed by light brushing if required, to observe the condition of the underlying stratum.

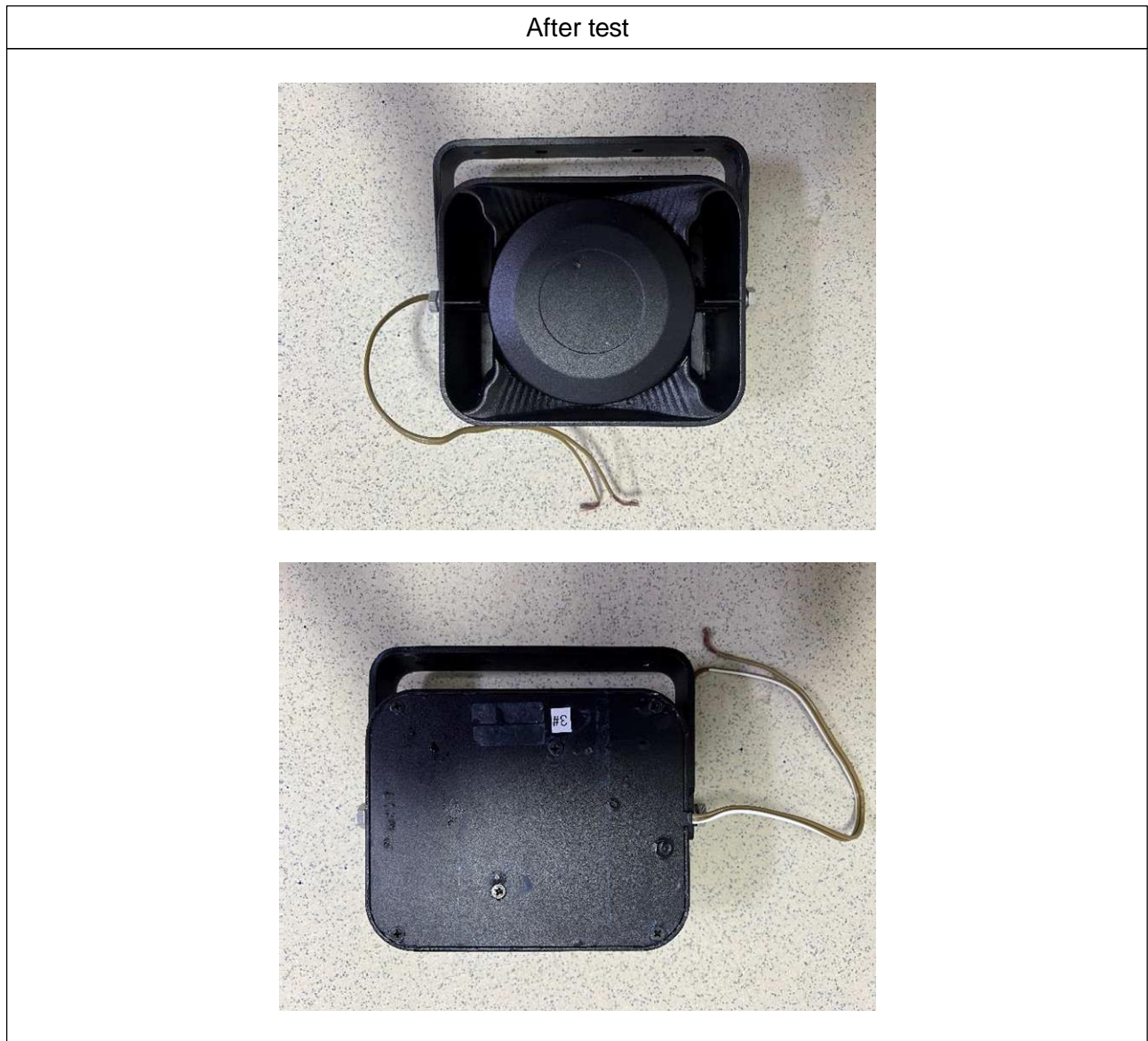
Laboratory Environmental Conditions:

Ambient Temperature, °C	24.0	Relative Humidity, %	52.3
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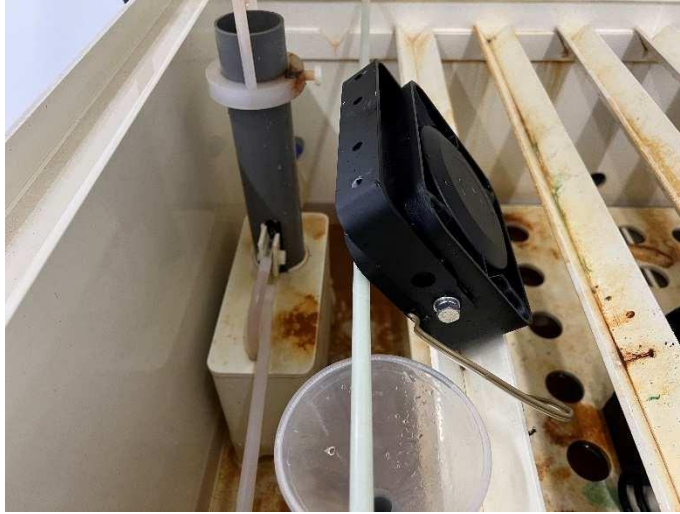
Test Result(s)

Sample ID	Test Result(s)
7939049	No obvious corrosion degradation in the front of the sample. Slight blistering appears on the back of the sample.

Test Photo(s)



Test Setup



Detailed Test Data

Tested by:	Sun Xin	Sample Tested:	2025-01-02
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Dust Test

Description and Setup

1. Equipment: The inside of test chamber is a cube. The size of each side is 0.9~1.5 m. The bottom is funnel-shaped. It can hold 3~5 kg dust.
2. Dust size: Class 6 from JIS Z8901
3. Dust concentration: 2 kg/m³
4. The sample should be at least 150 mm away from chamber's side.
5. Test conditions: 10 s movement of the air/dust mixture, 15 mins break, allowable settlement. The test period is 5 hours.

Laboratory Environmental Conditions:

Ambient Temperature, °C	25.0	Relative Humidity, %	50.0
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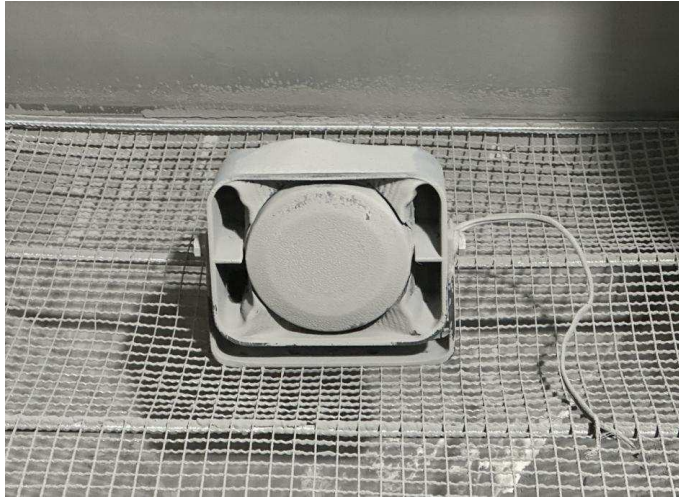
Test Result(s)

Sample ID	Test Result(s)
7939049	The experimental results would not be evaluated.

Test Photo(s)



Test Setup



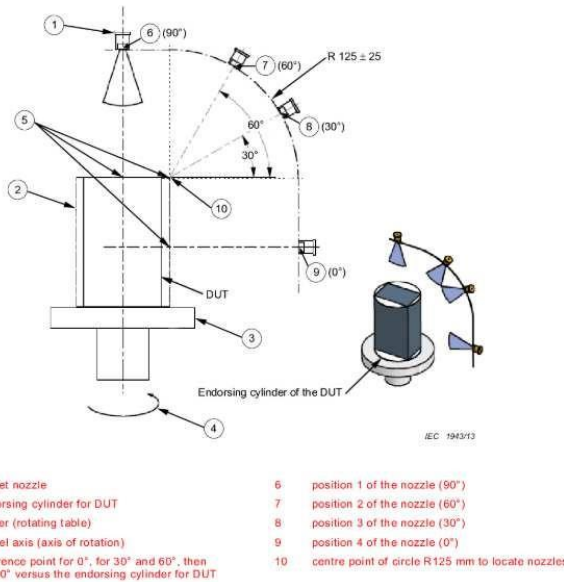
Detailed Test Data

Tested by:	Wei Jiacheng/Coulson Li	Sample Tested:	2025-01-06
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IPX9K Test

Description and Setup

1. Test equipment see IEC 60529 Figure 12.
2. Test conditions:
 - Speed: $(5 \pm 1)r/min$
 - Test position: Spray at 0°, 30°, 60°, 90° distance (100 to 150)mm
 - Water flow rate: 14 l/min to 16 l/min
 - Water pressure: approx. (8000 to 10000) kPa
 - Water temperature: $(80 \pm 5) ^\circ C$
 - Exposure time: 30s per position



Key

1 fan jet nozzle	6 position 1 of the nozzle (90°)
2 endorsing cylinder for DUT	7 position 2 of the nozzle (60°)
3 holder (rotating table)	8 position 3 of the nozzle (30°)
4 swivel axis (axis of rotation)	9 position 4 of the nozzle (0°)
5 reference point for 0°, for 30° and 60°, then for 90° versus the endorsing cylinder for DUT	10 centre point of circle R125 mm to locate nozzles

Figure 12 – Test set-up for determining the protection against high-pressure and temperature water jet; degree of protection against ingress of water IP X9 for small enclosures

IEC 60529 Fig 12. Test set-up for degree of protection against water 9K

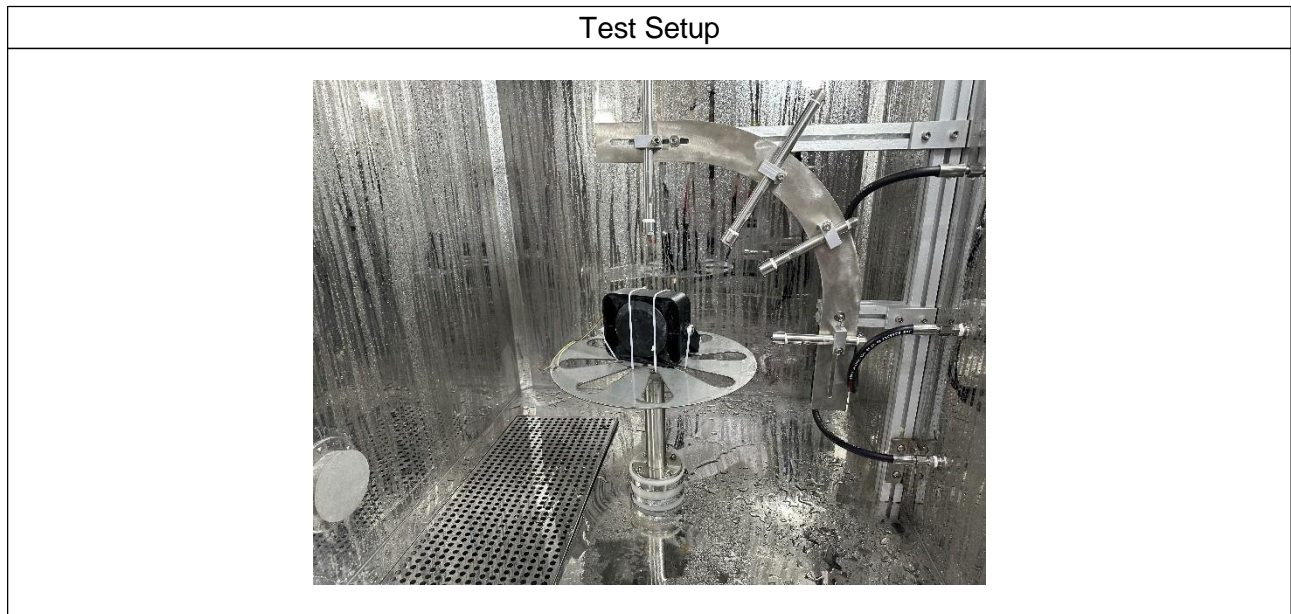
Laboratory Environmental Conditions:

Ambient Temperature, °C	25.4	Relative Humidity, %	46.5
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Test Result(s)

Sample ID	Test Result(s)
7939049	The experimental results would not be evaluated.

Test Photo(s)



Appendix – Instrument reference list

Instrument ID	Equipment Type	Model	Calibration date	
			Last	Due
139910	Vibration System	MPA406/M232A	05/28/2024	05/29/2025
89626	Temperature and Humidity Datalogger	iTHX-SD	05/31/2024	05/30/2025
156695	Scale – Digital	ME203	06/28/2024	06/27/2025
156701	Scale – Digital	ACS JS (ICS241 06000)	06/28/2024	06/27/2025
155032	Salt Fog Cabinet	UYW-1200	05/06/2024	05/05/2025
138107	Refractometer	PAL-035	05/24/2024	05/23/2025
70201	CONDUCTIVITY METER	SC72	10/12/2024	10/11/2025
155507	Measuring Cup	50mL	06/07/2024	06/06/2025
155508	Measuring Cup	50mL	06/07/2024	06/06/2025
183146	Temperature and Humidity Datalogger	iTHX-SD	06/08/2024	06/07/2025
156712	pH meter	HI8424	06/09/2024	06/08/2025
220551	IPX9K	KP-IPX9	05/28/2024	05/27/2025
221162	Temperature and Humidity Datalogger	iTHX-SD	07/02/2024	07/01/2025
201409IP001	Dust Test Chamber	XR-SC500	10/09/2024	10/08/2025

Table 4 Instrument reference list

END OF TEST REPORT. THIS PAGE INTENTIONALLY LEFT BLANK