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DEKRA

Test report No: 2022037A

TEST REPORT

Electromagnetic Compatibility (EMC)-Automotive

Identification of item tested	Electric pump
Trademark	Bestway
Model and /or type reference	#62164
S/N	N/A
Test Plan No.	N/A
Applicant´s name / address	Bestway (Hongkong) International Ltd Suite 713, 7/Floor, East Wing, Tsim Sha Tsui Centre, 66 Mody Road, Kowloon, Hongkong
Test method requested, standard	EN 50498-2010
Verdict Summary	In Compliance
Prepared by (name / position & signature)	Jason Wang / Senior Project Manager
Reviewed by (name / position & signature)	Win Wei / Supervisor
Approved by (name / position & signature)	Leesen Li / Manager
Date of issue	2020-03-12
Report template No	Template_ Automotive EMC Report_V1.0

INDEX

page

Competences and Guarantees 4
General conditions 4
Uncertainty 4
Environmental conditions 5
Possible test case verdicts 6
Definition of symbols used in this test report 6
Abbreviations 6
Document History 8
1. General Information 9
1.1. General Description of the Item(s) 9
1.2. Test data 10
1.3. The environment(s) in which the DUT is intended to be used 10
1.4. Classification of the DUT 11
1.5. Immunity related function check 11
2. Description of Test Setup 12
2.1. Operating mode(s) used for tests 12
3. Verdict summary section 13
3.1. Deviation(s) from the Standard(s) / Test Specification(s) 13
3.2. Overview of results 14
3.3. Test Matrix 15
4. Emission Test Results 16
4.1. Radiated disturbances 16
4.2. Conducted transient disturbances 23
5. Immunity Test Results 26
5.1. Functional performance status classification 26
5.2. Manufacturer defined performance criteria 26
5.3. Monitored - Checked 26
5.4. Conducted transient immunity 27

6. Identification of the Equipment Under Test 30
7. Annex 1 - Measurement Uncertainties 34
8. Annex 2 - Used Equipment 35
9. Annex 3 - Test Photos 37

COMPETENCES AND GUARANTEES

DEKRA is a testing laboratory competent to carry out the tests described in this report.

In order to assure the traceability to other national and international laboratories, DEKRA has a calibration and maintenance program for its measurement equipment.

DEKRA guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated in the report and it is based on the knowledge and technical facilities available at DEKRA at the time of performance of the test.

DEKRA is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

The test results presented in this report relate only to the object tested.

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GENERAL CONDITIONS

1. This report is only referred to the item that has undergone the test.
2. This report does not constitute or imply on its own an approval of the product by the Certification Bodies or Competent Authorities.
3. This document is only valid if complete; no partial reproduction can be made without previous written permission of DEKRA.
4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of DEKRA.
5. This report is not used for social proof in China (or Mainland China) market.
6. The measurement result is considered in conformance with the requirement if it is within the prescribed limit, it is not necessary to calculate the uncertainty associated with the measurement result.

UNCERTAINTY

For all measurements where guidance for the calculation of the instrumentation uncertainty of a measurement is specified in EN 55016-4-2 (CISPR 16-4-2), ISO 11452, EN/IEC 61000-4 series or a product standard, the measurement instrumentation uncertainty has been calculated and applied in accordance with these standards.

Uncertainties have been calculated according to the DEKRA internal document PROD-P-EMC-M22[w1]. The reported expanded uncertainties are based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%. Refer to the Annex 1 for furter information.

ENVIRONMENTAL CONDITIONS

The climatic conditions during the tests are within the limits specified by the manufacturer for the operation of the EUT and the test equipment. The climatic conditions during the tests were within the following limits:

Ambient temperature	23±5 ° C
Relative Humidity air	25 % - 75 %; 20 % - 60 %(ESD)
Atmospheric pressure	86 kPa - 106 kPa

If explicitly required in the basic standard or applied product / product family standard the climatic values are recorded and documented separately in this test report.

POSSIBLE TEST CASE VERDICTS

Test case does not apply to test object	N/A
Test object does meet requirement	In Compliance
Test object does not meet requirement	Not In Compliance
Not measured	N/M

DEFINITION OF SYMBOLS USED IN THIS TEST REPORT

☒ Indicates that the listed condition, standard or equipment is applicable for this report/test/EUT.				
☐ Indicates that the listed condition, standard or equipment is not applicable for this report/test/EUT.				
Decimal separator used in this report	☒	Comma (,)	☐	Point (.)

ABBREVIATIONS

For the purposes of the present document, the following abbreviations apply:

DUT : Device Under Test
EUT : Equipment Under Test
ESA : Electrical/electronic sub-assembly
QP : Quasi-Peak
CAV : CISPR Average
AV : Average
CDN : Coupling Decoupling Network
SAC : Semi-Anechoic Chamber
OATS : Open Area Test Site
BW : Bandwidth
AM : Amplitude Modulation
PM : Pulse Modulation
U_N : Nominal voltage
T_X : Transmitter
R_X : Receiver
N/A : Not Applicable
N/M : Not Measured
BB : Broadband

NB : Narrowband

DOCUMENT HISTORY

Report no.	Date	Description
2022037A	2020.03.12	First release.

1. GENERAL INFORMATION

1.1. General Description of the Item(s)

Description of the item ..... :	Electric pump
Model / Type number ..... :	#62164
Serial number ..... :	N/A
Trademark ..... :	N/A
Manufacturer / Address ..... :	N/A

Operating voltage ..... :	DC 13.5V			
Rated Power ..... :	N/A			
Other parameters ..... :	N/A			
Software version ..... :	N/A			
Hardware version ..... :	N/A			
Dimensions in cm (W x H x D) .. :	N/A			
Intentional RF transmitter? ... :	☒	No	☐	Yes (please specify):

Copy of marking plate:



1.2. Test data

Test Location	No.99 Hongye Rd., Suzhou Industrial Park, Suzhou, 215006, Jiangsu, China
Date (start)	2020.02.20
Date (finish)	2020.02.26

1.3. The environment(s) in which the DUT is intended to be used

The equipment under test (EUT) is intended to be used in the following environment(s):

☒	Vehicular environment.
☐	Residential (domestic) environment.
☐	Commercial and light-industrial environment.
☐	Industrial environment.

1.4. Classification of the DUT

☐	ESA defined as "component".
☒	ESA defined as "STU (Separate Technical Unit)".
☐	ESA with relation to immunity related functions of the vehicle.
☒	ESA without relation to immunity related functions of the vehicle.
☐	ESA must be operational during engine start phases.
☒	ESA must not be operational during engine start phases.

1.5. Immunity related function check

The table below shows whether the DUT is related to immunity related functions of the vehicle or not.

IMMUNITY-RELATED FUNCTIONS	Yes	No
Functions related to the direct control of the vehicle, e.g. degradation or change in engine, gear, brake, suspension, active steering, speed limitation devices; Affecting driver's position, e.g. seat or steering wheel positioning; Affecting driver's visibility: e.g. dipped beam, windscreen wiper.	☐	☒
Functions related to driver, passenger and other road-user protection e.g. airbag and safety restraint systems.	☐	☒
Functions which, when disturbed, cause confusion to the driver or other road users e.g. optical disturbances: incorrect operation of e.g. direction indicators, stop lamps, end outline marker lamps, rear position lamp, light bars for emergency system, wrong information from warning indicators, lamps or displays related to functions in clauses (a) or (b) which might be observed in the direct view of the driver; acoustical disturbances: incorrect operation of anti-theft alarm, horn, for example.	☐	☒
Functions related to vehicle data bus functionality e.g. by blocking data transmission on vehicle data bus-systems, which are used to transmit data, required to ensure the correct functioning of other immunity-related functions.	☐	☒
Functions which, when disturbed, affect vehicle statutory data: e.g. tachograph, odometer.	☐	☒

2. DESCRIPTION OF TEST SETUP

2.1. Operating mode(s) used for tests

During the tests the following operating mode(s) has(have) been used.

Operating mode	Operating mode description	Used for testing	
		Emission	Immunity
1	DUT powered up, Electric pump worked normally.	☒	☒
Supplemental information:			

3. VERDICT SUMMARY SECTION

This chapter presents an overview of standards and results. Refer to the next chapters for details of measured test results and applied test levels.

3.1. Deviation(s) from the Standard(s) / Test Specification(s)

The following deviation(s) was / were made from the published requirements of the listed standards: N/A.

3.2. Overview of results

EMISSION TESTS				
Ref. Std. Clause	Requirement - Test case	Reference standard(s)	Verdict	Remark
7.1 / 7.2	Radiated disturbances	EN 50498-2010	In Compliance	---
7.3	Conducted transient disturbances	EN 50498-2010	In Compliance	---
Supplementary information:				

IMMUNITY TESTS				
Ref. Std. Clause	Requirement - Test case	Basic standard(s)	Verdict	Remark
7.4	Conducted transient immunity	EN 50498-2010	In Compliance	---
Supplementary information:				

3.3. Test Matrix

EMISSION TESTS	Mode / Type	
	Mode 1	Mode 2
Radiated disturbances	☒	☐
Conducted transient disturbances	☒	☐
Supplementary information:		

IMMUNITY TESTS	Mode / Type	
	Mode 1	Mode 2
Conducted transient immunity	☒	☐
Supplementary information:		

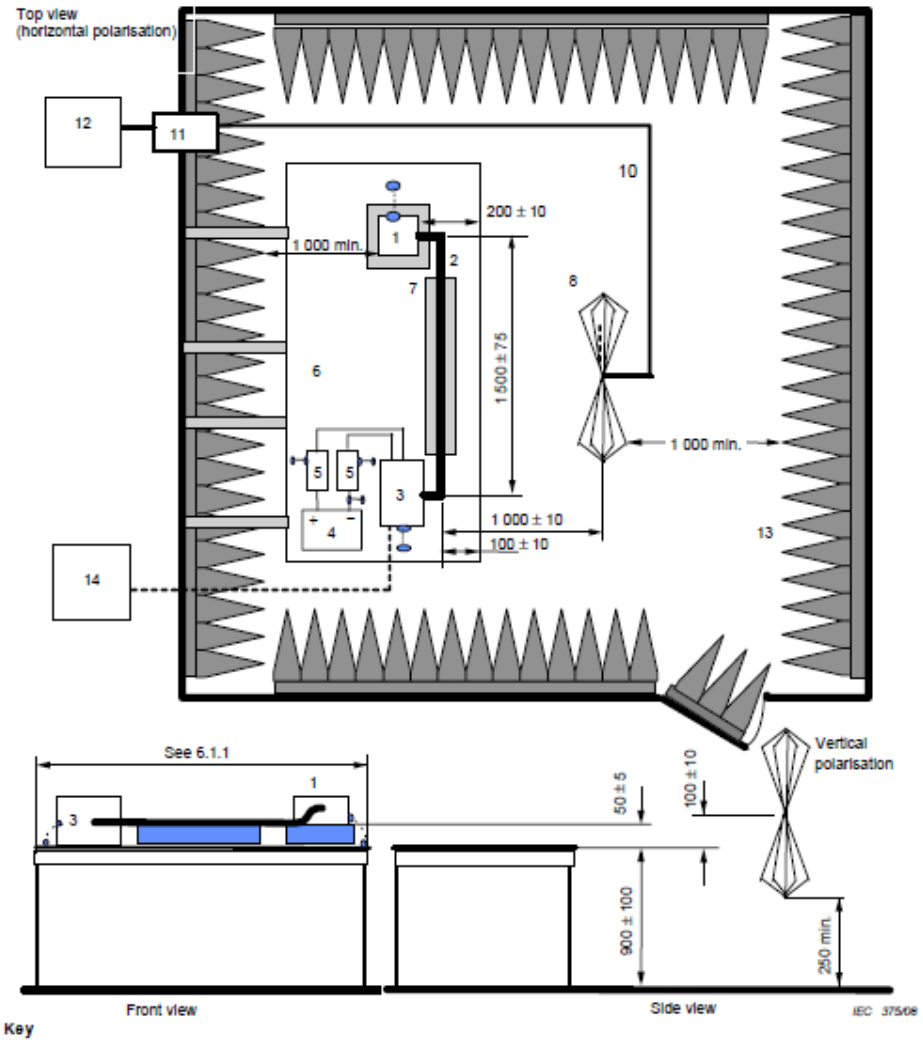
4. EMISSION TEST RESULTS

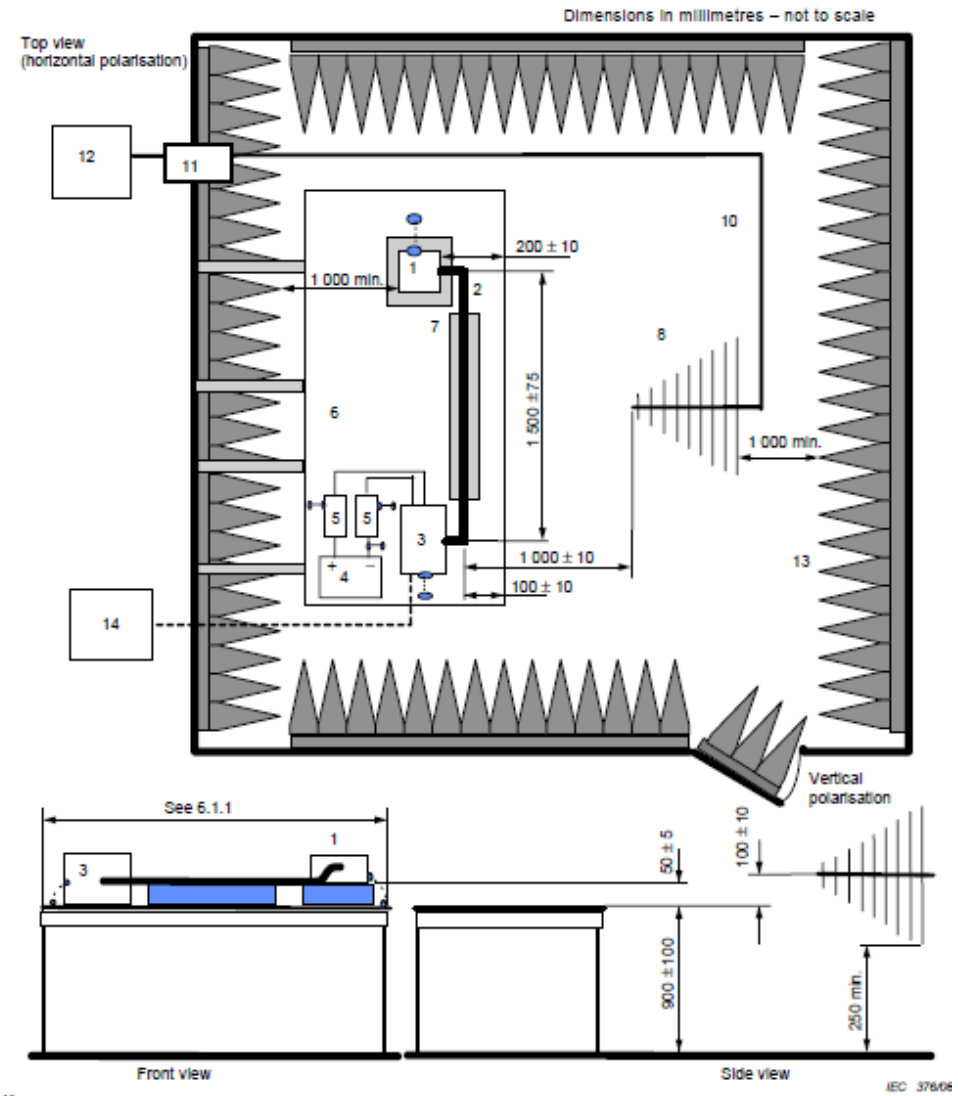
4.1. Radiated disturbances	VERDICT: In Compliance

Standard / Regulation	EN 50498-2010
Test method	Antenna Method
Antenna polarisation	Horizontal and Vertical
Limits	**Table 1 – Limits for broadband radiated disturbances** **Frequency range F** MHz / **Limits Quasi peak** dBµV/m 30 to 75: 62 – 52 [a] 75 to 400: 52 – 63 [b] 400 to 1 000: 63 [a] Decreasing linearly with the log of the frequency. [b] Increasing linearly with the log of the frequency. **Table 2 – Limits for narrowband radiated disturbances of ESAs** **Frequency range F** MHz / **Limits Average** dBµV/m 30 to 75: 52 – 42 [a] 75 to 400: 42 – 53 [b] 400 to 1 000: 53 [a] Decreasing linearly with the log of the frequency. [b] Increasing linearly with the log of the frequency.

Performed measurements

Port under test	Harness					
Voltage - Mains [V_{DC}]	☒	12.5	☐	27	☐	Other:

Test method applied	a. Turn on the measurement equipment and allow a sufficient time for stabilization. b. Calibration. Perform the measuring system checking using the measurement system check setup. c. Turn on the EUT and allow a sufficient time for stabilization. Make sure all the functions of DUT are normally before testing. d. EUT Testing. Perform the emission data scan using the measurement setup.
Test setup	 **Key** 1 EUT (grounded locally if required in test plan) 2 Test harness 3 Load simulator (placement and ground connection according to 6.4.2.5) 4 Power supply (location optional) 5 Artificial network (AN) 6 Ground plane (bonded to shielded enclosure) 7 Low relative permittivity support ($\varepsilon_r \leq 1{,}4$) 8 Biconical antenna 10 High-quality coaxial cable e.g. double-shielded (50 Ω) 11 Bulkhead connector 12 Measuring instrument 13 RF absorber material 14 Stimulation and monitoring system **Figure 13 – Example of test set-up – biconical antenna**



Key

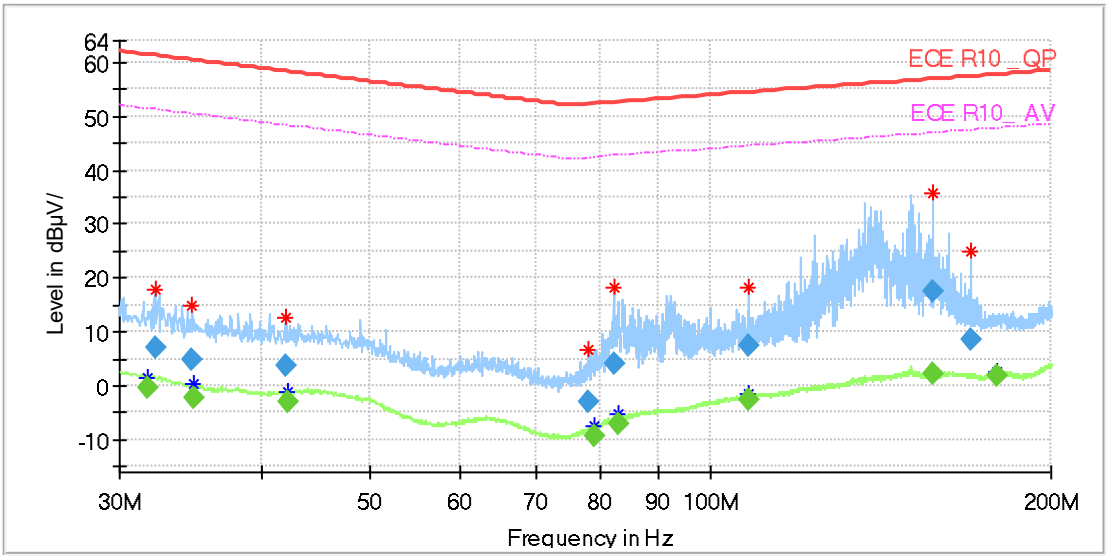
1 EUT (grounded locally if required in test plan)
2 Test harness
3 Load simulator (placement and ground connection according to 6.4.2.5)
4 Power supply (location optional)
5 Artificial network (AN)
6 Ground plane (bonded to shielded enclosure)
7 Low relative permittivity support ($\varepsilon_r \leq 1{,}4$)
8 Log-periodic antenna
10 High-quality coaxial cable e.g. double-shielded (50 Ω)
11 Bulkhead connector
12 Measuring instrument
13 RF absorber material
14 Stimulation and monitoring system

Figure 14 – Example of test set-up – log-periodic antenna

Refer to the Annex 3 for test setup photo(s).

Operating mode(s) used	Mode 1
Remark	---

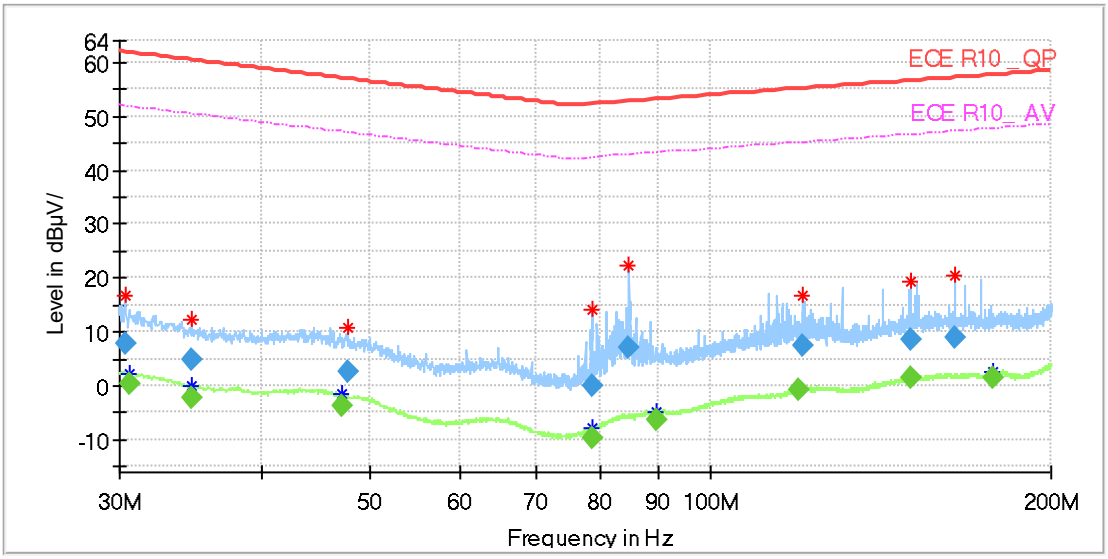
Measurement data(RE 30-200MHz Hor)	☒	Horizontal	☐	Vertical
Operating mode / voltage	Mode 1 / DC 12.5V			



Frequency (MHz)	QuasiPeak (dB¦ÌV/m)	CAverage (dB¦ÌV/m)	Limit (dB¦ÌV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol
31.750000	---	-0.25	51.38	51.63	1000.0	120.000	H
32.250000	6.90	---	61.21	54.31	1000.0	120.000	H
34.800000	4.85	---	60.38	55.53	1000.0	120.000	H
34.850000	---	-2.21	50.37	52.58	1000.0	120.000	H
42.050000	3.67	---	58.32	54.64	1000.0	120.000	H
42.300000	---	-3.16	48.25	51.41	1000.0	120.000	H
77.850000	-2.84	---	52.25	55.09	1000.0	120.000	H
78.750000	---	-9.37	42.32	51.69	1000.0	120.000	H
82.050000	4.03	---	52.59	48.56	1000.0	120.000	H
82.950000	---	-7.07	42.66	49.74	1000.0	120.000	H
107.800000	---	-2.67	44.38	47.05	1000.0	120.000	H
108.150000	7.51	---	54.41	46.89	1000.0	120.000	H
157.200000	17.67	---	56.86	39.19	1000.0	120.000	H
157.200000	---	2.08	46.86	44.78	1000.0	120.000	H
170.100000	8.60	---	57.38	48.78	1000.0	120.000	H
179.350000	---	1.80	47.73	45.92	1000.0	120.000	H

Remark	

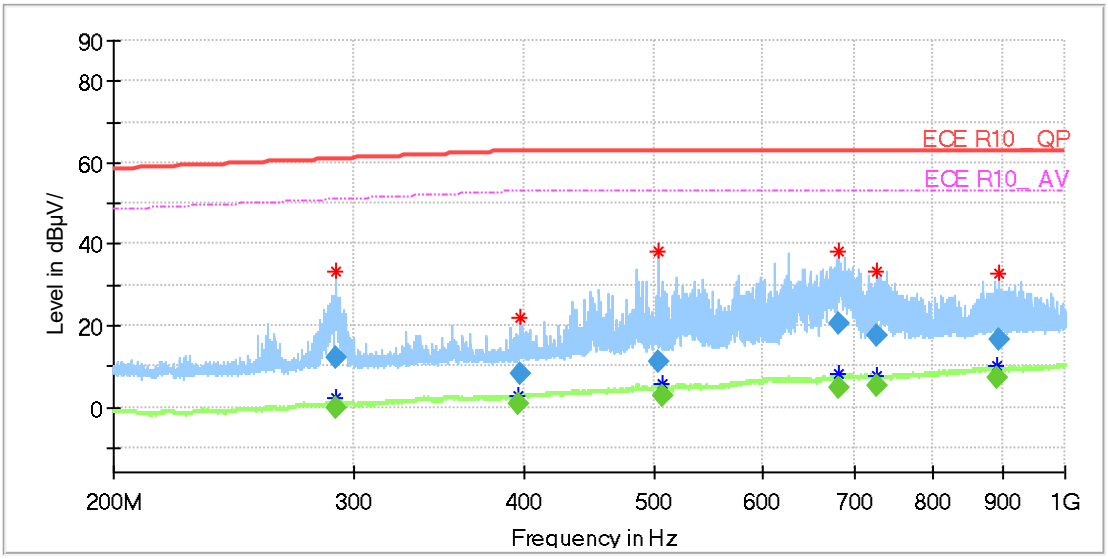
Measurement data(RE 30-200MHz Ver)	☐	Horizontal	☒	Vertical
Operating mode / voltage	Mode 1 / DC 12.5V			



Frequency (MHz)	QuasiPeak (dB¦ÌV/m)	CAverage (dB¦ÌV/m)	Limit (dB¦ÌV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol
30.350000	7.99	---	61.87	53.88	1000.0	120.000	V
30.600000	---	0.33	51.78	51.45	1000.0	120.000	V
34.700000	---	-2.11	50.41	52.52	1000.0	120.000	V
34.750000	5.00	---	60.40	55.39	1000.0	120.000	V
47.100000	---	-3.78	47.08	50.86	1000.0	120.000	V
47.750000	2.78	---	56.93	54.15	1000.0	120.000	V
78.500000	-0.13	---	52.30	52.43	1000.0	120.000	V
78.650000	---	-9.54	42.31	51.85	1000.0	120.000	V
84.700000	7.11	---	52.80	45.69	1000.0	120.000	V
89.600000	---	-6.24	43.17	49.41	1000.0	120.000	V
119.800000	---	-0.82	45.08	45.89	1000.0	120.000	V
120.750000	7.41	---	55.13	47.72	1000.0	120.000	V
150.100000	---	1.46	46.56	45.10	1000.0	120.000	V
150.200000	8.66	---	56.56	47.90	1000.0	120.000	V
164.150000	9.04	---	57.15	48.10	1000.0	120.000	V
178.000000	---	1.58	47.68	46.10	1000.0	120.000	V

Remark	

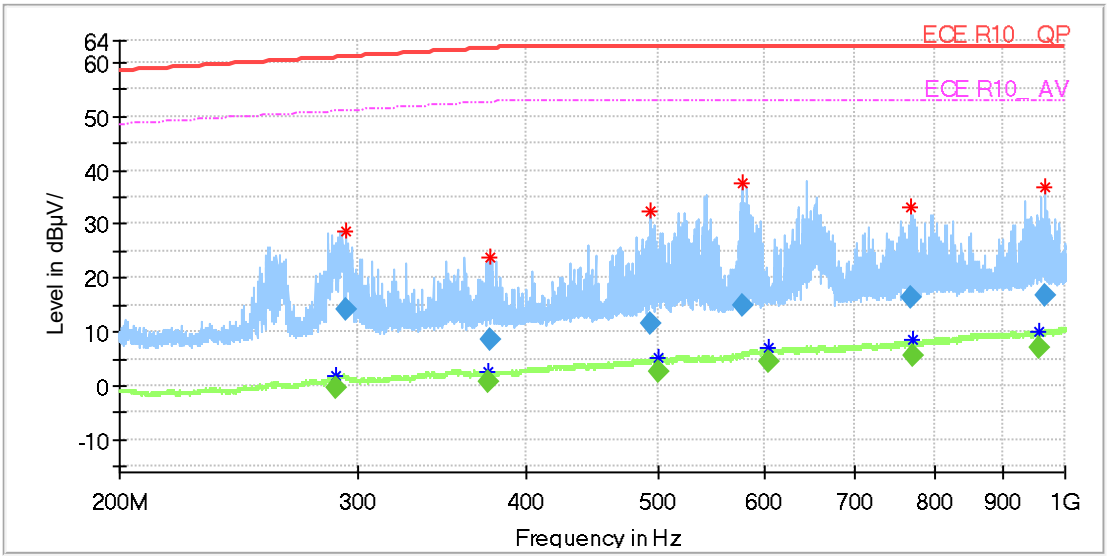
Measurement data(RE 200-1000MHz Hor)	☒	Horizontal	☐	Vertical
Operating mode / voltage	Mode 1 / DC 12.5V			



Frequency (MHz)	QuasiPeak (dB¦ÌV/m)	CAverage (dB¦ÌV/m)	Limit (dB¦ÌV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol
291.550000	---	-0.24	50.92	51.16	1000.0	120.000	H
291.550000	12.28	---	60.92	48.65	1000.0	120.000	H
396.450000	---	0.89	52.94	52.05	1000.0	120.000	H
398.500000	8.06	---	62.98	54.91	1000.0	120.000	H
502.600000	11.19	---	63.00	51.81	1000.0	120.000	H
505.700000	---	2.77	53.00	50.23	1000.0	120.000	H
681.600000	20.65	---	63.00	42.35	1000.0	120.000	H
683.050000	---	4.94	53.00	48.06	1000.0	120.000	H
726.300000	17.34	---	63.00	45.66	1000.0	120.000	H
728.350000	---	5.21	53.00	47.79	1000.0	120.000	H
891.150000	---	7.15	53.00	45.85	1000.0	120.000	H
893.800000	16.35	---	63.00	46.65	1000.0	120.000	H

Remark	

Measurement data(RE 200-1000MHz Ver)	☐	Horizontal	☒	Vertical
Operating mode / voltage	Mode 1 / DC 12.5V			



Frequency (MHz)	QuasiPeak (dB¦ ÌV/m)	CAverage (dB¦ ÌV/m)	Limit (dB¦ ÌV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol
289.250000	----	-0.35	50.87	51.22	1000.0	120.000	V
294.000000	14.31	----	60.98	46.67	1000.0	120.000	V
374.550000	----	0.61	52.57	51.96	1000.0	120.000	V
376.350000	8.59	----	62.60	54.00	1000.0	120.000	V
493.750000	11.66	----	63.00	51.34	1000.0	120.000	V
500.250000	----	2.72	53.00	50.28	1000.0	120.000	V
578.200000	15.00	----	63.00	48.00	1000.0	120.000	V
604.700000	----	4.46	53.00	48.54	1000.0	120.000	V
770.200000	16.53	----	63.00	46.47	1000.0	120.000	V
771.850000	----	5.52	53.00	47.48	1000.0	120.000	V
957.300000	----	7.20	53.00	45.80	1000.0	120.000	V
965.000000	16.77	----	63.00	46.23	1000.0	120.000	V

Remark	

4.2. Conducted transient disturbances	VERDICT: In Compliance

Standard / Regulation	EN 50498-2010			
Port under test	☒	DC mains input power	☐	Other:

Limits

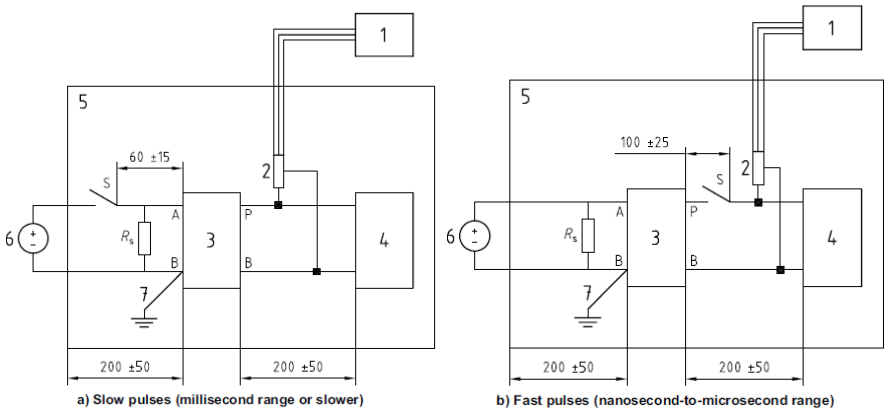
Table 3 – Limits of transient disturbances

Polarity of pulse amplitude	Maximum allowed pulse amplitude for	
	vehicles with 12 V systems	vehicles with 24 V systems
Positive	+ 75	+ 150
Negative	- 100	- 450

Performed measurements

Port under test	☒	DC mains input power	☐	Other:		
Voltage - Mains [V_{DC}]	☒	13.5	☐	27	☐	Other:

Test setup



a) Slow pulses (millisecond range or slower)

b) Fast pulses (nanosecond-to-microsecond range)

Key:

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

Test method applied

a. Turn on the measurement equipment and allow a sufficient time for stabilization.

b. Calibration. Perform the measuring system checking using the measurement system check setup.

c. Turn on the EUT and allow a sufficient time for stabilization. Make sure all the functions of DUT are normally before testing.

d. EUT Testing. Perform the emission data scan using the measurement setup.

Operating mode(s) used	Mode 1
Remark	---

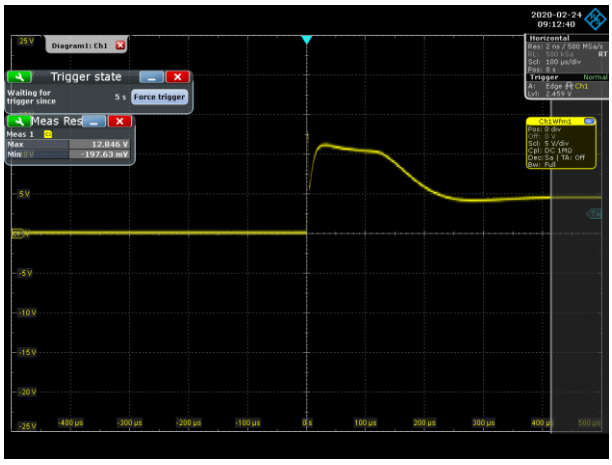
Measurement data	Port under test	DC mains input power
Operating mode / voltage	Mode 1 / 13.5Vdc	

Test Site	TR11	Test Time	2020.02.24
DUT	Electric pump	Test Voltage	DC 13.5V
Temperature	22℃	Humidity	46%RH
Barometer Pressure	101.3kPa	Tested By	Jason
Test Mode	Mode 1		

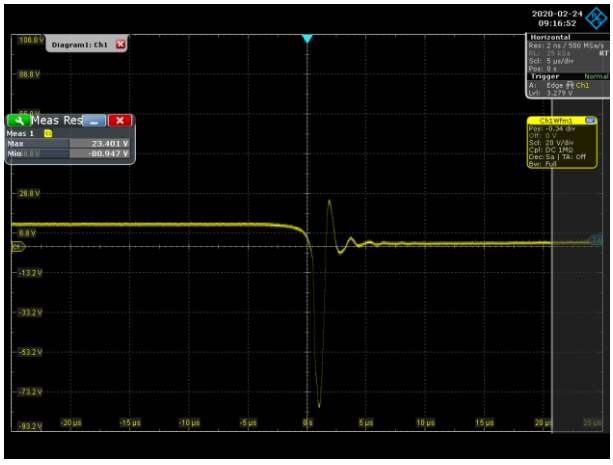
Polarity of pulse amplitude		Maximum allowed pulse amplitude for vehicles with 12V systems (V)		Test results	
		Slow Limit	Fast Limit	Slow pulse(V)	Fast pulse(V)
SW On-Off	Positive	+75	+75	-1.12	9.90
	Negative	-100	-100	-13.78	-94.45
SW Off-On	Positive	+75	+75	1.24	-0.70
	Negative	-100	-100	-13.78	-13.70
Test Determine				Complied	Complied

Test Waveform

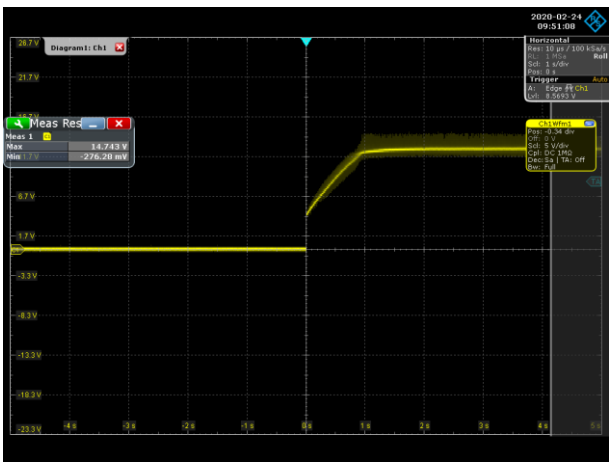
Fast off-on



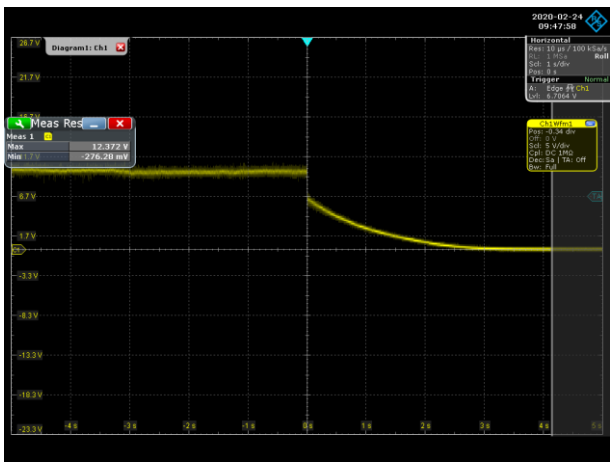
Fast on-off



Slow off-on



Slow on-off



Remark	

5. IMMUNITY TEST RESULTS

5.1. Functional performance status classification

Class A: All functions of a device/system perform as designed during and after exposure to disturbance.

Class B: All functions of a device/system perform as designed during exposure. However, one or more of them can go beyond 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/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/system do not perform as designed during exposure and do not return to normal operation until exposure is removed and the device/system is reset by simple "operator/use" action.

Class E: One or more functions of a device/system do not perform as designed during and after exposure and cannot be returned to proper operation without repairing or replacing the device/system.

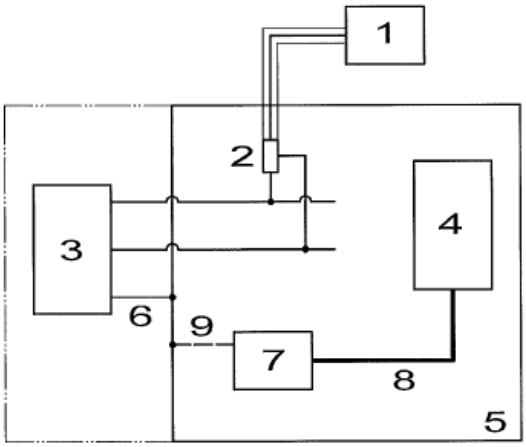
5.2. Manufacturer defined performance criteria

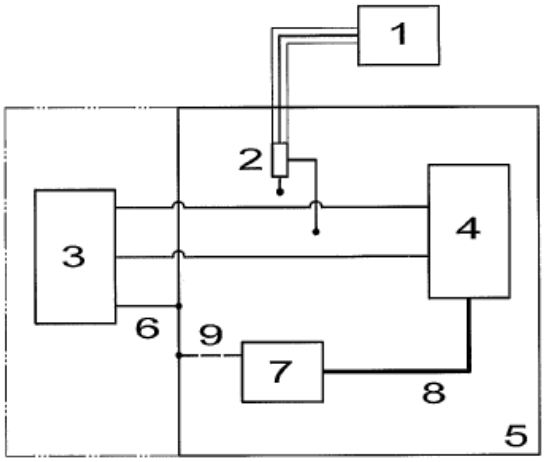
Not provided.

5.3. Monitored - Checked

N/A

5.4. Conducted transient immunity	VERDICT: In Compliance

Standard	EN 50498-2010
Port under test	DC mains power input
Test setup	 a) Pulse adjustment **Key** 1 oscilloscope or equivalent 2 voltage probe 3 test pulse generator 4 DUT disconnected 5 ground plane 6 DC power ground connection; maximum length for test pulse 3 is 100 mm 7 load simulator (connected to ground plane if required) 8 interconnect cable routed away from DUT power leads under test to avoid coupling 9 load simulator ground (if required) **Figure 2 — Transient immunity test set-up** (*continued*)



b) Pulse injection

Key
1 oscilloscope or equivalent
2 voltage probe disconnected
3 test pulse generator
4 DUT
5 ground plane
6 DC power ground connection; maximum length for test pulse 3 is 100 mm
7 load simulator (connected to ground plane if required)
8 interconnect cable routed away from DUT power leads under test to avoid coupling
9 load simulator ground (if required)

Figure 2 — Transient immunity test set-up

Test Procedure

a. Turn on the measurement equipment and allow a sufficient time for stabilization.
b. Calibration. Perform the measuring system checking using the measurement system check setup.
c. Turn on the DUT and allow a sufficient time for stabilization. Make sure all the functions of DUT are normally before testing.
d. DUT Testing. Perform the test with the setup and record the status of DUT.

Limits

Test Pulse	Voltage(V)	Test cycle/time	Performance Criteria
1	-75V	5000 pulses	D
2a	+37V	5000 pulses	D
2b	+10V	10 pulses	D
3a	-112V	1h	D
3b	+75V	1h	D
4	-6V	10 pulses	D

Supplementary information:

Performed tests

Test site	TR11	Test Date	2020.02.25
DUT	Electric pump	Test Voltage	DC 13.5V
Temperature	25℃	Humidity	45%RH
Barometer Pressure	101.3kPa	Tested By	Kobe
Test Mode	Mode 1		

Test Pulse	Test Level, Us(V)	Number of pulse or test time	Performance criterion	Test Result criterion	Result	Observation
1	-75V	5000 pulses	D	C	Complied	Note 2
2a	+37V	5000 pulses	D	A	Complied	Note 1
2b	+10V	10 pulses	D	C	Complied	Note 2
3a	-112V	1h	D	A	Complied	Note 1
3b	+75V	1h	D	A	Complied	Note 1
4	-6V	10 pulses	D	B	Complied	Note 3

Test setup photo(s)	Refer to the Annex 3 for test setup photo(s).
Observation(s)	Note 1: During and after the test, the pump maintains normal inflation Note 2: During the test, the pump will be charged again after repeated power failure, and it will automatically resume normal operation after the test. Note 3: During the test, the air volume of the pump becomes smaller, and it can automatically resume normal operation after the test

6. IDENTIFICATION OF THE EQUIPMENT UNDER TEST









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7. ANNEX 1 - MEASUREMENT UNCERTAINTIES

Radiated disturbances / AC15
The maximum expanded uncertainty (K = 2) is evaluated as: 30MHz~ 200MHz: 3.5dB 200MHz~1000MHz: 3.9dB
Conducted transient disturbances / TR11
The maximum expanded uncertainty (K = 2) is evaluated as: U: 2.00 %
Conducted transient immunity / TR11
The maximum expanded uncertainty (K = 2) is evaluated as: Us: 2.12 % ; tr: 2.28% ; td: 2.24%

8. ANNEX 2 - USED EQUIPMENT

Radiated disturbances / AC15

Equipment	Manufacturer	Model No.	Serial No.	Due Cal. Date
EMI TEST RECEIVER	R&S	ESR	102048	2020.09.27
Amplifier	N/A	SCU-01F	010093	2020.08.08
Preamplifier	COM-POWER	PAM-118A	18020026	2020.11.18
Biconical antenna	SCHWARZBECK	BBA9106	00444	2020.09.22
Log periodic antenna	SCHWARZBECK	VUSLP9111B	356	2020.09.22
V-Network	SCHWARZBECK	NNBM 8124	01509	2020.10.15
V-Network	SCHWARZBECK	NNBM 8124	01510	2020.10.15
50ohm Termination	woken	N/A	AC9-25W-2	2020.03.06
50ohm Termination	woken	N/A	AC9-25W-3	2020.03.06

Conducted transient immunity / TR11

Equipment	Manufacturer	Model No.	Serial No.	Due Cal. Date
MICRO TRANSIENT GENERATOR	TESEQ	MT 5511	1475	2020.05.24
LOAD DUMP GENERATOR	TESEQ	LD 5550	2136	2020.05.24
FAST TRANSIENT GENERATOR	TESEQ	FT 5531	2056	2020.05.24
POWER AMPLIFIER	TESEQ	PA 5740	1198	2020.05.24
Power amplifier/Battery simulation	TESEQ	PA 5840-75/230	4150	2020.06.28
FUNCTION GENERATOR	TESEQ	FG 5621	1322	2020.05.24
DC SWITCH	TESEQ	DS 5630	1318	2020.05.24
POWER AMPLIFIER	TESEQ	PA 5640	1262	2020.05.24
TRANSFORMER CONDUCTED COUPLER	TESEQ	TC 5650	1243	2020.05.24

Conducted transient disturbances / TR11

Equipment	Manufacturer	Model No.	Serial No.	Due Cal. Date
Automotive emission	TESEQ	AES 5501	1312	2020.03.04

system				
Oscilloscope	R&S	RTO 1022	200215	2020.09.27

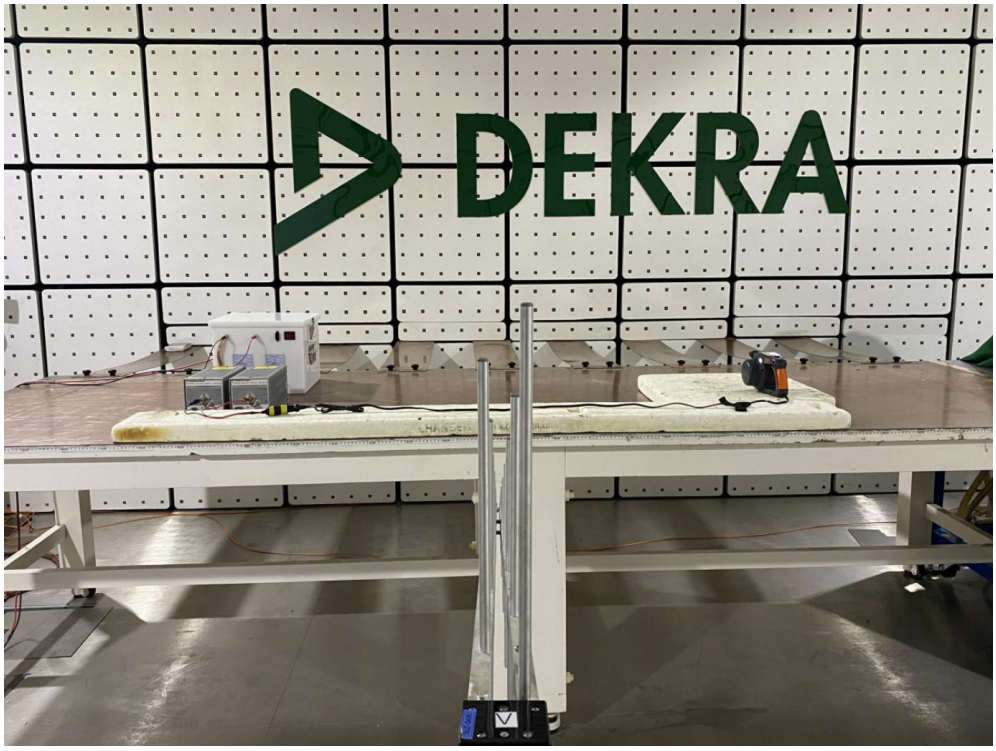
9. ANNEX 3 - TEST PHOTOS

Radiated disturbances
30~200MHz Hor 
30~200MHz Ver 

200~1000MHz Hor



200~1000MHz Ver



Conducted transient disturbances
Fast 
Slow 

Conducted transient immunity


----------END----------