EMC TEST REPORT

Product Name:	AERMOTOR
Trademark:	AERMOTOR
Model :	ELM327 SBB, KESS, KTAG, LEXIA, MINIVCI, AK90+, ZEDBULL, vida dice volvo, IPROG, MPPSV21, DIGIPROG, VAS6154, VAS5054, Emulator 9 in 1, Adblue Emulator 8 in 1, TOYOTA OTC, Renault Can Clip, bmwinpa, UPAUSB, DS150E, VCM2, OPCOM, ntg5S1, EL50448, EL50449, OPENPORT2.0, T300 Key Programmer, CARPROG, FORO VCM
Applicant : Address:	Shenzhen keruibao Technology Co., Ltd 440, No. 18, Century Industrial Zone, egongling community, Pinghu street, Longgang District, Shenzhen
Manufacturer : Address:	Shenzhen keruibao Technology Co., Ltd 440, No. 18, Century Industrial Zone, egongling community, Pinghu street, Longgang District, Shenzhen
Test Date:	Jul. 13, 2021 - Jul. 20, 2021
Date of Report :	Jul. 20, 2021
Report No.:	SiCT2107150468E
Test Result:	The equipment under test was found to be compliance with the requirements of the standards applied.
Test Standard:	EN 50498:2010

Compiled by: Daisy Wei

Reviewed by: Sky Wang

Approved by: Andy Wang/Manager

This test report is based on a single evaluation of one sample of above mentioned products. It is not permitted to be duplicated in extracts without written approval of Shenzhen SiCT Technology Co., Ltd.

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1. GENERAL PRODUCT INFORMATION

1.1 Product Function

Refer to Technical Construction Form and User Manual.

1.2 Description of Device (EUT)

Description	:	AERMOTOR
M/N	:	ELM327 SBB, KESS, KTAG, LEXIA, MINIVCI, AK90+, ZEDBULL, vida dice volvo, IPROG, MPPSV21, DIGIPROG, VAS6154, VAS5054, Emulator 9 in 1, Adblue Emulator 8 in 1, TOYOTA OTC, Renault Can Clip, bmwinpa, UPAUSB, DS150E, VCM2, OPCOM, ntg5S1, EL50448, EL50449, OPENPORT2.0, T300 Key Programmer, CARPROG, FORO VCM
Power Input	:	Input: DC 12-24V

1.3 Independent Operation Modes

The basic operation mode is: Working

2. TEST SITES

2.1 Test Facilities

Name of Firm	:	Shenzhen SiCT Technology Co., Ltd.
Site Location	:	4F, Building A, EDerH Industrial District, Fukang Community, Longhua Subdistrict, Longhua District, Shenzhen, Guangdong, P. R. China

2.2 List of Test and Measurement Instruments

For Broadband radiated disturbances/ Narrowband disturbances test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESCI	101156	Dec. 26, 20	Dec. 25, 21
Bilog Antenna	ETS-LINDGREN	3142D	00135452	Dec. 26, 20	Dec. 25, 21
Spectrum Analyzer	Agilent	8593E	3911A04271	Dec. 26, 20	Dec. 25, 21
3m Semi-anechoic Chamber	ETS-LINDGREN	966	KW01	Dec. 26, 20	Dec. 25, 21
Signal Amplifier	SONOMA	310	187303	Dec. 26, 20	Dec. 25, 21
RF Cable	IMRO	IMRO-400	966 Cable 1#	Dec. 26, 20	Dec. 25, 21
MULTI-DEVICE Controller	ETS-LINDGREN	2090	126913	N/A	N/A
Antenna Holder	ETS-LINDGREN	2070B	00109601	N/A	N/A

For Conducted transient disturbances test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
A.N.	SCHWARZBECK	NNBM8125	81251473	Dec. 26, 20	Dec. 25, 21
Electric switch	EM Test	BS 200B	V0816103664	Dec. 26, 20	Dec. 25, 21
Voltage drop generator	EM Test	VDS 200B2	V0816103662	Dec. 26, 20	Dec. 25, 21
Digital phosphor oscilloscope	Tektronix	DPO4054	C012685	Dec. 26, 20	Dec. 25, 21

For Conducted transient immunity test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Ultra Compact Simulator	EM Test	UCS 200M	V0816103661	Dec. 26, 20	Dec. 25, 21
Voltage drop generator	EM Test	VDS 200B2	V0816103662	Dec. 26, 20	Dec. 25, 21
Load dump generator	EM Test	LD 200M	V0816103663	Dec. 26, 20	Dec. 25, 21
Digital phosphor oscilloscope	Tektronix	DPO4054	C012685	Dec. 26, 20	Dec. 25, 21

3. TEST SET-UP AND OPERATION MODES

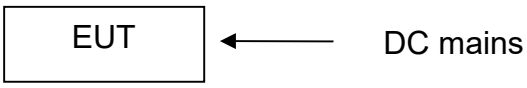
3.1 Principle of Configuration Selection

Emission: The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the Operating Instructions.

Immunity: The equipment under test (EUT) was configured to the representative operating mode and conditions.

3.2 Block Diagram of EMI Test Set-up

System Diagram of Connections between EUT and Simulators



(EUT: AERMOTOR)

3.3 Test Operation Mode and Test Software

Refer to Test Setup in clause 4 & 5.

3.4 Special Accessories and Auxiliary Equipment

None.

3.5 Countermeasures to Achieve EMC Compliance

None.

4. EMISSION TEST RESULTS

4.1 Broadband radiated disturbances/ Narrowband disturbances Test

Result	:	**Pass**
Test Procedure	:	EN 50498:2010
Frequency Range	:	below 108 MHz
Test Site	:	966 Chamber
Limits	:	EN 50498:2010

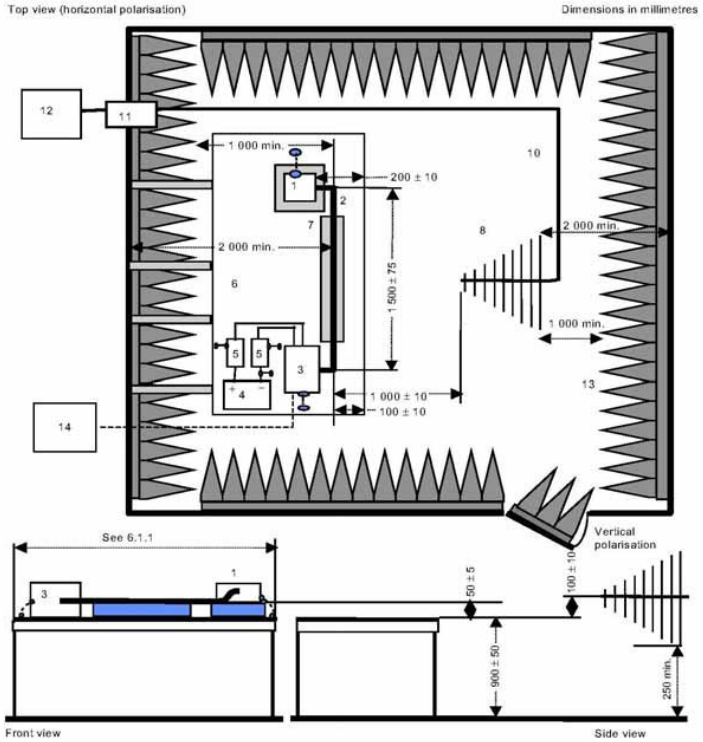
Test Setup

Date of Test	:	Jul. 16, 2021
Input Voltage	:	DC 12-24V
Operation Mode	:	Working

The EUT shall be placed on a non-conductive, low relative permittivity material (εr ≤ 1,4), at(50 ± 5) mm above the ground plane.
The case of the EUT shall not be grounded to the ground plane unless it is intended to simulate the actual vehicle configuration.
The side of the EUT, which is nearest to the edge of the ground plane, shall be located at a distance of (200 ± 10) mm from the front edge of the ground plane.
The total length of the test harness between the EUT and the load simulator (or the RF boundary) shall not exceed 2 000 mm (or as defined in the test plan). The wiring type is defined by the actual system application and requirement.
The test harness shall be placed on a non-conductive, low relative permittivity material (εr ≤ 1,4), at (50 ± 5) mm above the ground plane.
The length of test harness parallel to the front of the ground plane shall be (1 500 ± 75) mm.
The long segment of test harness shall be located parallel to the edge of the ground plane facing the antenna at a distance of (100 ± 10) mm from the edge.
The phase centre of the measuring antenna shall be (100 ± 10) mm above the ground plane for the biconical, log-periodic and horn antenna.
The EUT shall be made to operate under typical loading and other conditions as in the vehicle such that the maximum emission state occurs. These operating conditions must be clearly defined in the test plan to ensure supplier and customer are performing identical tests. The orientation(s) of the EUT for radiated emission measurements shall be defined in the test plan.
The minimum width of the ground plane for radiated emissions shall be 1 000 mm. The minimum length of the ground plane for radiated emissions shall be 2 000 mm, or underneath the entire equipment plus 200 mm, whichever is larger.
The height of the ground plane (test bench) shall be (900 ± 50) mm above the

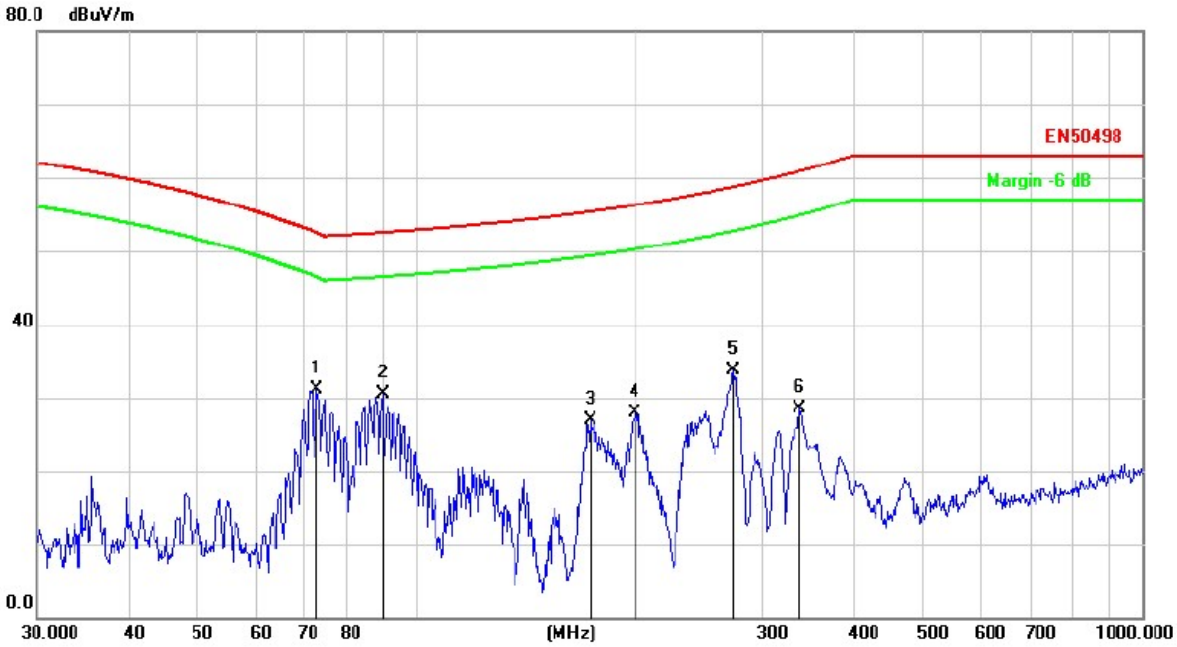
floor. The EUT was tested in the Chamber Site. It was pre-scanned with a Peak detector from the spectrum, and all the final readings from the test receiver were measured with the Quasi-Peak detector.
The bandwidth setting on the test receiver was 120 kHz.
The test data of the worst case condition(s) was reported on the following pages.
All the scanning waveforms were attached within Appendix .
Note: Emission Level = Antenna Factor + Cable Loss + Meter Reading-Preamp Factor.
Measurement Uncertainty: ±3.6 dB at a level of confidence of 95%.

Radiated Emission Test Set-Up Frequency

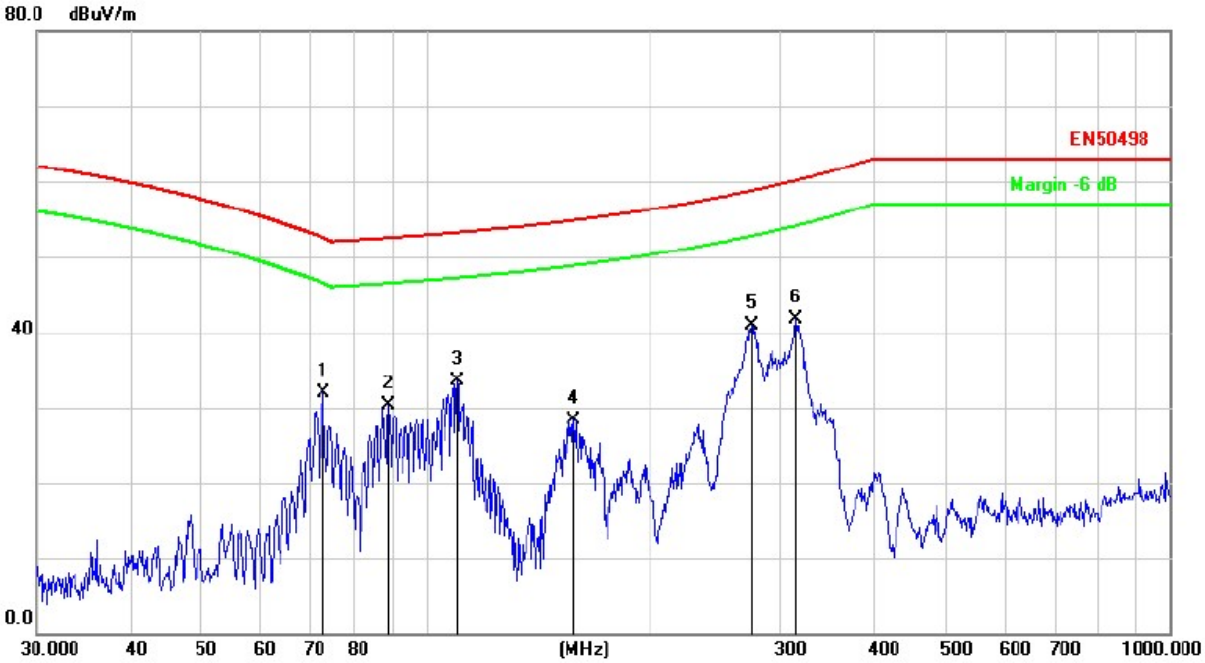


1	Equipment under test	8	Log-periodic antenna
2	Test harness	9	Monitoring device
3	Load simulator	10	High quality double-shielded coaxial cable (50 Ω)
4	Battery	11	Bulkhead connector
5	Artificial mains network (AN)	12	Measuring instrument
6	Ground plane	13	RF absorber material
7	Low relative permittivity support (εr ≤ 1.4)	14	Stimulation and monitoring system

Test Data



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector	cm	degree	Comment
1	*	72.8466	49.23	-18.16	31.07	52.32	-21.25	QP			
2		89.5899	48.06	-17.53	30.53	53.17	-22.64	QP			
3		173.2051	45.35	-18.42	26.93	57.50	-30.57	QP			
4		199.9856	44.13	-16.28	27.85	58.44	-30.59	QP			
5		273.2341	48.59	-14.88	33.71	60.50	-26.79	QP			
6		337.2155	41.53	-12.94	28.59	61.88	-33.29	QP			



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector	cm	degree	Comment
1		72.5916	50.08	-18.12	31.96	52.36	-20.40	QP			
2		88.9639	48.01	-17.67	30.34	53.12	-22.78	QP			
3		110.1816	49.33	-15.77	33.56	54.53	-20.97	QP			
4		158.1123	47.42	-19.05	28.37	56.90	-28.53	QP			
5	*	274.1939	55.85	-14.88	40.97	60.52	-19.55	QP			
6		314.3765	55.35	-13.57	41.78	61.42	-19.64	QP			

4.2 Conducted transient disturbances

Result : **Pass**

Test Procedure : ISO 7637-2:2004

Limit :

Test voltage	12V system V	24V system V
U_A	13.5±0.5	27±1
U_B	12±0.2	24±0.4

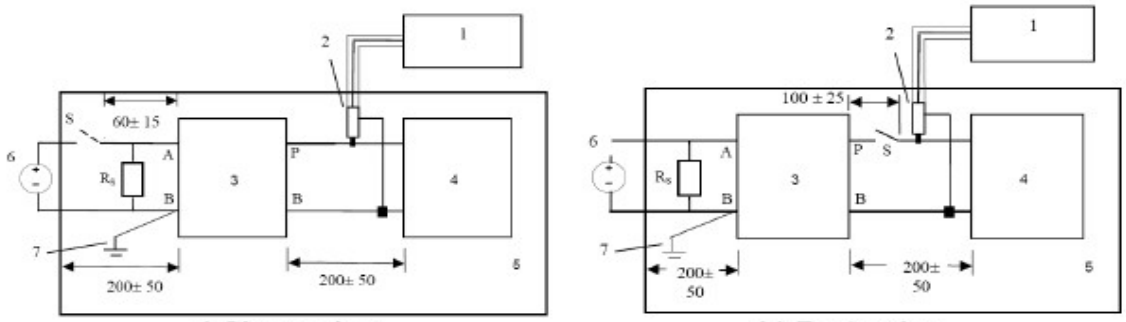
Test Setup

Date of Test : Jul. 16, 2021

Input Voltage : DC 12-24V

Operation Mode : Operation Mode

For conducted emission, all wiring connections between artificial network, switch, and the DUT shall 50mm + 10mm above the metal ground plane. The DUT shall be place on a non-conductive material 50mm + 10mm above the ground plane. The artificial network shall be kept 200mm ± 50mm with the edge of the ground plane and DUT.



a) Slow pulse b) Fast pulse

Note:

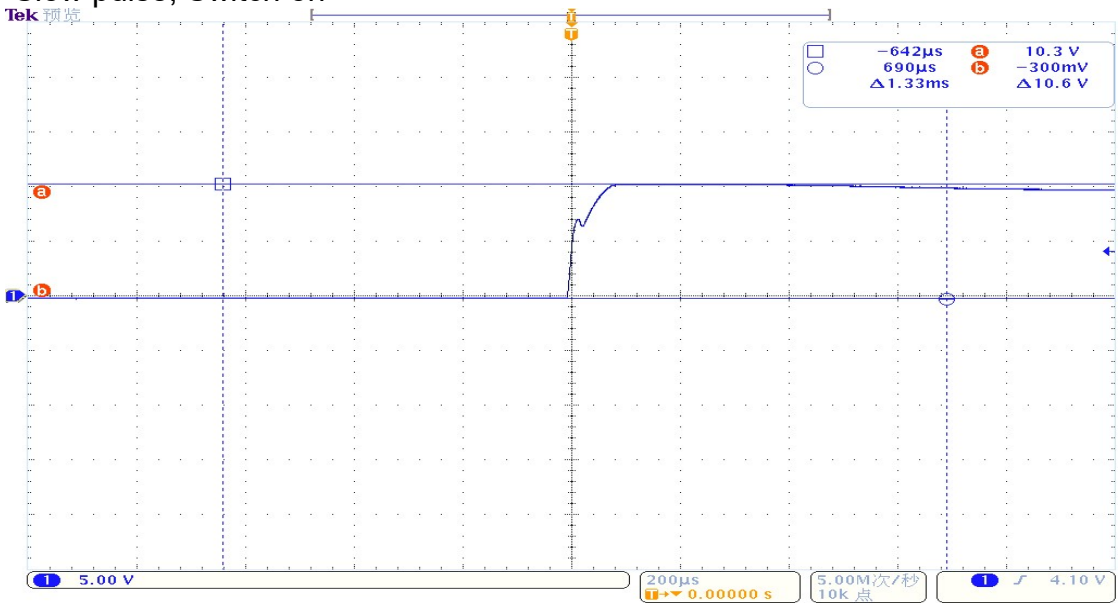
1 oscilloscope or equivalent
2 voltage probe
3 artificial network
4 DUT (source of transient)
5 ground plane
6 power supply
7 Ground connection; length < 100 mm

The measurements were made to the requirements of Regulation 10.03 for an ESA, section 6.9, Specifications concerning the emission of conducted disturbances. The test was set-up to the requirements of ISO 7637-2:2004 section 4.3 Electrical transient conduction along supply lines only.

Test Curve and Data

☒ **System**

Slow pulse, Switch on

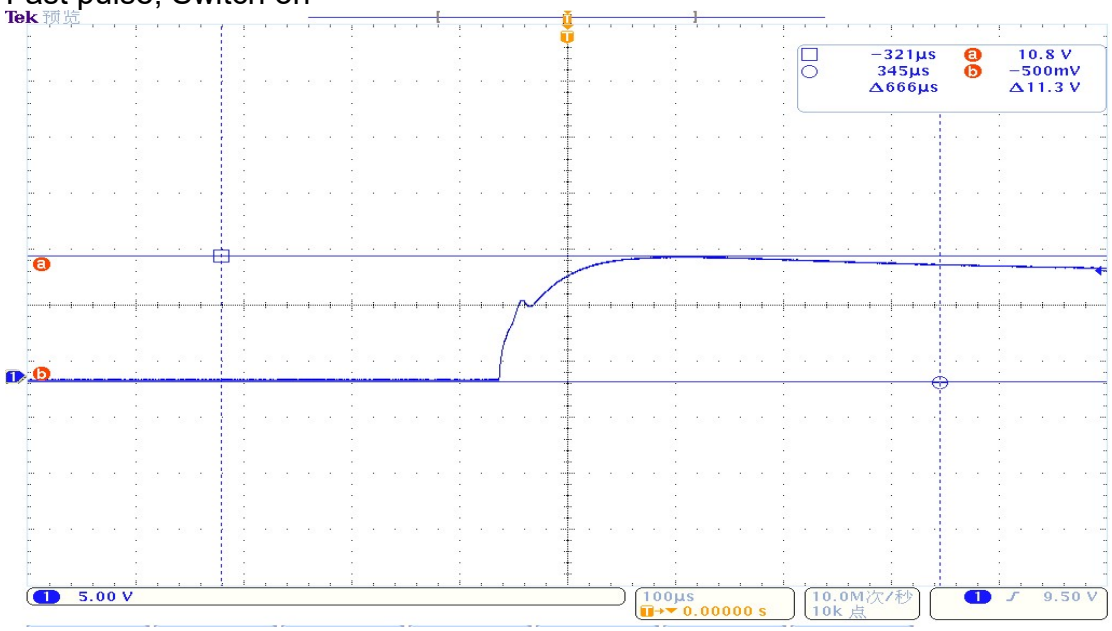


Slow pulse, Switch off

Negative pulse U_{s1}= -12.8 V (Limit: -100V)

Positive pulse U_{s2}= 10.6 V (Limit: +75V)

Fast pulse, Switch on



Fast pulse, Switch off

Negative pulse U_{s1}= -12.8 V (Limit: -100V)
Positive pulse U_{s2}= 10.6 V (Limit: +75V)

5. IMMUNITY TEST RESULTS

5.1 Description of Performance Criteria:

Class A:
all functions of a device or system perform as designed during and after exposure to interference.
Class B:
all functions of a device/system perform as designed during exposure; however, one or more of them may go beyond the specified tolerance. All functions return automatically to within normal limits after exposure is removed. Memory functions shall remain class A.
Class C:
one or more functions of a device or system do not perform as designed during exposure but return automatically to normal operation after exposure is removed.
Class D:
one or more functions of a device or system do not perform as designed during exposure and do not return to normal operation until exposure is removed and the device or system is reset by a simple “operator/use” action.
Class E:
one or more functions of a device or system do not perform as designed during and after exposure and cannot be returned to proper operation without repairing or replacing the device or system.

Test pulse number	Immunity test level	Functional status
1	Ⅲ	D
2a	Ⅲ	D
2b	Ⅲ	D
3a/3b	Ⅲ	D
4	Ⅲ	D
Functional status D is where one or more functions of the ESA do not perform as designed during and after exposure and do not return to normal operation until exposure is removed and the ESA is reset by simple “operator/use” action.		

5.2 Conducted transient immunity Test

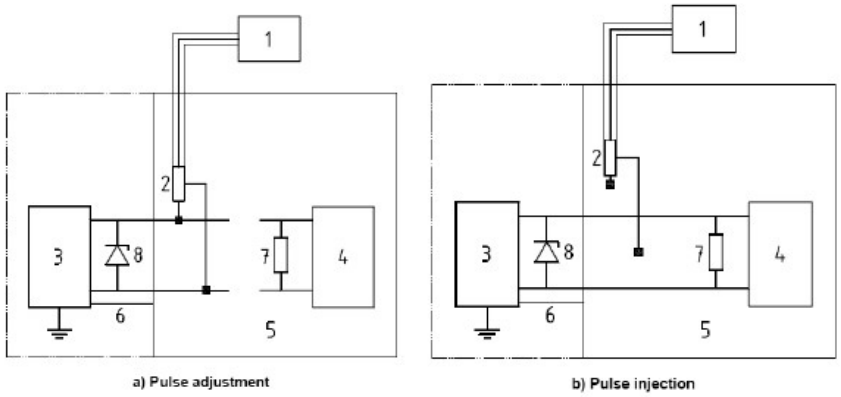
Result	:	**Pass**
Test Procedure	:	ISO7637-2 :2004
Basic Standard	:	ISO7637-2 :2004

Test Setup

Date of Test	:	Jul. 16, 2021
Input Voltage	:	DC 12-24V
Operation Mode	:	Operation Mode
Temperature	:	24.9℃
Humidity	:	55%

Atmospheric Pressure : 101.52kPa

For transient immunity, the supply lines between the terminals of the test pulse generator and the DUT shall be laid out in a straight parallel line at a height of 50mm + 10mm above the ground plane and shall have a length of 0.5m ± 0.1m.



Note:

1. oscilloscope or equivalent
2. voltage probe
3. test pulse generator with internal power supply resistance R_i
4. DUT
5. ground plane
6. Ground connection (maximum length for test pulse 3: 100 mm)
7. optional resistor (Rv)[a]
8. optional diode bridge [b]

The measurements were made to the requirements of Regulation 10.03 for an ESA, section 6.8, Specifications concerning the immunity to transient disturbances conducted along supply lines. The test was set-up to the requirements of ISO 7637-2:2004 Electrical transient conduction along supply lines only.

Test Result

Test Port: Power Port

Test Pulse	☒ System	Result
1	-75V	Pass
2a	+37 V	Pass
2b	+10 V	Pass
3a	-112 V	Pass
3b	+75 V	Pass
4	-6 V	Pass

6. PHOTOGRAPHS OF THE EUT

EUT Photo 1

EUT Photo 2

EUT Photo 3

※※※※※ END OF REPORT ※※※※※