

EMC TEST REPORT

of

Diesel generator set

Model No.: DG2500(E),DG3000(E),DG6000(E),DG7000(E),DG8000(E),DG11000(E)
,DG12000(E),DG15000(E),DG4500SE,DG6500SE,DG7500SE,DG8500S
E,DG11000SE,DG12000SE,DG15000SE

Serial No. /

Report No.: EMC-2017741-02

Date of test : 2017.07.20

Date of approval: 2017.07.24

Results : **PASS**

Standards: EN 61000-6-1:2007

Applicant

TAIZHOU NEULAND MACHINERY CO.,LTD

1390# WEST GONGREN ROAD,JIAOJIANG

DISTRICT,TAIZHOU,ZHEJIANG

Prepared by

Hangzhou Wanve Certification Technology Service Co.,Ltd

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Testing engineers:

吴建切

Approver.



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General Description of EUT

Product:	Diesel generator set	
Certified models:	DG2500(E),DG3000(E),DG6000(E),DG7000(E),DG8000(E),DG11000(E),DG12000(E),DG15000(E),DG4500SE,DG6500SE,DG7500SE,DG8500SE,DG11000SE,DG12000SE,DG15000SE	
Test Sample models:	DG7500SE	
Power Supply:	/	
I/O Ports:	N/A	
	Rated power:5.0kW	Rated current (A):21.7/7.2A
Technical data	Rated Voltage: 230/400V	Rated Frequency: 50/60Hz
Manufacturer:	TAIZHOU NEWLAND MACHINERY CO.,LTD	
Manufacturer Address:	1390# WEST GONGREN ROAD,JIAOJIANG DISTRICT, TAIZHOU,ZHEJIANG	
Standards	EN 61000-6-1:2007. Electromagnetic compatibility (EMC). Generic standards. Immunity for residential, commercial and light-industrial environments	

1.EN61000-6-1

Description of Performance Criterion (According with EN61000-6-1 Section 4)

Performance Criterion A

The apparatus shall continue to operate as intended during the test. No degradation of performance or loss of function is allowed below a performance level (or permissible loss of performance) specified by the manufacturer, when the apparatus is used as intended. If the minimum performance level or the permissible performance loss is not specified by the manufacture, then either of these may be derived from the product description and documentation, and from what the user may reasonably expect from the apparatus if used as intended.

Performance Criterion B

The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level (or permissible loss of performance) specified by the manufacturer, when the apparatus is used as intended. During the test, degradation of performance is allowed, however, no change of actual operating state or stored data is allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacture, then either of these may be derived from the product description and documentation, and from what the user may reasonably expect from the apparatus if used as intended.

Performance Criterion C

Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls, or by any operation specified in the instructions for use.

1.1 SURGES

1.1.1 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Last Cal. Date	Cal. Period
Noise Laboratory CO., LTD	Surge Lite	LSS-6030	9099E00350	2015.11	2 Year

1.1.2 Description of Measurement Conditions

Temperature: 27°C

Humidity: 58%

Pressure: 1033mbar

Electromagnetic environment: normal

1.1.3 Test procedure and the test set-up

Procedure

a. For EUT power supply:

The surge is to be applied to the EUT power supply terminals via the capacitive coupling network. Decoupling networks are required in order to avoid possible adverse effects on equipment not under test that may be powered by the same lines, and to provide sufficient decoupling impedance to the surge wave. The power cord between the EUT and the coupling/decoupling networks shall be 2 meters in length (or shorter).

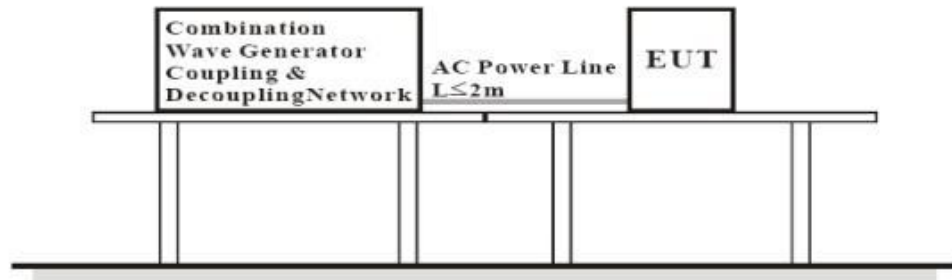
b. For test applied to unshielded unsymmetrically operated interconnection lines of EUT:

The surge is applied to the lines via the capacitive coupling. The coupling / decoupling networks shall not influence the specified functional conditions of the EUT. The interconnection line between the EUT and the coupling/decoupling networks shall be 2 meters in length (or shorter).

c. For test applied to unshielded symmetrically operated interconnection / telecommunication lines of EUT:

The surge is applied to the lines via gas arrestors coupling. Test levels below the ignition point of the coupling arrestor cannot be specified. The interconnection line between the EUT and the coupling/decoupling networks shall be 2 meters in length (or shorter).

Set-up



1.1.4 Test Data and Records

Level	Voltage	Poll	Path	Pass	Fail
1	0.5kV	±	L-N	B	
2	1.0kV	±	L-N	B	

1.1.5 Verdict

The EUT was working as normal, so met the requirement of performance criteria B.

1.2 ESD

1.2.1 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Last Cal. Date	Cal. Period
Shanghai Sanki	Electrostatic Discharge tester	ESD-320	0329501C	2017.6	2 Year

1.2.2 Description of Measurement Conditions

Temperature: 27°C

Humidity: 58%

Pressure: 1033mbar

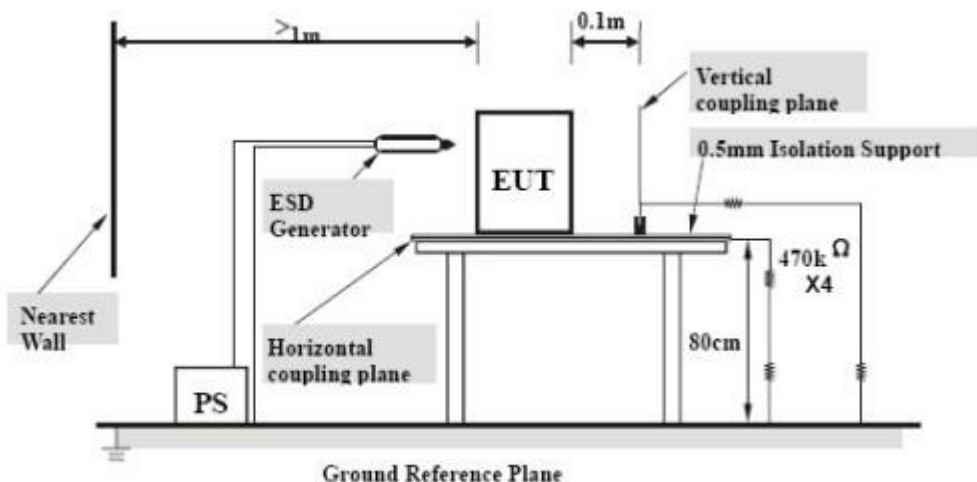
Electromagnetic environment: normal

1.2.3 Test procedure and the test set-up

Procedure

- a. Electrostatic discharges were applied only to those points and surfaces of the EUT that are accessible to users during normal operation.
- b. The test was performed with at least ten single discharges on the pre-selected points in the most sensitive polarity.
- c. The time interval between two successive single discharges was at least 1 second.
- d. The ESD generator was held perpendicularly to the surface to which the discharge was applied and the return cable was at least 0.2 meters from the EUT.
- e. Contact discharges were applied to the non-insulating coating, with the pointed tip of the generator penetrating the coating and contacting the conducting substrate.
- f. Air discharges were applied with the round discharge tip of the discharge electrode approaching the EUT as fast as possible (without causing mechanical damage) to touch the EUT. After each discharge, the ESD generator was removed from the EUT and re-triggered for a new single discharge. The test was repeated until all discharges were complete.
- g. At least ten single discharges (in the most sensitive polarity) were applied at the front edge of each Horizontal Coupling Plane opposite the center point of each unit of the EUT and 0.1 meters from the front of the EUT. The long axis of the discharge electrode was in the plane of the HCP and perpendicular to its front edge during the discharge.
- h. At least ten single discharges (in the most sensitive polarity) were applied to the center of one vertical edge of the Vertical Coupling Plane in sufficiently different positions that the four faces of the EUT were completely illuminated. The VCP (dimensions 0.5m x 0.5m) was placed vertically to and 0.1 meters from the EUT.

Set-up



1.2.4 Test Data and Records

Air Discharge

Test Levels																
EN61000-4-2 Test Points	-2 kV	+2 kV	-4 kV	+4 kV	-6 kV	+6 kV	-8 kV	+8 kV	-10 kV	+10 kV	-12.5 kV	+12.5 kV	-15 kV	+15 kV	-20 kV	+20 kV
EUT Front Side	B	B	B	B	B	B	B	B								
EUT Top Side	B	B	B	B	B	B	B	B								
EUT Back Side	B	B	B	B	B	B	B	B								
EUT Left Side	B	B	B	B	B	B	B	B								
EUT Right Side	B	B	B	B	B	B	B	B								

Direct Contact

Test Levels																
EN61000-4-2 Test Points	-2 kV	+2 kV	-4 kV	+4 kV	-6 kV	+6 kV	-8 kV	+8 kV	-10 kV	+10 kV	-12.5 kV	+12.5 kV	-15 kV	+15 kV	-20 kV	+20 kV
EUT Front Side	B	B	B	B												
EUT Top Side	B	B	B	B												
EUT Back Side	B	B	B	B												
EUT Left Side	B	B	B	B												
EUT Right Side	B	B	B	B												

1.2.5 Verdict

The EUT was working as normal, so met the requirement of performance criteria B.

1.3 EFT/B

1.3.1 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Last Cal. Date	Cal. Period
Shanghai Sanki	E.F.TB Generator	8014	069504E	2017.6	2 Year

1.3.2 Description of Measurement Conditions

Temperature: 27°C

Humidity: 58%

Pressure: 1033mbar

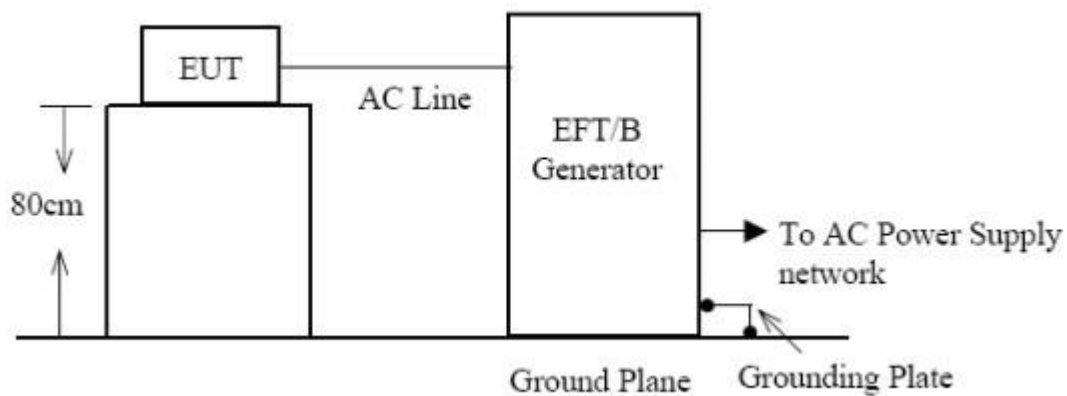
Electromagnetic environment: normal

1.3.3 Test procedure and the test set-up

Procedure

- a. Both positive and negative polarity discharges were applied.
- b. The length of the “hot wire” from the coaxial output of the EFT generator to the terminals on the EUT should not exceed 1 meter.
- c. The duration time of each test sequential was 1 minute.
- d. The transient/burst waveform was in accordance with IEC 61000-4-4, 5/50ns.

Set-up



1.3.4 Test Data and Records

		Test Levels (kV)							
EN61000-4-4 Test Points		+0.25	-0.25	+0.5	-0.5	+1.0	-1.0	+2.0	-2.0
Power Port	L	A	A	A	A	A	A		
	N	A	A	A	A	A	A		
	L +N	A	A	A	A	A	A		

1.3.5 Verdict

The EUT was working as normal, so met the requirement of performance criteria A.

1.4 INJECTED CURRENTS

1.4.1 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Last Cal. Date	Cal. Period
Giga-tronics	Synthesized RF Signal Generator	6061A	5130304	2015.9	2 Year
QF	Broadband Power Amplifier	QF3860	---	2015.9	2 Year
QF	Millivoltmeter	QF2281	92028	2015.9	2 Year

1.4.2 Description of Measurement Conditions

Temperature: 27°C

Humidity: 58%

Pressure: 1033mbar

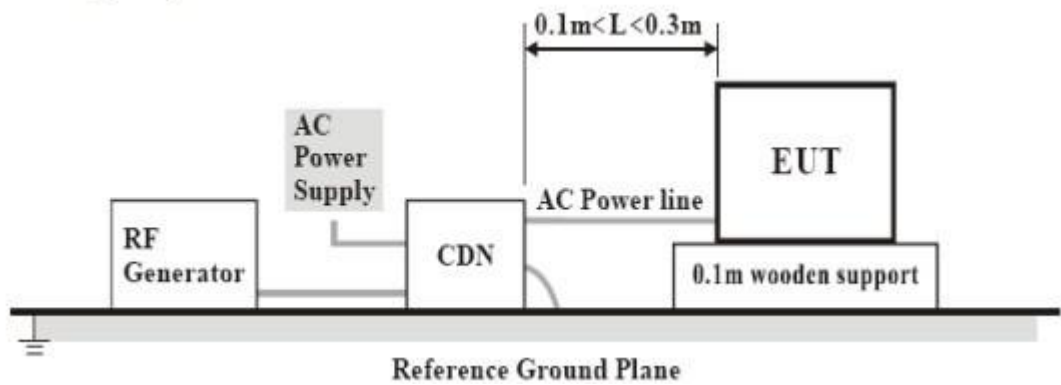
Electromagnetic environment: normal

1.4.3 Test procedure and the test set-up

Procedure

- a. The EUT shall be tested within its intended operating and climatic conditions.
- b. The test shall be performed with the test generator connected to each of the coupling and decoupling devices in turn, while the other non-excited RF input ports of the coupling devices are terminated by a 50-ohm load resistor.
- c. The frequency range is swept from 150 kHz to 80 MHz, using the signal level established during the setting process and with a disturbance signal of 80 % amplitude. The signal is modulated with a 1 kHz sine wave, pausing to adjust the RF signal level or the switch coupling devices as necessary. The sweep rate shall not exceed 1.5×10^{-3} decades/s. The step size shall not exceed 1 % of the start and thereafter 1 % of the preceding frequency value where the frequency is swept incrementally.
- d. The dwell time at each frequency shall not be less than the time necessary for the EUT to be exercised, and able to respond. Sensitive frequencies such as clock frequency(ies) and harmonics or frequencies of dominant interest, shall be analyzed separately.
- e. Attempts should be made to fully exercise the EUT during testing, and to fully interrogate all exercise modes selected for susceptibility.

Set-up



1.4.4 Test Data and Records

EN61000-4-6 Test Points	Frequency range MHz	Levels	Voltage Level (e.m.f.)V	Pass	Fail
Power Line	0.15-80MHz	1	1		
		2	3	A	
		3	10		
		X	Special		

1.4.5 Verdict

The EUT was working as normal, so met the requirement of performance criteria A.

1.5 VOLTAGE DIPS AND INTERRUPTIONS

1.5.1 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Last Cal. Date	Cal. Period
Noise Laboratory CO., LTD	Voltage Dip Simulator	VDS-220B	2199D00098	2015.11	2 Year

1.5.2 Description of Measurement Conditions

Temperature: 27°C

Humidity: 58%

Pressure: 1033mbar

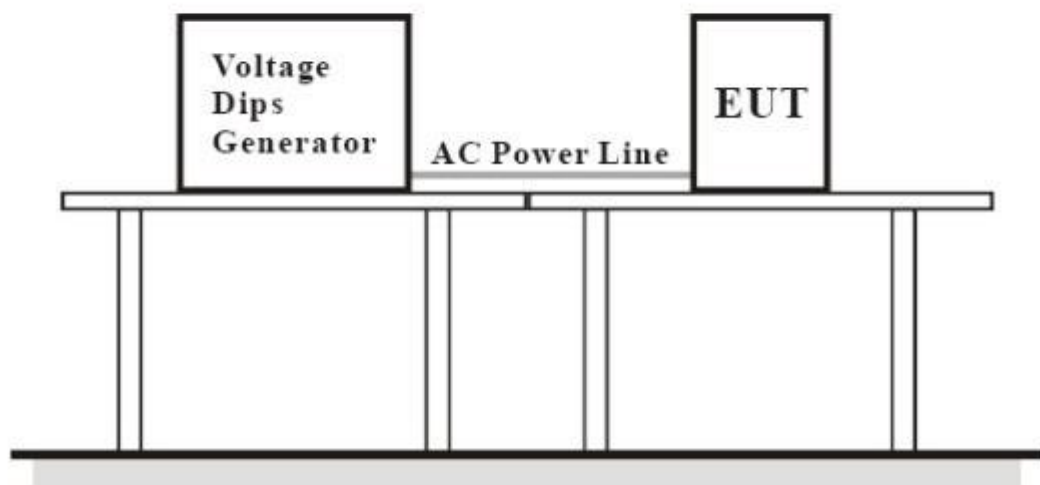
Electromagnetic environment: normal

1.5.3 Test procedure and the test set-up

Procedure

The EUT shall be tested for each selected combination of test levels and duration with a sequence of three dips/interruptions with intervals of 10 s minimum (between each test event). Each representative mode of operation shall be tested. Abrupt changes in supply voltage shall occur at zero crossings of the voltage waveform.

Set-up



1.5.4 Test Data and Records

Environmental phenomena	Test level in % U_T	Duration (in periods of the rated frequency)	Phase Angle	Pass	Fail
Interruptions	>95	250T	0/180	B	
Voltage dips in % U_T	0	100	0,5T	B	
	0	100	1T	B	
	70	30	25 T	B	

1.5.5 Verdict

The EUT was working as normal, so met the requirement of performance criteria B.

1.6 Radio-frequency electromagnetic field

1.6.1 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Last Cal. Date	Cal. Period
R&S	Signal Generator	SMR-40	1104	2015.11	2 Year
QF	Broadband Power Amplifier	QF3860	---	2017.2	2 Year
QF	Millivoltmeter	QF2281	92028	2017.2	2 Year
Albatross Projects GmbH	Anechoic Chamber	---	9290832	2017.2	2 Year
R&S	Ultra-broadband Antennas	HL562	---	2015.11	2 Year
Inn-co GmbH	Ultra-broadband Antennas	---	---	N/A	N/A
Inn-co GmbH	Turntable	DS2000S-1t	---	N/A	N/A
Inn-co GmbH	Controller	CO 2000	10806L	N/A	N/A

1.6.2 Description of Measurement Conditions

Temperature: 27°C

Humidity: 60%

Pressure: 1033mbar

Electromagnetic environment: normal

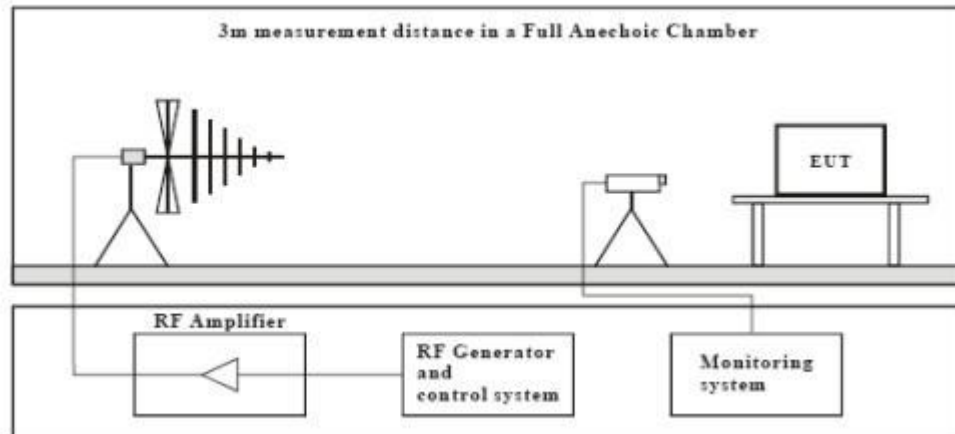
1.6.3 Test procedure and the test set-up

Procedure

The test procedure was in accordance with EN 61000-4-3

- a. The testing was performed in a fully-anechoic chamber. The transmit antenna was located at a distance of 3 meters from the EUT.
- b. The frequency range is swept from 80 MHz to 1000 MHz, 1400 MHz to 2000 MHz with the signal 80% amplitude modulated with a 1kHz sinewave. The rate of sweep did not exceed 1.5×10^{-3} decade/s. Where the frequency range is swept incrementally, the step size was 1 % of preceding frequency value.
- c. The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.
- d. The field strength level was 3V/m.
- e. The test was performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides.

Set-up



1.6.4 Test Data and Records

The EUT was tested that it worked at the normal state.

Frequency Range (GHz)	Front Side (3 V/m)		Rear Side (3 V/m)		Left Side (3 V/m)		Right Side (3 V/m)	
	VERT	HORI	VERT	HORI	VERT	HORI	VERT	HORI
0.08-1.0	Λ	Λ	Λ	Λ	Λ	Λ	Λ	Λ
1.4-2.0	Λ	Λ	Λ	Λ	Λ	Λ	Λ	Λ
2.0-2.7	Λ	Λ	Λ	Λ	Λ	Λ	Λ	Λ

1.6.5 Verdict

The EUT was working as normal, so met the requirement of performance criteria A.

1.7 Power-frequency magnetic field

1.7.1 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Last Cal. Date	Cal. Period
HAEFELY TEST AG	Magnetic field tester	MGA 100	152676	2015.11	2 Year
EMCO	Active loop	6502	9003-2484	2017.2	2 Year

1.7.2 Description of Measurement Conditions

Temperature: 27°C

Humidity: 59%

Pressure: 1033mbar

Electromagnetic environment: normal

1.7.3 Test Data and Records

Power-frequency magnetic field	units	Test specification	Pass	Fail
	Hz A/m	50, 60 3		A

1.7.4 Verdict

The EUT was working as normal, so met the requirement of performance criteria A

Photos of the sample

