



NSAI

ECE TYPE-APPROVAL CERTIFICATE



Communication Concerning:² ~~Approval granted~~
~~Approval extended~~
~~Approval refused~~
~~Approval withdrawn~~
~~Production definitively discontinued~~

Of a type of ~~vehicle~~/component/~~separate technical unit~~² with regard to Regulation No. 10.
Of a type of electrical/electronic sub-assembly² with regard to Regulation No.10.

Approval No: **E24*10R06/01*4187*00**

Reason for extension: *-N/A*

1. Make (trade name of manufacturer): ***Autel***

2. Type and general commercial description: ***ASI-100***

Variant(s): ***N/A***

3. Means of identification of type, if marked on the ~~vehicle~~/
component/separate technical unit²: ***Type Designation***

3.1 Location of that marking: ***On the bottom of the product***

4. Category of vehicle: ***N/A***

5. Name and address of manufacturer: ***Autel Intelligent Automobile Corp.,
Ltd. Floor 8, Floor 7 and Floor 4,
Building B1, Zhiyuan, No.1001 Xueyuan
Avenue, Changyuan Community,
Taoyuan Road, Nanshan District
Shenzhen City, Guangdong
Province, P.R. China Post Code:
518055***


6. In the case of components and separate technical units,
location and method of affixing of the approval mark: ***adhesive label on the bottom of the
product***

7. Address(es) of assembly plant(s): ***Autel Intelligent Automobile Corp.,
Ltd. Workroom 103 104. 105. 106. 108.
1st Floor, Building A9, Tianliao
Industrial Zone, Taoyuan Road,
Nanshan District, Shenzhen City,
Guangdong Province, P.R. China***



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Approval No: E24*10R06/01*4187*00

- | | |
|--|--|
| 8. Additional information (where applicable): | <i>See appendix below</i> |
| 9. Technical service responsible for carrying out the tests: | <i>SGS-TUV Saar GmbH
Am TUV 1 D-66280 Sulzbach</i> |
| 10. Date of test report: | <i>02.09.2022</i> |
| 11. Number of test report: | <i>HOM ECN T22/070-00</i> |
| 12. Remarks (if any): | <i>See Appendix below</i> |
| 13. Place: | <i>Dublin</i> |
| 14. Date: | <i>21st October, 2022</i> |
| 15. Signature:  | |



16. The index to the information package lodged with the approval authority, which may be obtained on Request, is attached.

-
1. Distinguishing number of the country which issued/extended/refused or withdrawn approval. (see Regulation, provisions on approval).
 2. Strike out what does not apply.



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Approval No: E24*10R06/01*4187*00

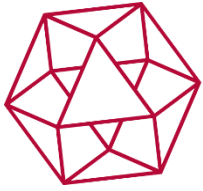
Appendix

To type-approval communication concerning the type approval of an electrical/electronic sub-assembly under Regulation No.10.

1. Additional information
 - 1.1. Electrical system rated voltage: *DC 12V~24V, negative ground*
 - 1.2. This ESA can be used on any vehicle type with the following restrictions: *See manufacturer's specifications.*
 - 1.2.1 Installation conditions, if any: *See manufacturer's specifications.*
 - 1.3. This ESA can only be used on the following vehicle types: *N/A*
 - 1.3.1 Installation conditions, if any: *N/A*
 - 1.4. The specific test method(s) used and the frequency ranges covered to determine immunity were: *Bulk Current Injection Method:
Frequency: (20 – 400 MHz)
Absorber Chamber Test:
Frequency: (400 – 2000 MHz)*
 - 1.5. Laboratory accredited to ISO 17025 and recognized by the Approval Authority responsible for carrying out the tests: *SGS-TUV Saar GmbH*
2. Remarks: *N/A*

Appendix to type-approval communication concerning the type approval of a vehicle under Regulation No.10.

1. Additional information
2. Electrical system rated voltage: *N/A*
3. Type of bodywork: *N/A*
4. List of electronic systems installed in the tested vehicle(s) not limited to the items in the information document: *N/A*
 - 4.1. Vehicle equipped with 24 GHz short-range radar equipment (yes/no/optional)²: *N/A*
5. Laboratory accredited to ISO 17025 and recognized by the Approval Authority responsible for carrying out the tests: *N/A*
6. Remarks: *N/A*

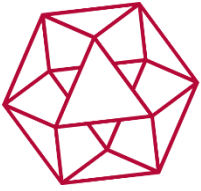


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Approval No: E24*10R06/01*4187*00

Index to the Information Package

Date of issue:	<i>21st October, 2022</i>
Date of latest amendment:	<i>N/A</i>
Reason for extension/revision:	<i>N/A</i>
1. Additional conditions, and advisory notes on legal alternatives.	
2. Test report(s)	
- numbers(s):	<i>HOM ECN T22/070-00</i>
- date of issue:	<i>02.09.2022</i>
- date of latest amendment:	<i>N/A</i>
3. Information document	
- number(s):	<i>IF_ASI-100_R10.06_00</i>
- date of issue:	<i>25.08.2022</i>
- date of latest amendment:	<i>N/A</i>
Documentation:	<i>75 pages</i>



NSAI

Approval No: E24*10R06/01*4187*00

Appendix: **Additional conditions, and advisory notes on legal alternatives**

A: Additional conditions:

1. The attached technical report, with any of its attachments, forms part of this Type Approval certificate.
2. Each device from series production shall be to the measurements specified in the attached drawings, and shall be manufactured only from the materials specified in the Approval documents.
3. Changes in the type are permitted only with the explicit permission of NSAI. Breaches of this requirement will lead to a withdrawal of the Type Approval, and in addition may be subject to criminal prosecution.
4. At regular intervals, any tests or associated checks prescribed by the applicable legislation to verify continued conformity with the approved type shall be carried out. The manufacturer shall demonstrate compliance with this by submitting to NSAI evidence of adequate arrangements and documented control plans for each type approved.
5. Any set of samples or test pieces showing evidence of non-conformity shall give rise to further sampling and testing and all steps shall be taken to restore conformity of production.
6. This Type Approval will expire when it is surrendered by the holder, or withdrawn by NSAI, or when the approved type no longer conforms to legal requirements. The recall of the Type Approval can be issued by NSAI when the conditions required for the issuing or continuation of the Type Approval are no longer current, or when the Approval holder is in breach of the duties attached to the Type Approval, or when it is established that the approved type no longer meets the requirements of traffic safety.
7. Changes in the company name, address or manufacturing site, as well as in any of the sales or other agents specified in the issuing of the approval must immediately be notified to NSAI.
8. The duties imposed by the issuing of this certificate are not transferable. The legal protection of third parties is not affected by this certificate.
9. When the manufacture or sale of the system, component or separate technical unit has not been started within one year of the date of issue of this certificate, then NSAI is to be informed. This requirement also applies when the manufacture or sale has been halted for more than one year, or when it ought to have been halted for more than one year. The initial commencement of manufacture or sale, or the resumption of manufacture or sale, shall then be notified to NSAI within one month of commencement or resumption.

B: Legal Options:

Any objection to the requirements set out in this certificate shall be made within one month of the date of issue. The objection shall be made, in writing, to NSAI in Dublin.

Technical Report

V00

Test standard:
ECE R10

Level of amendment:
06 Series of amendments, 01 supplement

Title:
Electromagnetic compatibility

Manufacturer:
Autel Intelligent Automobile Corp., Ltd.

Type:
ASI-100

Subject of testing:
Component

0 General:

0.1	Make (trade name of manufacturer):	Autel
0.2	Type:	ASI-100
0.2.1	Variant:	n.a.
0.2.2	Commercial description(s):	n.a.
0.3	Means of identification of type, if marked on the vehicle / component / technical unit:	Type designation
0.3.1	Location of that markings:	refer to information document
0.4	Category of vehicle:	n.a.
0.5	Manufacturer's name and address:	Autel Intelligent Automobile Corp., Ltd. Floor 8, Floor 7 and Floor 4, Building B1, Zhiyuan, No.1001 Xueyuan Avenue, Changyuan Community, Taoyuan Road, Nanshan District Shenzhen City, Guangdong Province, P.R. China Post Code: 518055
0.8	Name(s) and address(es) of assembly plant(s):	Autel Intelligent Automobile Corp., Ltd. Workroom 103 104. 105. 106. 108. 1st Floor, Building A9, Tianliao Industrial Zone, Taoyuan Road, Nanshan District, Shenzhen City, Guangdong Province, P.R. China
0.9	Name and address of representative:	n.a.
	Location of the approval mark:	refer to information document

1 **Test record:**

See appendix

2 **Attachments:**

- | | | |
|-----|------------------------|--|
| 2.1 | List of modifications: | Refer to attachment 2.1 |
| 2.2 | Information folder: | No.: IF_ ASI-100_R10.06_00
Date of issue: 25.08.202 |
| 2.3 | Test Report: | No.: SZEM220800563801
Date of issue: 11.08.2022 |

3 Statement of conformity:

The information folder as mentioned under no. 2.2 and the type described therein are in compliance with the test standard mentioned above. With regard to the required level of performance to be achieved, the test specimen were representative for the type to be approved.

The tests were carried out in accordance to the relevant requirements of the

EN ISO/IEC 17025 EN ISO/IEC 17020

Test Laboratory
SGS-TÜV Saar GmbH

notified by

Kraftfahrt-Bundesamt (KBA),
Federal Republic of Germany

National Standards
Authority of Ireland (NSAI)

Rijksdienst voor het
Wegverkeer (RDW),
The Netherlands

No. KBA - P 00084 – 10

No. 101

No. 99050064 00

Responsible expert

Conformity check by




Gangling Zhang

Natalia Zhang

Shanghai, 02.09.2022

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To assess the conformity, the laboratory refers to the "scope classification" of the Kraftfahrt-Bundesamt (KBA) – Federal Motor Transport Authority (in its valid version at the time of testing) and the specified consideration of the measurement uncertainty for the related test procedure.

In case the measurement uncertainty does not need to be considered according to the scope classification, the laboratory considers the result conform if its measured value is within the specification.

In case the measurement uncertainty does need to be considered according to the scope classification, the laboratory considers the result conform if its value incl. its measurement uncertainty is within the specification.

Test record

1 Test conditions

- 1.1 Test component
- 1.1.1 Function description IMU module
- 1.1.2 Type ASI-100
- 1.1.3 Variant n.a
- 1.1.4 Tested operating mode(s) See test report of the enclosure.
- 1.1.5 Tested rated voltage(s) 12V 24V 12V/24V
- 1.1.6 The approval object is ...
- an ESA that is not related to a connection system for charging a REESS yes
 no
- a complete connection system for charging a REESS yes
 no
- a component of a connection system for charging a REESS yes
 no
- Have the HV voltages and HV currents been taken into account in the tests and measurements? yes
 no
 n.a.
- a light source or a part of a light source acc. to item 3.2.10 of the Regulation? yes
 no
 n.a.
- 1.1.7 Approval number or number of test report n.a.
- Do the devices of the type have immunity related functions? yes
 no
- Reason if necessary: IMU module related to safety functions and within ECE R10.06, 2.12
- 1.1.8 Do the devices of the type have to be in operation during the engine start phase? yes
 no
- 1.1.9 Photo documentation of the examinee including existing labels See test report of the enclosure.
- 1.1.10 Remarks: n.a.
- 1.2 Test equipment



Technical Report
No.: HOM ECN T22/070-00
Type: ASI-100
Appendix

Parameter of the test area:

The equipment, on which the tests were carried out, fulfilled the requirements of the Regulation.

2 Test Results

2.1	Test results in configurations <u>other</u> than „REESS charging mode coupled of the power grid	<input checked="" type="checkbox"/> fulfilled <input type="checkbox"/> not fulfilled <input type="checkbox"/> n.a.
	Remarks:	<input checked="" type="checkbox"/> n.a.
2.1.1	Measurement of <u>radiated broadband</u> electromagnetic emissions from electrical/ electronic subassemblies according to item 6.5 of the Regulation:	<input checked="" type="checkbox"/> fulfilled <input type="checkbox"/> not fulfilled <input type="checkbox"/> n.a.
2.1.1.1	Measurement procedure:	Quasi-peak-detector
2.1.1.2	Measurement setup:	Anechoic chamber
2.1.1.3	Measurement results:	The measured values, expressed in dB μ V/m, are below the reference limits. See test report of the enclosure
2.1.1.4	Photo documentation of the measurement setup (if applicable):	See test report of the enclosure.
2.1.1.5	Remarks:	<input checked="" type="checkbox"/> n.a.
2.1.2	Measurement of <u>radiated narrowband</u> electromagnetic emissions from electrical/ electronic subassemblies according to item 6.6 of the Regulation:	<input checked="" type="checkbox"/> fulfilled <input type="checkbox"/> not fulfilled <input type="checkbox"/> n.a.
2.1.2.1	Measurement procedure:	Average-detector
2.1.2.2	Measurement setup:	Anechoic chamber
2.1.2.3	Measurement results:	The measured values, expressed in dB μ V/m, are below the reference limits. See test report of the enclosure.
2.1.2.4	Photo documentation of the measurement setup (if applicable):	See test report of the enclosure.
2.1.2.5	Remarks:	<input checked="" type="checkbox"/> n.a.

2.1.3 Testing for emission of transient conducted disturbances of electrical/electronic subassemblies on 12/24/48 V supply lines according to item 6.7 of the Regulation: fulfilled
 not fulfilled
 n.a.

2.1.3.1 Test results: The limits are kept. See test report of the enclosure.

2.1.3.2 Photo documentation of the measurement setup (if applicable): See test report of the enclosure.

2.1.3.3 Remarks: n.a.
 See below table.

For 12V system (Test Voltage: 13.5V)

Limit	Measured Value [V]			
	Slow pulse OFF→ON	Slow pulse ON→OFF	Fast pulse OFF→ON	Fast pulse ON→OFF
+75V	+0.9V	+0.5V	+0.9V	+0.5V
-100V	-13.9V	-14.3V	-13.9V	-14.3V

For 24V system

Limit	Measured Value [V]			
	Slow pulse OFF→ON	Slow pulse ON→OFF	Fast pulse OFF→ON	Fast pulse ON→OFF
+150V	+8.2V	+1.4V	+8.6V	+1V
-450V	-28.2V	-28.6V	-28.2V	-28.6V

2.1.4 Testing for radiated immunity of electrical/electronic subassemblies to electromagnetic radiation according to item 6.8 of the Regulation: fulfilled
 not fulfilled
 n.a.

2.1.4.1 Test procedure: Bulk current injection (BCI) (20-400 MHz) and Absorber chamber (400-2000 MHz)

2.1.4.2 Test setup: See test report of the enclosure.

2.1.4.3 Test results: During the test was no degradation of performance of „functions related to immunity“ (acc. to 2.12).

2.1.4.4 Photo documentation of the measurement setup (if applicable): See test report of the enclosure.

- | | | |
|---------|---|--|
| 2.1.4.5 | Remarks: | <input type="checkbox"/> n.a.
ESA safety-related according to item 2.12 of the Regulation. |
| 2.1.5 | Testing for <u>immunity to transient disturbances</u> conducted along on 12/24 V supply lines of electrical/electronic subassemblies according to item 6.9 of the Regulation: | <input checked="" type="checkbox"/> fulfilled
<input type="checkbox"/> not fulfilled
<input type="checkbox"/> n.a. |
| 2.1.5.1 | Test results: | During the test was no unacceptable degradation. See test report of the enclosure. |
| 2.1.5.2 | Photo documentation of the measurement setup (if applicable): | See test report of the enclosure. |
| 2.1.5.3 | Remarks: | <input checked="" type="checkbox"/> n.a. |
| 2.2 | Test results in configurations „REESS charging mode coupled of the power grid: | <input type="checkbox"/> fulfilled
<input type="checkbox"/> not fulfilled
<input checked="" type="checkbox"/> n.a. |
| | Remarks: | <input checked="" type="checkbox"/> n.a.

Test component not related to REESS |



List of modifications:

- | | | |
|---|------------------|------|
| 1 | Correction of: | n.a. |
| 2 | Modification of: | n.a. |
| 3 | Addition of: | n.a. |
| 4 | Deletion of: | n.a. |

TEST REPORT

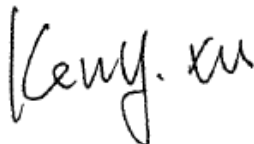
Application No.: SZEM2208005638AU
Applicant: Autel Intelligent Automobile Corp., Ltd.
Address of Applicant: Floor 8, Floor 7 and Floor 4, Building B1, Zhiyuan, No.1001 Xueyuan Avenue, Changyuan Community, Taoyuan Road, Nanshan District Shenzhen City, Guangdong Province, P.R. China Post Code: 518055
Manufacturer: Autel Intelligent Automobile Corp., Ltd.
Address of Manufacturer: Floor 8, Floor 7 and Floor 4, Building B1, Zhiyuan, No.1001 Xueyuan Avenue, Changyuan Community, Taoyuan Road, Nanshan District Shenzhen City, Guangdong Province, P.R. China Post Code: 518055
Factory: Autel Intelligent Automobile Corp., Ltd
Address of Factory: Workroom 103 104. 105. 106. 108. 1st Floor, Building A9, Tianliao Industrial Zone, Taoyuan Road, Nanshan District, Shenzhen City, Guangdong Province, P.R. China

Equipment Under Test (EUT):

EUT Name: IMU module
Model No.: ASI-100
Trade Mark: Autel
Standard(s) : ECE R10.06
Date of Receipt: 2022-08-01
Date of Test: 2022-08-01 to 2022-08-04
Date of Issue: 2022-08-11

Test Result:	Pass*
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* In the configuration tested, the EUT complied with the standards specified above.



Keny Xu
EMC Laboratory Manager



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SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch

SZEMC-TRF-01 Rev. A/0 Aug01,2022

Report No.: SZEM220800563801

Page: 2 of 54

Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2022-08-11		Original

Authorized for issue by:			
		<i>Powell Bao</i>	
		_____ Powell Bao/Project Engineer	
		<i>Eric Fu</i>	
		_____ Eric Fu/Reviewer	



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2 Test Summary

Emission Part				
Item	Standard	Method	Requirement	Result
Radiated Emission (30MHz-1GHz)	ECE R10.06	CISPR 25:2002	Clause 6.5 & 6.6 of R10-06	Pass
Conducted transient disturbances		ISO 7637-2:2004	Clause 6.7 of R10-06	Pass

Immunity Part				
Item	Standard	Method	Requirement	Result
Conducted transient immunity	ECE R10.06	ISO 7637-2:2004	Clause 6.9 of R10-06	Pass
Bulk Current Injection (20MHz-400MHz)		ISO 11452-4:2011	Clause 6.8 of R10-06:60mA, 80%, 1kHz. AM(Amplitude Modulation)	Pass
Radiation immunity-ALSE (400MHz-2GHz)		ISO 11452-2:2004	Clause 6.8 of R10-06:400MHz to 800MHz: 30V/m,80%, 1kHz. AM (Amplitude Modulation); 800MHz to 2GHz: 30V/m, Ton=577 μs, period=4600 μs, PM (Pulse Modulation)	Pass



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4 General Information

4.1 Details of E.U.T.

Power supply:	DC12V/24V
---------------	-----------

Remark: The information in this section is provided by the applicant or manufacturer, SGS is not liable to the accuracy, suitability, reliability or/and integrity of the information.

4.2 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
--	--	--	--

The EUT has been tested as an independent unit.

4.3 Measurement Uncertainty

Test Item	Measurement Uncertainty
Radiated Emission(30MHz-1GHz)	±4.5dB
Conducted transient immunity	±5%

Remark:

The U_{lab} (lab Uncertainty) is less than $U_{CISPR/ETSI}$ (CISPR/ETSI Uncertainty), so the test results

- compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.



4.4 Test Location

All tests were performed at:

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Room 105, Building A, Xinlong Technology Industrial Park, No. 50 Fengtang Road, Xintian Community, Fuyong Street, Bao'an District, Shenzhen, China

Tel: +86 755 2601 2053 Fax: +86 755 2671 0594

No tests were sub-contracted.

4.5 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **A2LA (Certificate No. 3816.01)**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

- **Innovation, Science and Economic Development Canada**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0006.

IC#: 4620C.

4.6 Deviation from Standards

None

4.7 Abnormalities from Standard Conditions

None

4.8 EMS Monitor

Visual: Monitored the work status of the EUT



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5 Equipment List

Radiated Emission(30MHz-1GHz)					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
764 Anechoic Chamber	CRT	N/A	SEM001-12	2019-10-10	2022-10-09
Measurement Software	Rohde & Schwarz	EMC 32 V10.01.00	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM034-01	2022-05-16	2023-05-15
Biconical Antenna	Schwarzebeck	VHBB9124	SEM003-27	2021-10-17	2022-10-16
Log.-Per. Antenna	Schwarzebeck	VUSLP9111B	SEM003-28	2021-10-17	2022-10-16
Amplifier	Sonoma Instrument Co	310N	SEM005-03	2022-04-06	2023-04-05
EMI Test Receiver	Rohde & Schwarz	ESR	SEM004-03	2022-03-23	2023-03-22
LISN	Schwarzebeck	NNBM8124- 200	SEM007-20	2021-10-26	2022-10-25
LISN	Schwarzebeck	NNBM8124- 200	SEM007-21	2021-10-26	2022-10-25

Conducted transient disturbances					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Oscilloscope	Tektronix	MSO 4104	SEM022-02	2021-09-15	2022-09-14
Switch	EM TEST	BS 200B	SEM018-07	2021-09-18	2022-09-17
LISN	Schwarzebeck	NNBM8125	SEM007-18	2021-09-18	2022-09-17

Conducted transient immunity					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Automotive Transient Test System	Noiseken	ISS 7600	SEM050-13	2022-04-06	2023-04-05
DC Power supply	Noiseken	BP4610	SEM050-15	2022-04-06	2023-04-05
Measurement Software	EM Test/AG	ISMISO for windows V4.21	N/A	N/A	N/A
Oscilloscope	Tektronix	MSO 4104	SEM022-02	2021-09-15	2022-09-14



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Bulk Current Injection(20MHz-400MHz)					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Measurement Software	NEXIO	BAT V3.19.1.9	N/A	N/A	N/A
LISN	Schwarzebeck	NNBM8125	SEM007-18	2021-09-18	2022-09-17
LISN	Schwarzebeck	NNBM8125	SEM007-19	2021-09-18	2022-09-17
RF generator and power meter	TESEQ	NSG 4070C-0	SEM006-18	2021-10-26	2022-10-25
Bulk Current injection	FCC	F-130A-1	SEM013-05	2021-10-26	2022-10-25
BCI Calibration Fixture	FCC	FCC-BCICF-1	SEM013-06	2021-10-26	2022-10-25
Dual directional coupler	Werlatone	C5339	SEM021-11	2021-10-26	2022-10-25
BCI Cable Output	Huber Suhner	N/A	SEM036-01	2022-05-16	2023-05-15
BCI Cable Input	Huber Suhner	N/A	SEM036-02	2022-05-16	2023-05-15
RF Generator And Power Meter	TESEQ	NSG 4070C-0	SEM006-18	2021-10-26	2022-10-25
Coupling/Decoupling Network	SCHLODER	CDN M2+3	SEM007-17	2022-04-07	2023-04-06
Solid State Amplifier	TESEQ	CBA 400M-110	SEM005-22	2021-10-26	2022-10-25

Radiation immunity-ALSE(400MHz-2GHz)					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
764 Anechoic Chamber	CRT	N/A	SEM001-12	2019-10-10	2022-10-09
LISN	Schwarzebeck	NNBM8124-200	SEM007-20	2021-10-26	2022-10-25
LISN	Schwarzebeck	NNBM8124-200	SEM007-21	2021-10-26	2022-10-25
Measurement Software	NEXIO	BAT V3.19.1.20	N/A	N/A	N/A
Solid State Amplifier	TESEQ	CBA 1G-1200B	SEM005-20	2021-10-26	2022-10-25
Solid State Amplifier	TESEQ	CBA 6G-200D	SEM005-21	2022-06-24	2023-06-23
USB Power Sensor	Keysight	U2042XA	SEM009-18	2021-10-26	2022-10-25
USB Power Sensor	Keysight	U2042XA	SEM009-19	2021-10-26	2022-10-25
MXG Analog Signal Generator	Agilent	N5181A	SEM006-16	2021-09-15	2022-09-14
Log.-Per. Antenna	Schwarzbeck	STLP 9128 Esp-7/16	SEM003-29	N/A	N/A
Broadband Horn Antenna	Schwarzbeck	BBHA 9120J	SEM003-30	N/A	N/A
RI Cable	Huber Suhner	N/A	SEM034-02	2022-05-16	2023-05-15
RI Cable	Huber Suhner	N/A	SEM034-03	2022-05-16	2023-05-15



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General used equipment					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
Humidity/ Temperature Indicator	MINGGAO	TH607	SEM002-18	2021-09-14	2022-09-13
Humidity/ Temperature Indicator	MINGGAO	TH607	SEM002-19	2021-09-14	2022-09-13
Humidity/ Temperature Indicator	MINGGAO	TH607	SEM002-20	2021-09-14	2022-09-13
Barometer	Shanghai Meteorological Industry Factory	DYM3	SEM002-24	2021-09-14	2022-09-13



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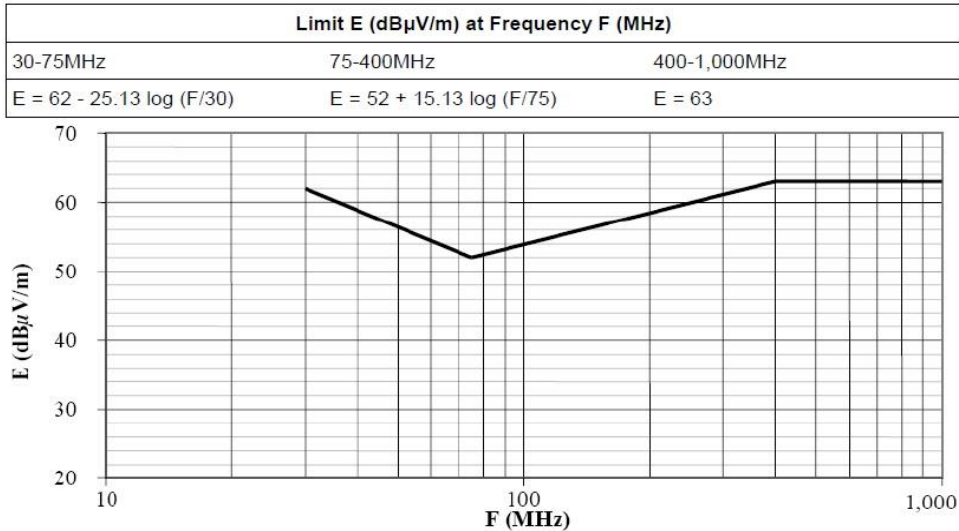
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6 Emission Test Results

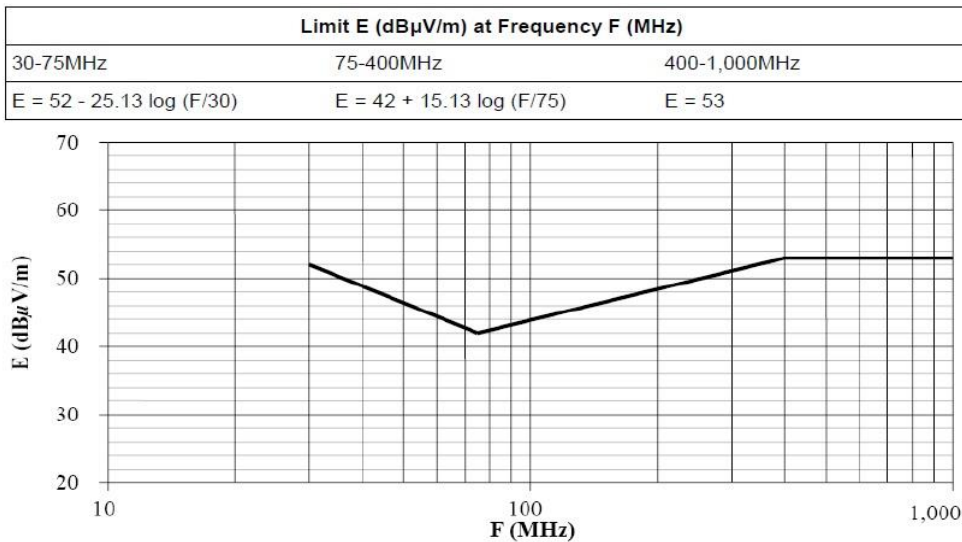
6.1 Radiated Emission(30MHz-1GHz)

Test Requirement: ECE R10.06
 Test Method: CISPR 25:2002
 Frequency Range: 30MHz to 1GHz
 Measurement Distance: 1m
 Limit:

Radiated Emission (Broadband Type) Limit for ESA



Radiated Emission (Narrowband Type) Limit for ESA



6.1.1 E.U.T. Operation

Operating Environment:

Temperature: 22.6 °C Humidity: 52.0 % RH Atmospheric Pressure: 1015 mbar

6.1.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	DC 13.5V Power Supply_Keep EUT working normally.
Pre-scan	01	DC 27V Power Supply_Keep EUT working normally.

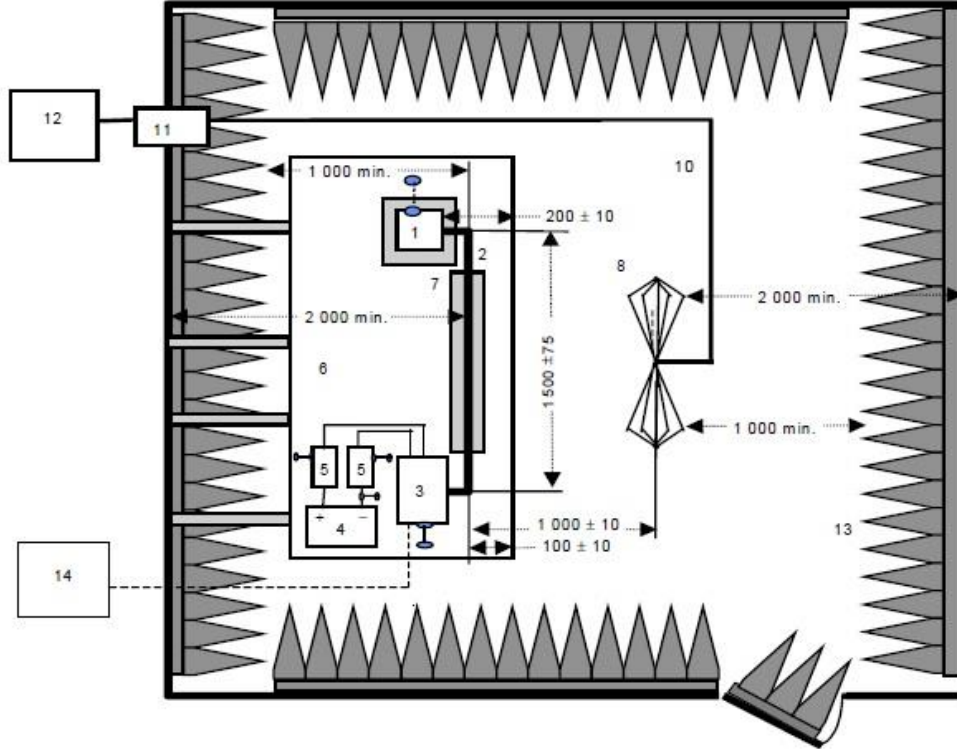


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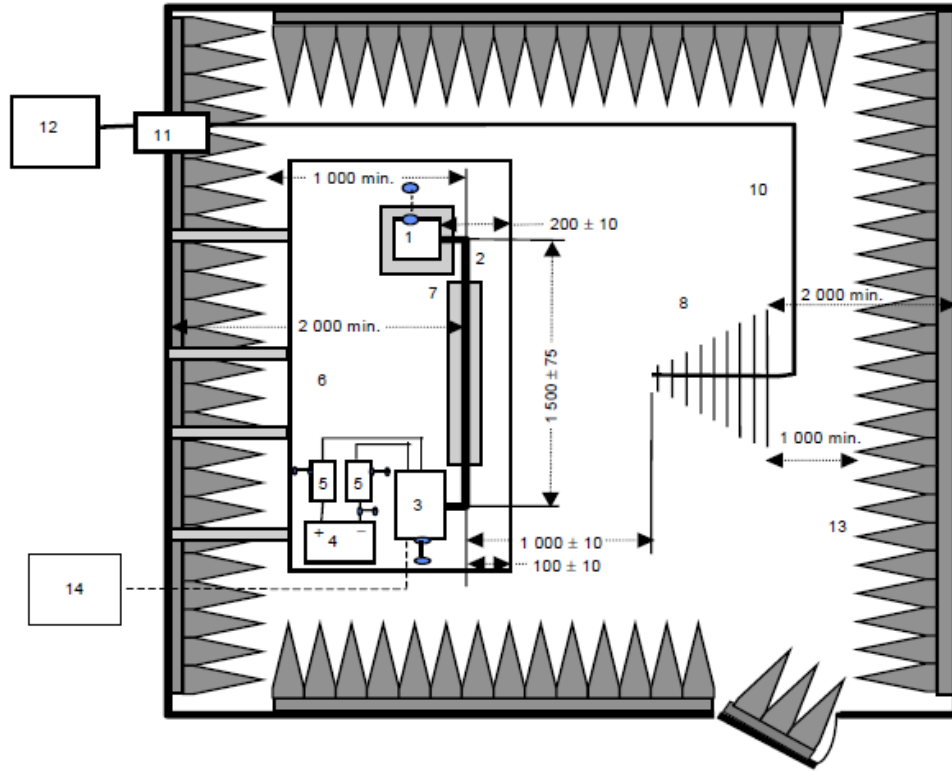
6.1.3 Test Setup Diagram



Key

1. EUT (grounded locally if required in test plan)	8. Biconical antenna
2. Test harness	10. High-quality coaxial cable
3. Load simulator	11. Bulkhead connector
4. Power supply (location optional)	12. Measuring instrument
5. Artificial network (AN)	13. RF absorber material
6. Ground plane (bonded to shielded enclosure)	14. Stimulation and monitoring system
7. Low relative permittivity support	

Figure – Example of test set-up – Biconical antenna



Key

1. EUT (grounded locally if required in test plan)	8. Log-periodic antenna
2. Test harness	10. High-quality coaxial cable
3. Load simulator	11. Bulkhead connector
4. Power supply (location optional)	12. Measuring instrument
5. Artificial network (AN)	13. RF absorber material
6. Ground plane (bonded to shielded enclosure)	14. Stimulation and monitoring system
7. Low relative permittivity support	

Figure – Example of test set-up – Log-periodic antenna

6.1.4 Measurement Procedure and Data

Frequency Range:30MHz-1GHz

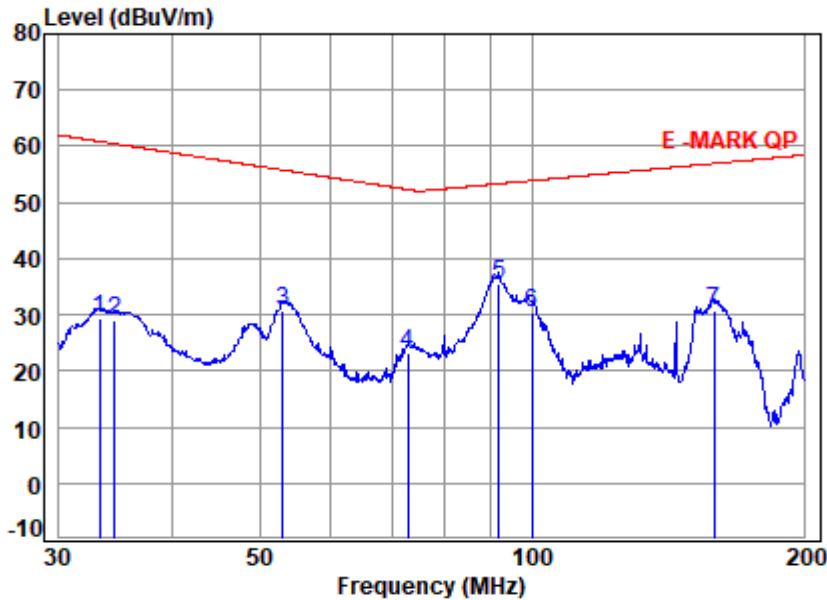


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Test Mode: 00 Polarity: Horizontal; 30-200MHz; Detector: QP



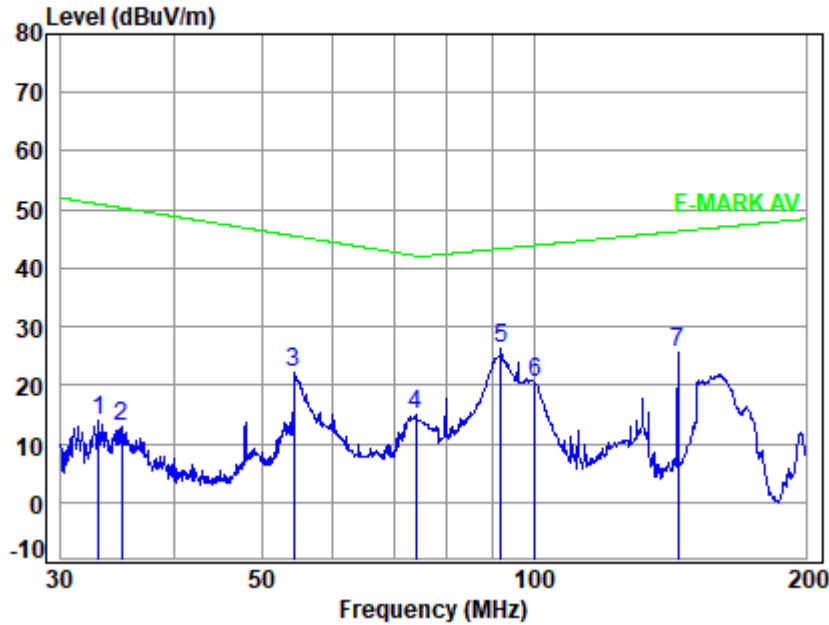
Condition: 1m Horizontal
 Job No : 05638AU
 Mode : 00

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	33.2363	0.40	12.64	32.60	48.77	29.21	60.88	-31.67 QP
2	34.5871	0.40	12.65	32.60	48.42	28.87	60.45	-31.58 QP
3	53.0022	0.51	11.22	32.59	51.43	30.57	55.79	-25.22 QP
4	73.0356	0.62	9.94	32.55	45.23	23.24	52.29	-29.05 QP
5 pp	92.0558	0.72	10.21	32.51	57.03	35.45	53.35	-17.90 QP
6	100.0699	0.77	10.60	32.50	51.42	30.29	53.90	-23.61 QP
7	158.9780	1.02	14.34	32.57	47.86	30.65	56.94	-26.29 QP



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Test Mode: 00 Polarity: Horizontal; 30-200MHz; Detector: AV



Condition: 1m Horizontal

Job No : 05638AU

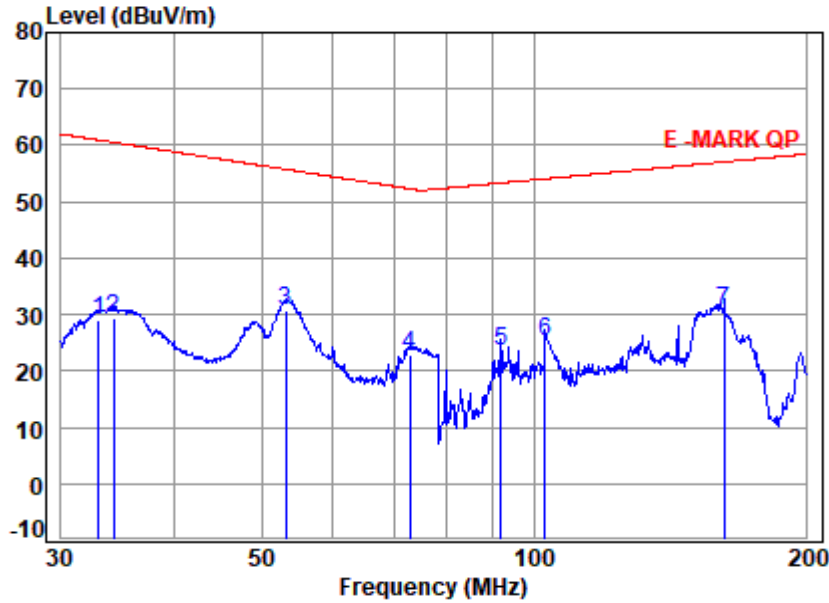
Mode : 00

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	32.9850	0.40	12.63	32.60	33.53	13.96	50.96	-37.00	Average
2	35.0495	0.40	12.65	32.60	32.33	12.78	50.30	-37.52	Average
3	54.3256	0.52	11.05	32.59	43.24	22.22	45.52	-23.30	Average
4	74.0120	0.63	9.92	32.54	36.84	14.85	42.14	-27.29	Average
5 pp	92.0558	0.72	10.21	32.51	47.75	26.17	43.35	-17.18	Average
6	100.2599	0.77	10.61	32.50	41.58	20.46	43.91	-23.45	Average
7	144.3171	0.96	13.69	32.55	43.65	25.75	46.30	-20.55	Average



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Test Mode: 00 Polarity: Vertical; 30-200MHz; Detector: QP



Condition: 1m Vertical

Job No : 05638AU

Mode : 00

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	33.0477	0.40	12.63	32.60	48.45	28.88	60.94	-32.06	QP
2	34.3257	0.40	12.65	32.60	48.97	29.42	60.53	-31.11	QP
3 pp	53.2037	0.51	11.19	32.59	51.53	30.64	55.75	-25.11	QP
4	73.0356	0.62	9.94	32.55	44.89	22.90	52.29	-29.39	QP
5	92.0558	0.72	10.21	32.51	45.02	23.44	53.35	-29.91	QP
6	102.9584	0.78	10.72	32.50	46.25	25.25	54.08	-28.83	QP
7	162.6387	1.03	14.53	32.57	47.69	30.68	57.09	-26.41	QP

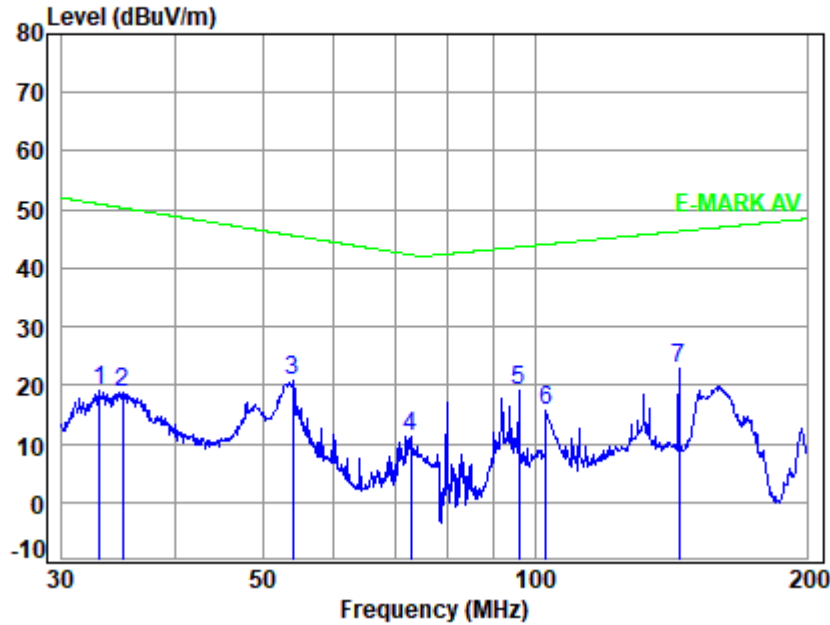


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Test Mode: 00 Polarity: Vertical; 30-200MHz; Detector: AV



Condition: 1m Vertical

Job No : 05638AU

Mode : 00

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	32.9850	0.40	12.63	32.60	38.69	19.12	50.96	-31.84	Average
2	35.0495	0.40	12.65	32.60	38.41	18.86	50.30	-31.44	Average
3	54.0173	0.51	11.09	32.59	41.73	20.74	45.58	-24.84	Average
4	73.0356	0.62	9.94	32.55	33.20	11.21	42.29	-31.08	Average
5	95.9792	0.74	10.41	32.51	40.57	19.21	43.62	-24.41	Average
6	102.9584	0.78	10.72	32.50	36.58	15.58	44.08	-28.50	Average
7 pp	144.3171	0.96	13.69	32.55	40.59	22.69	46.30	-23.61	Average



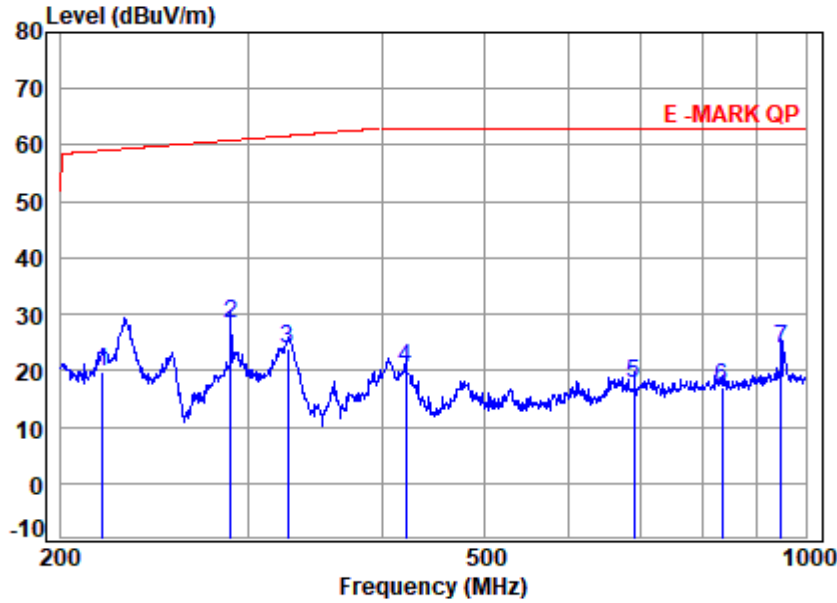
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Test Mode: 00 Polarity: Horizontal; 200-1000MHz; Detector: QP



Condition: 1m Horizontal

Job No : 05638AU

mode : 00

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	218.8630	1.24	13.00	32.58	38.22	19.88	59.04	-39.16 QP
2 pp	288.6657	1.47	14.14	32.51	45.30	28.40	60.86	-32.46 QP
3	326.7502	1.58	14.60	32.47	40.10	23.81	61.67	-37.86 QP
4	421.3598	1.84	15.77	32.40	35.29	20.50	63.00	-42.50 QP
5	690.6164	2.48	18.39	32.31	29.25	17.81	63.00	-45.19 QP
6	835.0555	2.79	19.71	31.98	26.61	17.13	63.00	-45.87 QP
7	948.2743	3.02	20.68	31.15	31.19	23.74	63.00	-39.26 QP

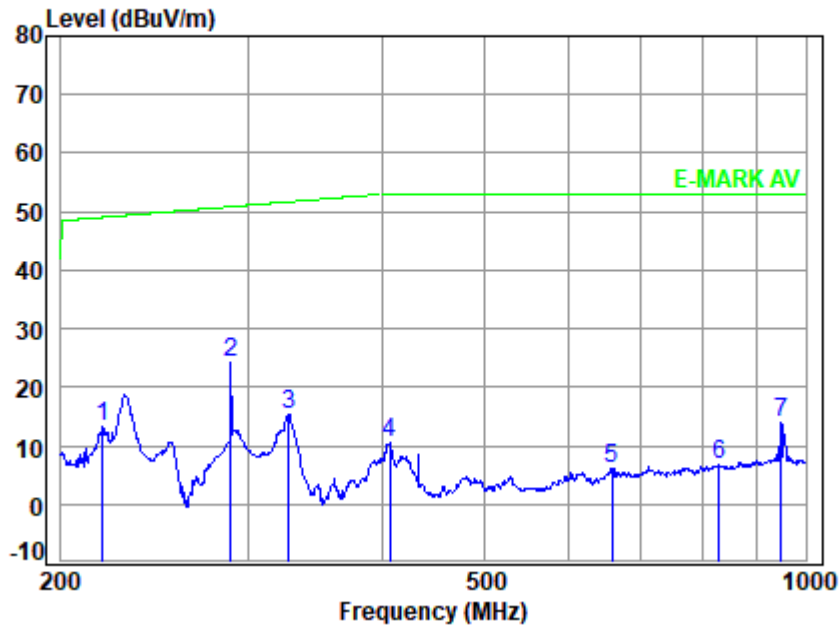


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Test Mode: 00 Polarity: Horizontal; 200-1000MHz; Detector: AV



Condition: 1m Horizontal

Job No : 05638AU

mode : 00

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	218.8630	1.24	13.00	32.58	31.50	13.16	49.04	-35.88 Average
2	288.6657	1.47	14.14	32.51	40.96	24.06	50.86	-26.80 Average
3	327.2765	1.58	14.60	32.47	31.77	15.48	51.68	-36.20 Average
4	406.7015	1.81	15.86	32.40	25.09	10.36	53.00	-42.64 Average
5	658.0635	2.41	18.00	32.34	18.18	6.25	53.00	-46.75 Average
6	828.3627	2.78	19.67	32.02	16.19	6.62	53.00	-46.38 Average
7	948.2743	3.02	20.68	31.15	21.40	13.95	53.00	-39.05 Average



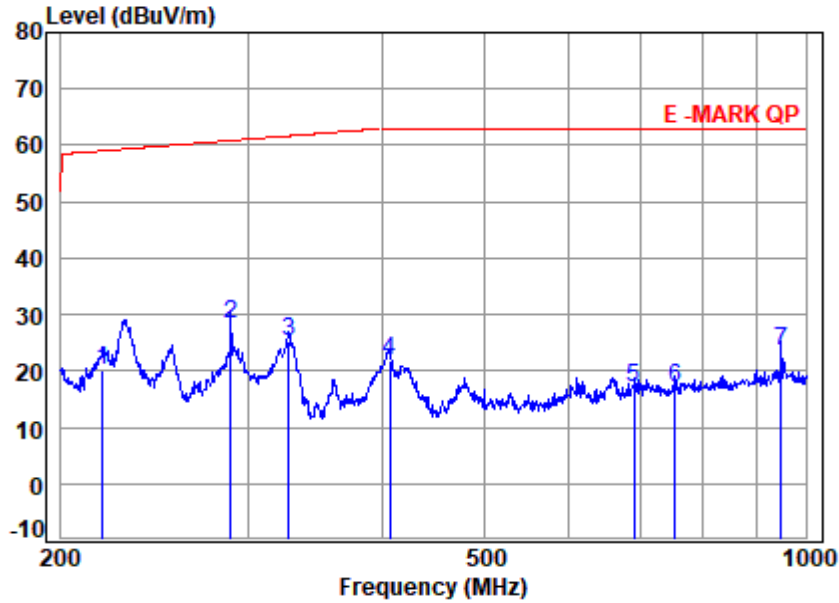
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Test Mode: 00 Polarity: Vertical; 200-1000MHz; Detector: QP



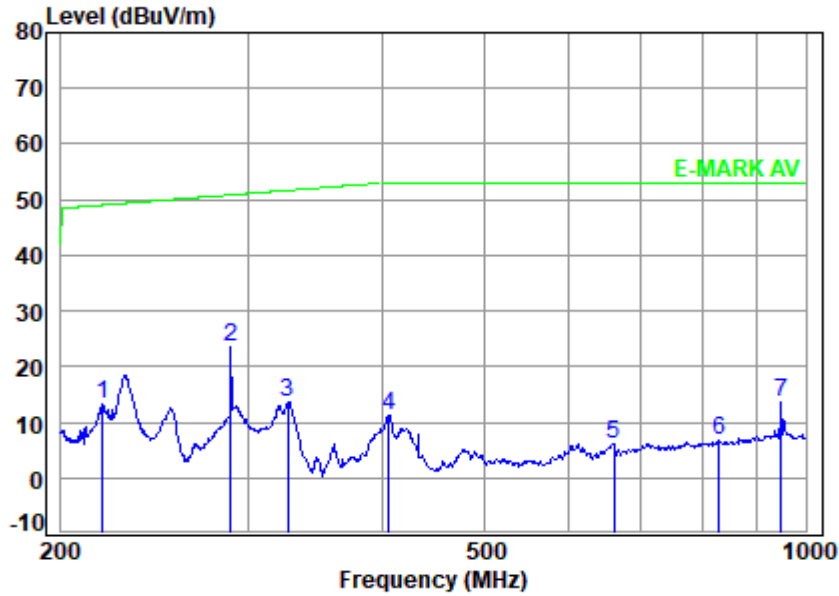
Condition: 1m Vertical
 Job No : 05638AU
 mode : 00

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	218.8630	1.24	13.00	32.58	38.49	20.15	59.04	-38.89	QP
2	pp 288.6657	1.47	14.14	32.51	45.17	28.27	60.86	-32.59	QP
3	327.2765	1.58	14.60	32.47	41.42	25.13	61.68	-36.55	QP
4	406.7015	1.81	15.86	32.40	36.68	21.95	63.00	-41.05	QP
5	690.6164	2.48	18.39	32.31	28.34	16.90	63.00	-46.10	QP
6	754.5365	2.62	19.14	32.24	27.65	17.17	63.00	-45.83	QP
7	948.2743	3.02	20.68	31.15	30.83	23.38	63.00	-39.62	QP



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Test Mode: 00 Polarity: Vertical; 200-1000MHz; Detector: AV



Condition: 1m Vertical

Job No : 05638AU

mode : 00

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	218.8630	1.24	13.00	32.58	31.55	49.04	-35.83	Average
2	288.6657	1.47	14.14	32.51	40.46	50.86	-27.30	Average
3	326.7502	1.58	14.60	32.47	30.07	51.67	-37.89	Average
4	406.0475	1.81	15.86	32.40	26.00	53.00	-41.73	Average
5	660.1851	2.41	18.03	32.34	18.02	53.00	-46.88	Average
6	828.3627	2.78	19.67	32.02	16.21	53.00	-46.36	Average
7	948.2743	3.02	20.68	31.15	20.90	53.00	-39.55	Average



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6.2 Conducted transient disturbances

Test Requirement: ECE R10.06
 Test Method: ISO 7637-2:2004

Limit:

Table – Limits of transient disturbances

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

6.2.1 E.U.T. Operation

Operating Environment:
 Temperature: 25.3 °C Humidity: 48.6 % RH Atmospheric Pressure: 1015 mbar

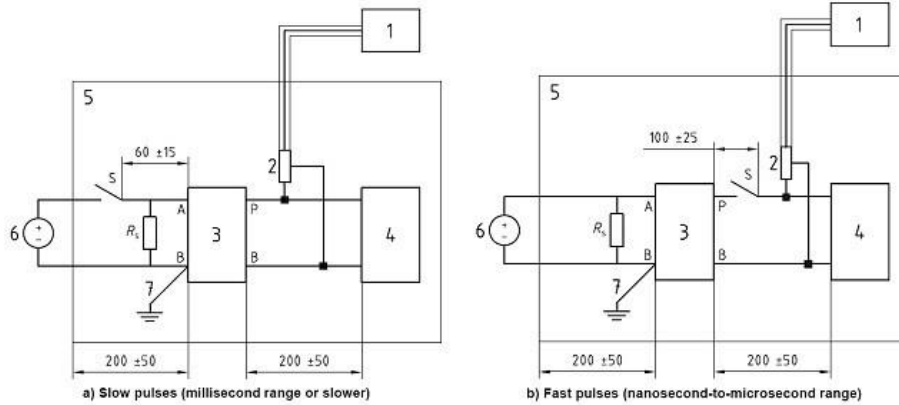
6.2.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	DC 13.5V Power Supply_Keep EUT working normally.
Final test	01	DC 27V Power Supply_Keep EUT working normally.



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6.2.3 Test Setup Diagram



Key	
1. oscilloscope	5. ground plane
2. voltage probe	6. power supply
3. artificial network	7. Ground connection; length 100 mm
4. EUT(source of transient)	

6.2.4 Measurement Procedure and Data

For 12V system

Limit	Measured Value [V]			
	Slow pulse OFF→ON	Slow pulse ON→OFF	Fast pulse OFF→ON	Fast pulse ON→OFF
+75V	+0.9V	+0.5V	+0.9V	+0.5V
-100V	-13.9V	-14.3V	-13.9V	-14.3V

For 24V system

Limit	Measured Value [V]			
	Slow pulse OFF→ON	Slow pulse ON→OFF	Fast pulse OFF→ON	Fast pulse ON→OFF
+150V	+8.2V	+1.4V	+8.6V	+1V
-450V	-28.2V	-28.6V	-28.2V	-28.6V



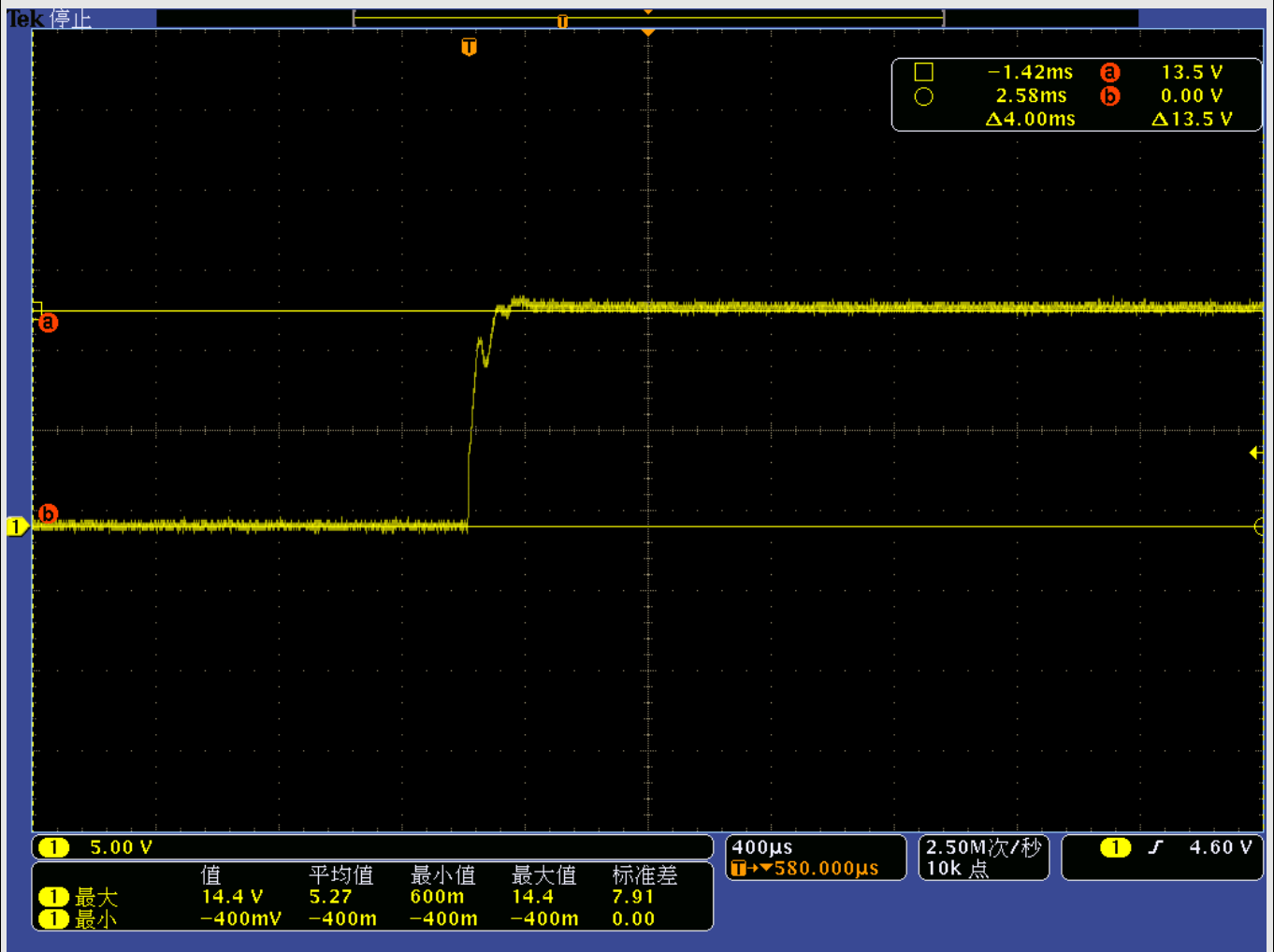
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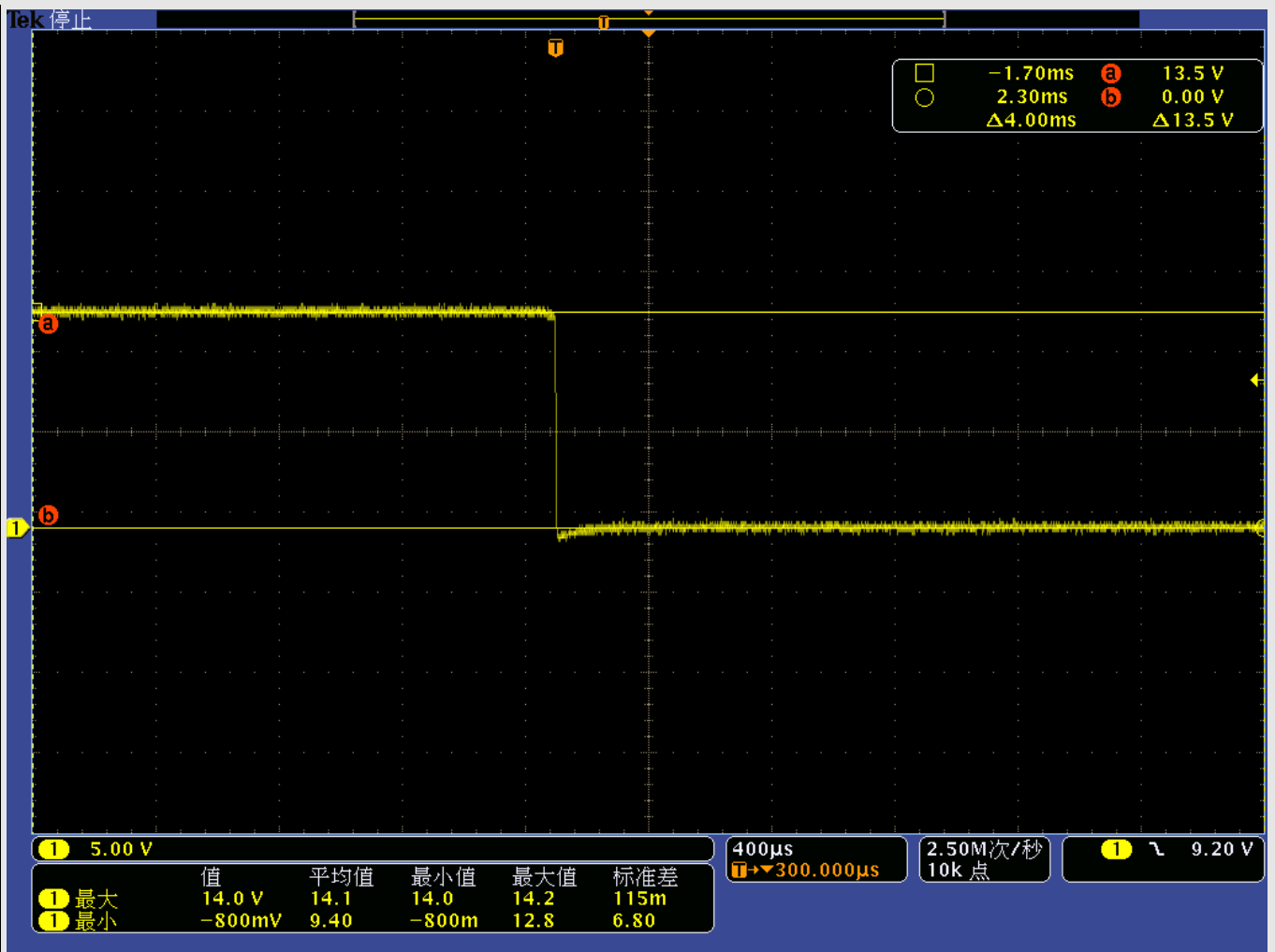
Mode 00					
Switch type	Pulse	Test Times	Off → On		
			Fast Pulses		
			Worst Reading	Limit	Result
Electronic switch	Positive	10	+0.9V	+75V	Pass
	Negative		-13.9V	-100V	Pass



maximum amplitude



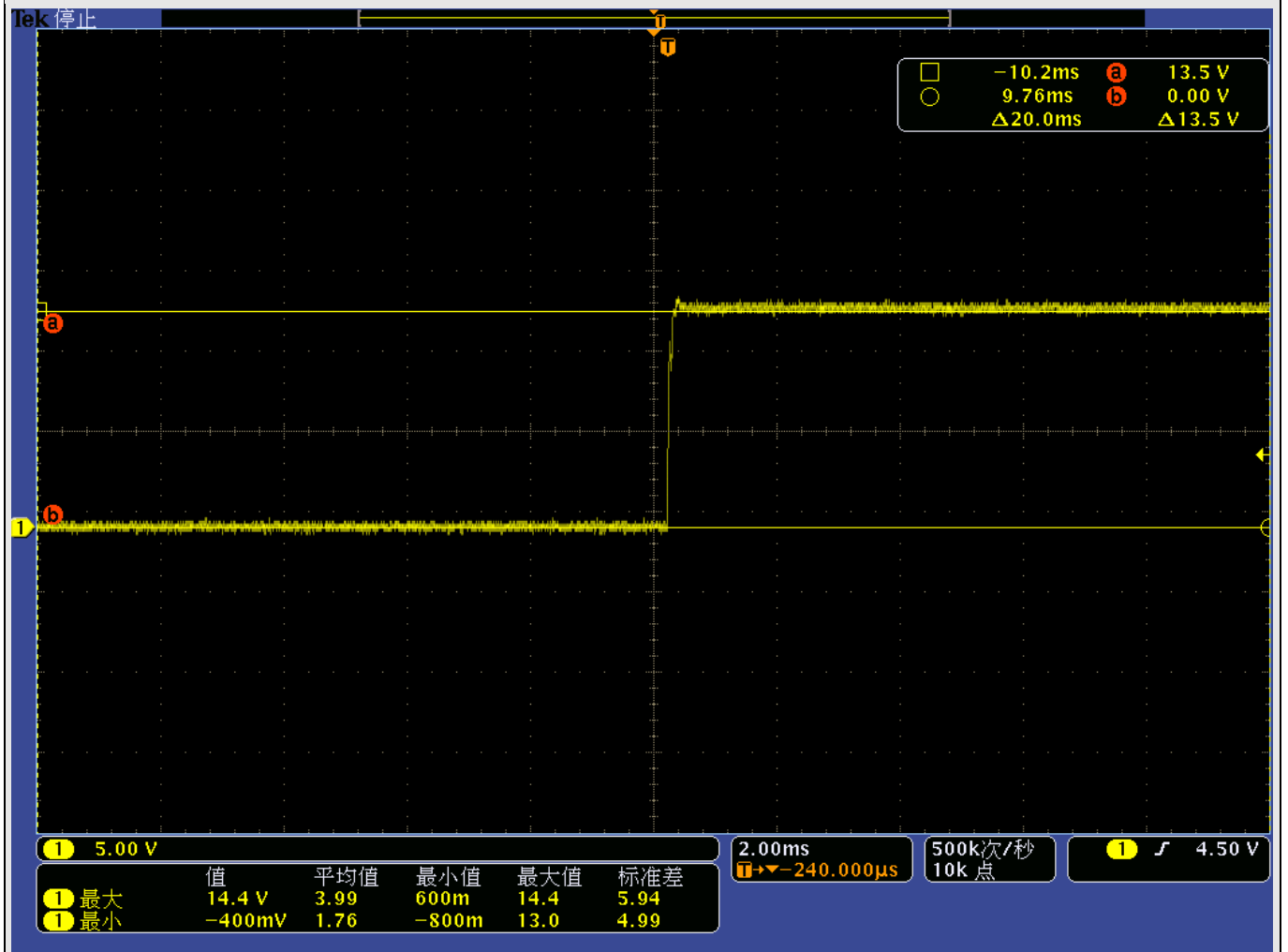
Mode 00					
Switch type	Pulse	Test Times	On → Off		
			Fast Pulses		
			Worst Reading	Limit	Result
Electronic switch	Positive	10	+0.5V	+75V	Pass
	Negative		-14.3V	-100V	Pass



maximum amplitude



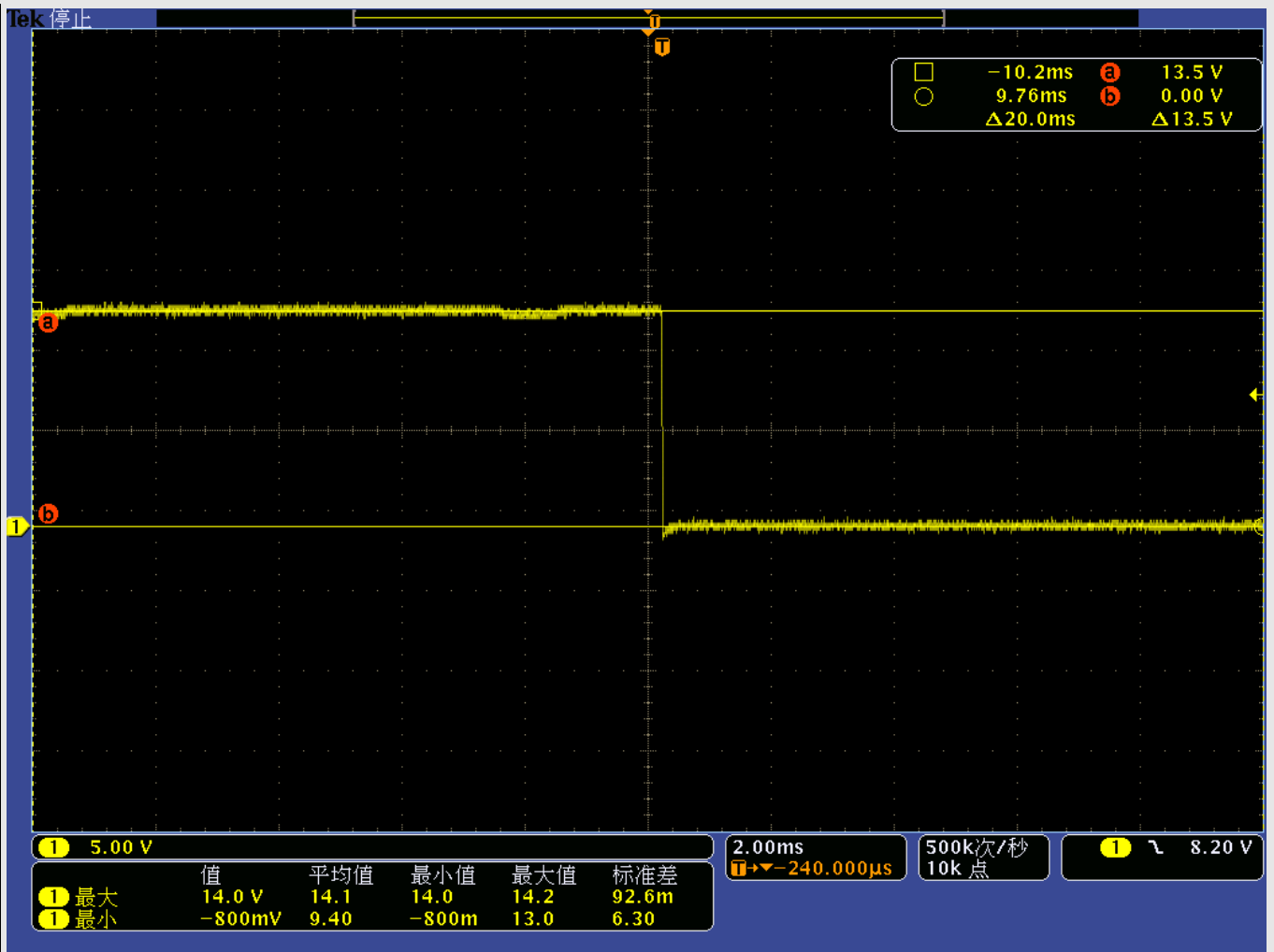
Mode 00					
Switch type	Pulse	Test Times	Off → On		
			Slow Pulses		
			Worst Reading	Limit	Result
Electronic switch	Positive	10	+0.9V	+75V	Pass
	Negative		-13.9V	-100V	Pass



maximum amplitude



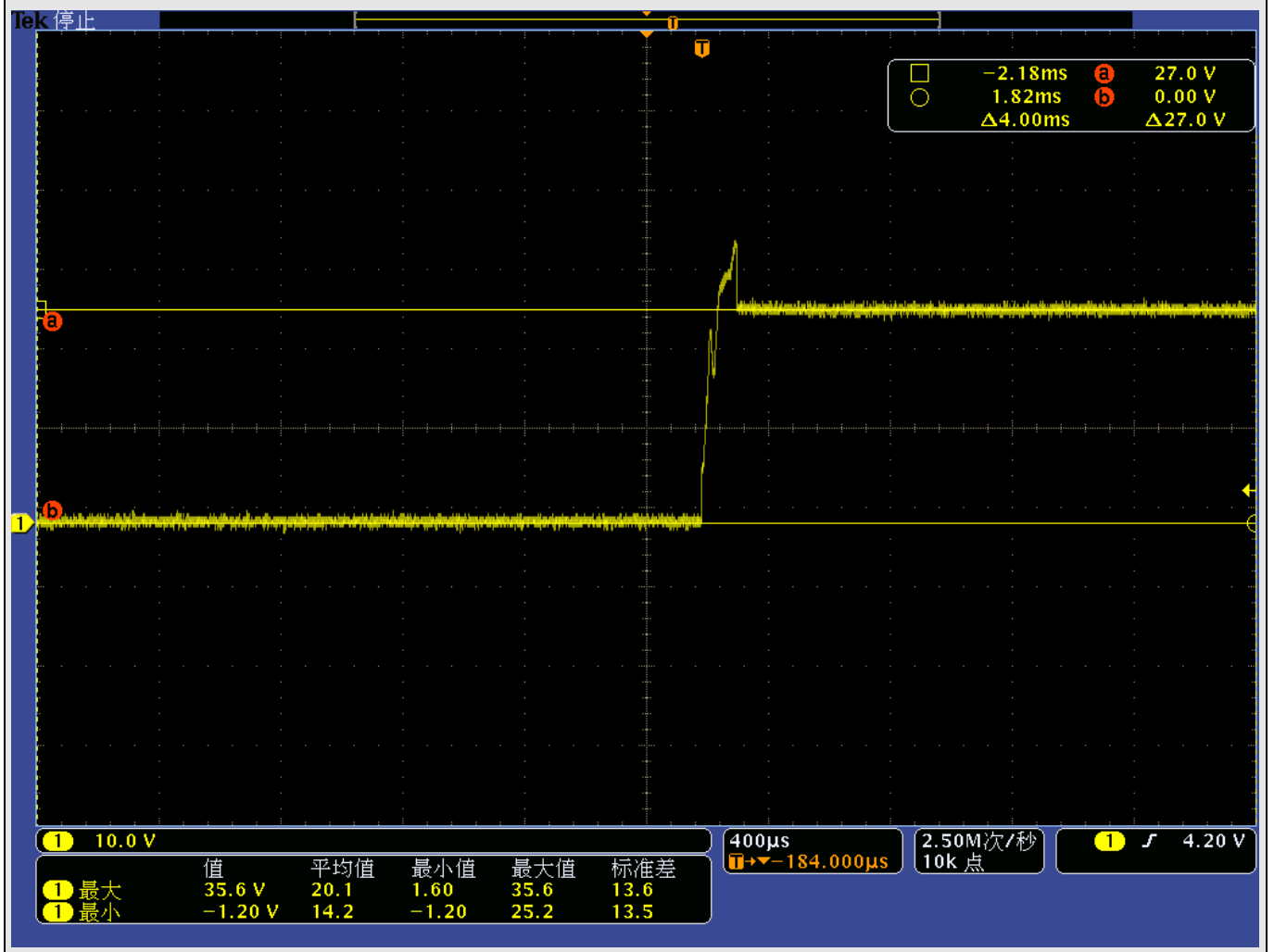
Mode 00					
Switch type	Pulse	Test Times	On → Off		
			Slow Pulses		
			Worst Reading	Limit	Result
Electronic switch	Positive	10	+0.5V	+75V	Pass
	Negative		-14.3V	-100V	Pass



maximum amplitude



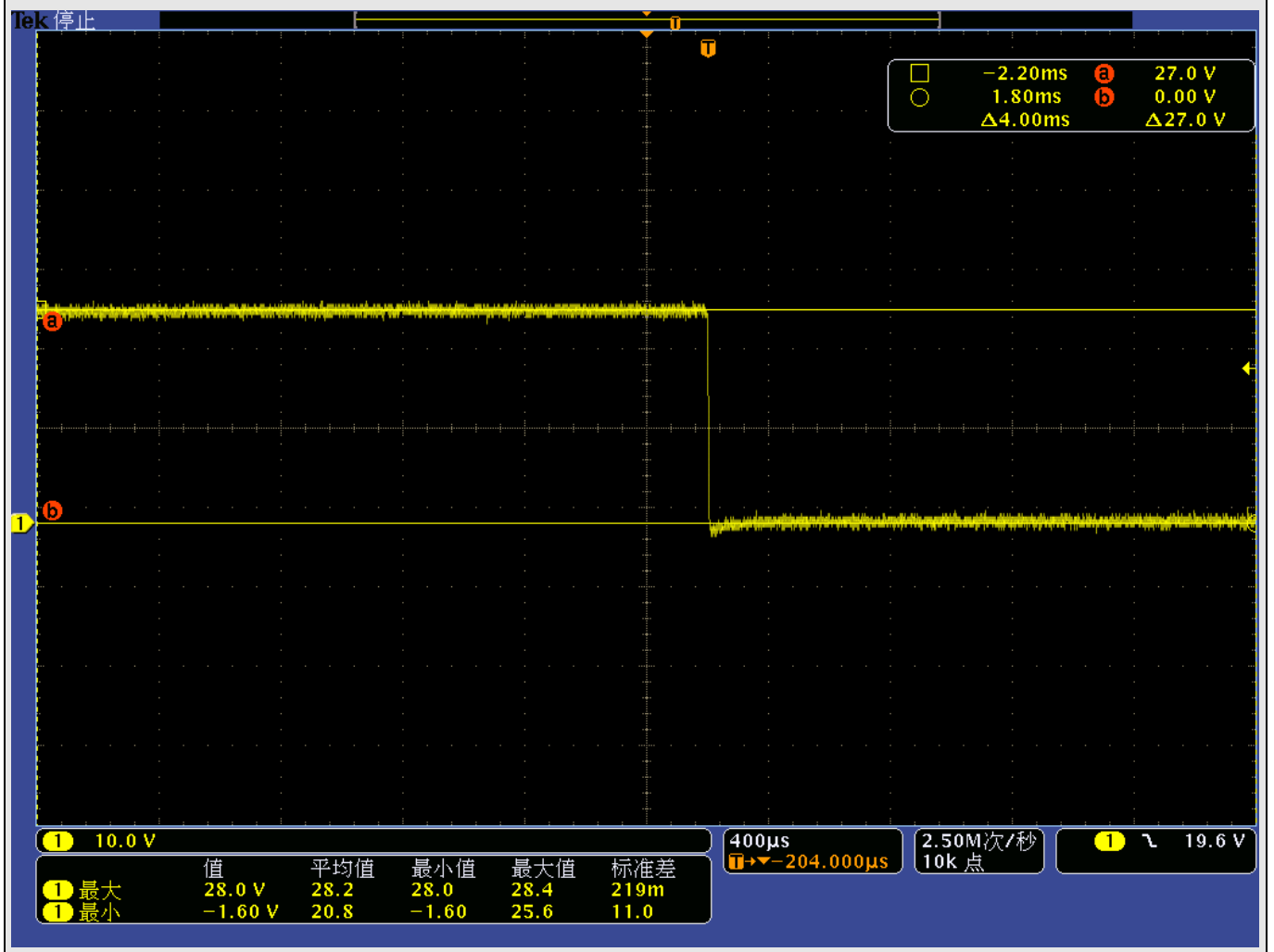
Mode 01					
Switch type	Pulse	Test Times	off → on		
			Fast Pulses		
			Worst Reading	Limit	Result
Electronic switch	Positive	10	+8.6V	+150V	Pass
	Negative		-28.2V	-450V	Pass



maximum amplitude

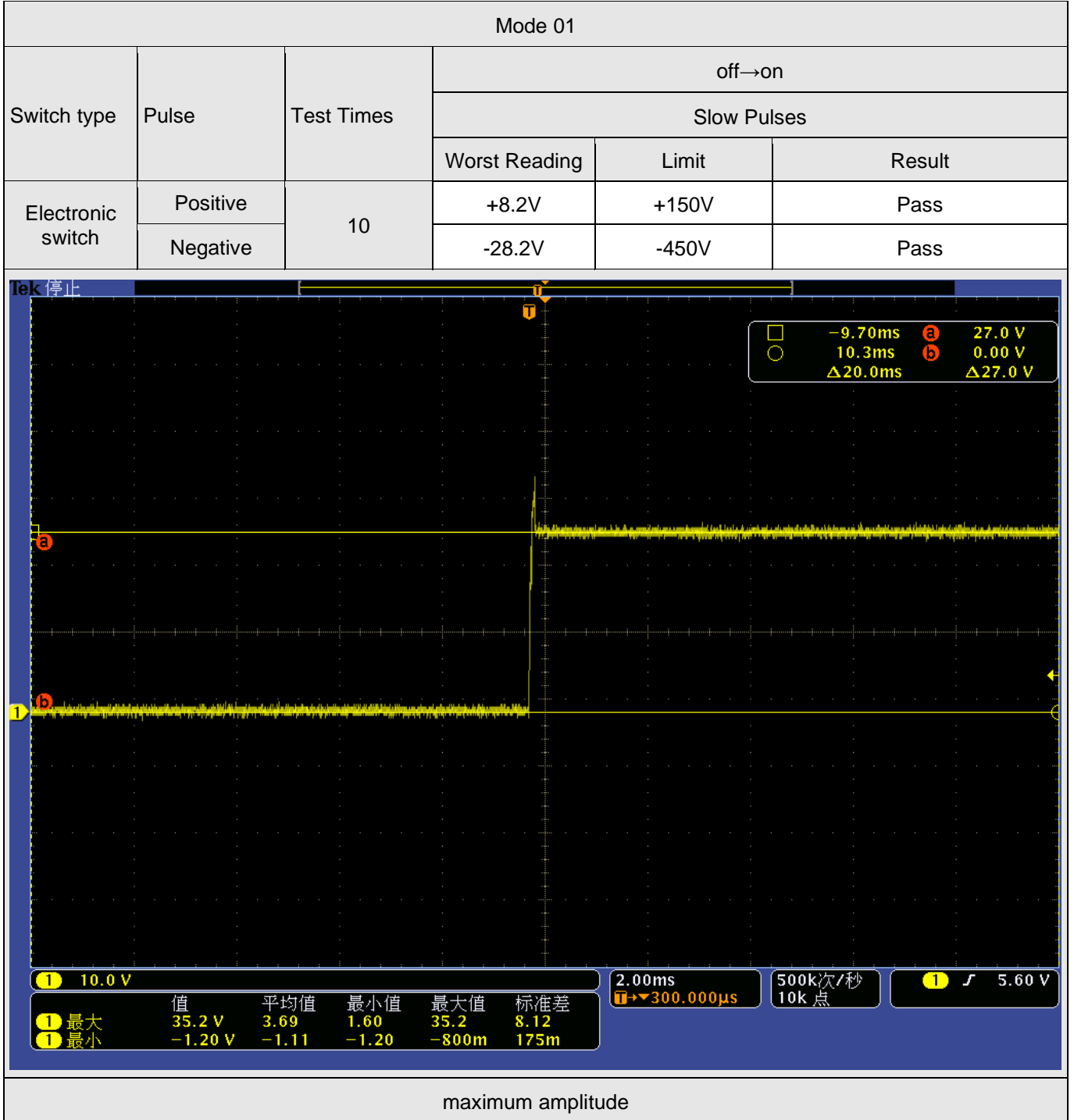


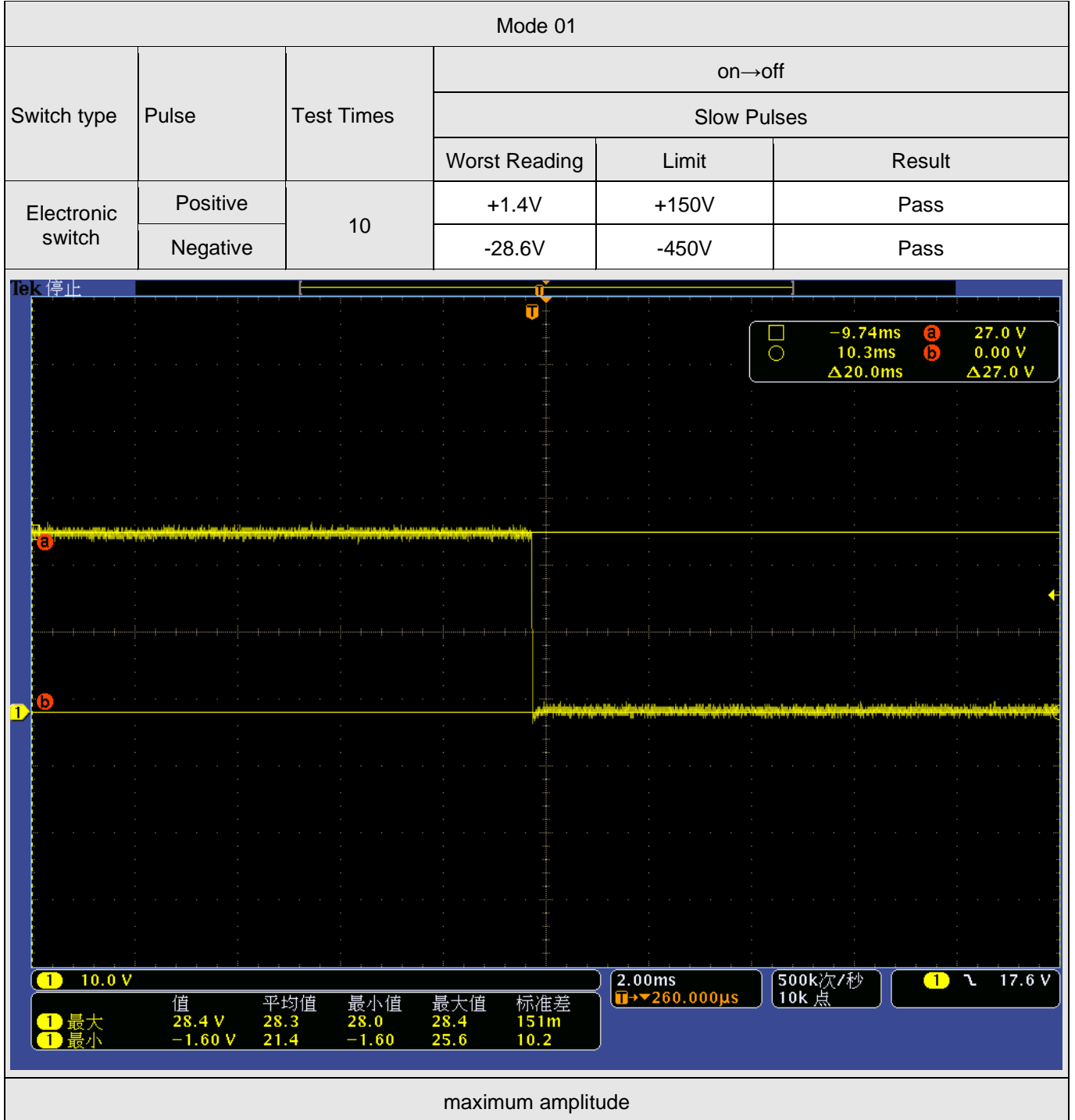
Mode 01					
Switch type	Pulse	Test Times	on→off		
			Fast Pulses		
			Worst Reading	Limit	Result
Electronic switch	Positive	10	+1V	+150V	Pass
	Negative		-28.6V	-450V	Pass



maximum amplitude







7 Immunity Test Results

Performance Criteria Description in ECE R10-06, ISO 7637-2:2004, ISO 11452-2:2004 and ISO 11452-4:2011.

- Criterion A** All functions of a device/system perform as designed during and after exposure to disturbance
- Criterion 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
- Criterion 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
- Criterion 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
- Criterion 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



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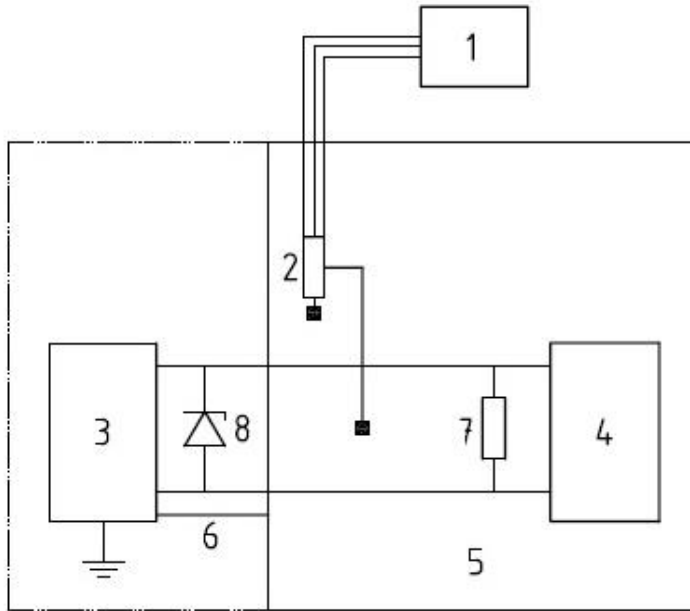
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7.1 Conducted transient immunity

Test Requirement: ECE R10.06
 Test Method: ISO 7637-2:2004
 Test Voltage: DC 13.5V & DC 27V
 Limit: Table 4 of EN50498

7.1.1 Test Setup Diagram



Key

- | | | | |
|---|---|---|--|
| 1 | oscilloscope or equivalent | 5 | ground plane |
| 2 | voltage probe | 6 | Ground connection |
| 3 | test pulse generator with internal power supply | 7 | optional resistor (R_v) ^a |
| | resistance R_i | 8 | optional diode bridge ^b |
| 4 | DUT | | |

7.1.2 E.U.T. Operation

Operating Environment:

Temperature: 25.6 °C Humidity: 48.2 % RH Atmospheric Pressure: 1015 mbar



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7.1.3 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	DC 13.5V Power Supply_Keep EUT working normally.
Final test	01	DC 27V Power Supply_Keep EUT working normally.

7.1.4 Test Condition and Results:

Test Pulse Number	Immunity Test Level	Min. number of pulses or test time	Performance Criterion required	Result / Observations
1	III (Us=-75V)	5000 pulses	C	C
2a	III (Us=+37V)	5000 pulses	B	A
2b	III (Us=+10V)	10 pulses	C	C
3a	III (Us=-112V)	1h	A	A
3b	III (Us=+75V)	1h	A	A
4	III (Us=-6V)	1 pulse	C	A
1	III (Us=-450V)	5000 pulses	C	C
2a	III (Us=+37V)	5000 pulses	B	A
2b	III (Us=+20V)	10 pulses	C	C
3a	III (Us=-150V)	1h	A	A
3b	III (Us=+150V)	1h	A	A
4	III (Us=-12V)	1 pulse	C	A

A: No degradation in the performance of the EUT was observed

C: The EUT resets periodically during the test and manual recovery after the test (comply with DUT logic setting requirements)

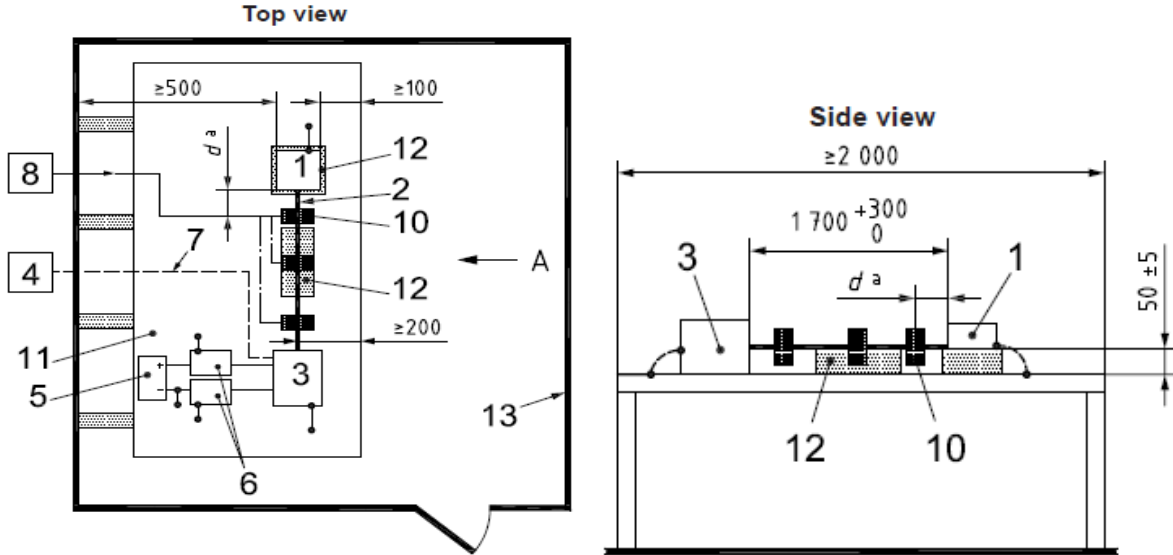


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7.2 Bulk Current Injection(20MHz-400MHz)

Test Requirement: ECE R10.06
 Test Method: ISO 11452-4:2011

7.2.1 Test Setup Diagram



Key

- 1 DUT (connected to ground if specified in the test plan)
- 2 wiring harness (S)
- 3 load simulator (placement and ground connection according to 7.5)
- 4 stimulation and monitoring system
- 5 power supply
- 6 AN
- 7 optical fibres
- 8 high-frequency equipment
- 9 optional current measurement probe (not shown in this figure, but shown in Figure 2)
- 10 injection probe (represented at 3 positions)
- 11 ground plane (connected to the shielded room)
- 12 low relative permittivity support ($\epsilon_r \leq 1,4$)
- 13 shielded room

Figure — Bulk Current Injection configuration — Substitution method

7.2.2 E.U.T. Operation

Operating Environment:

Temperature: 22.6 °C Humidity: 52.0 % RH Atmospheric Pressure: 1015 mbar

7.2.3 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	DC 13.5V Power Supply_Keep EUT working normally.
Final test	01	DC 27V Power Supply_Keep EUT working normally.



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7.2.4 Test Condition and Results:

Frequency (MHz)	Test Level (mA)	Test Location	Step Size	Dwell Time	Result / Observations
20~400	60	15cm	5%	2s	A
A: No degradation in the performance of the EUT was observed					



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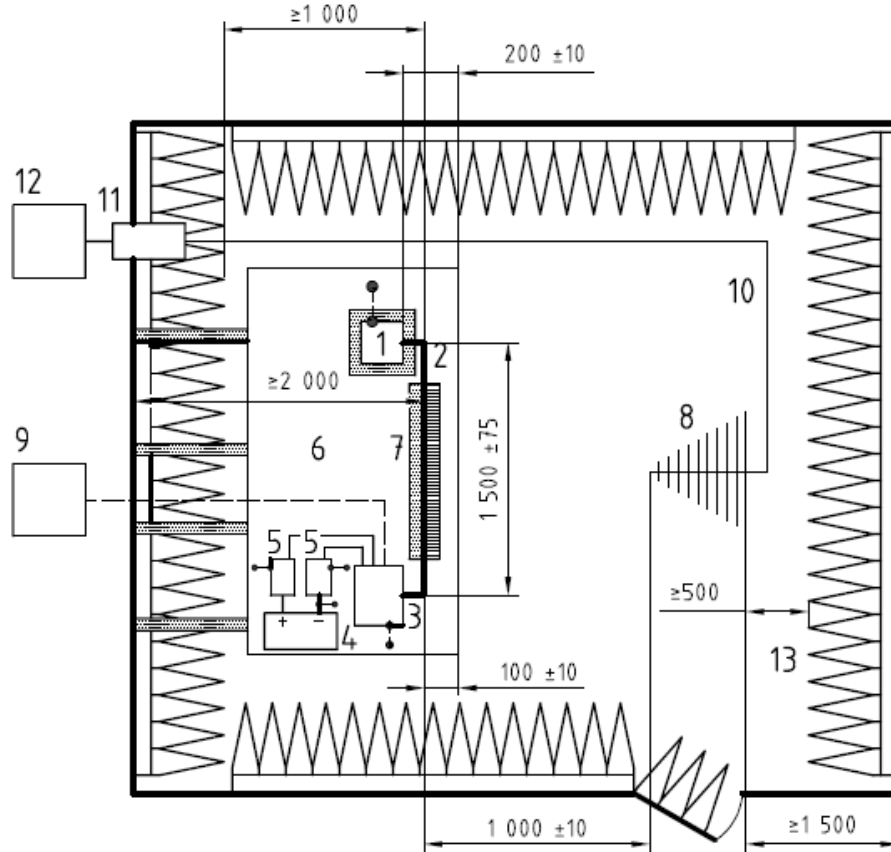
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7.3 Radiation immunity-ALSE(400MHz-2GHz)

Test Requirement: ECE R10.06
 Test Method: ISO 11452-2:2004

7.3.1 Test Setup Diagram



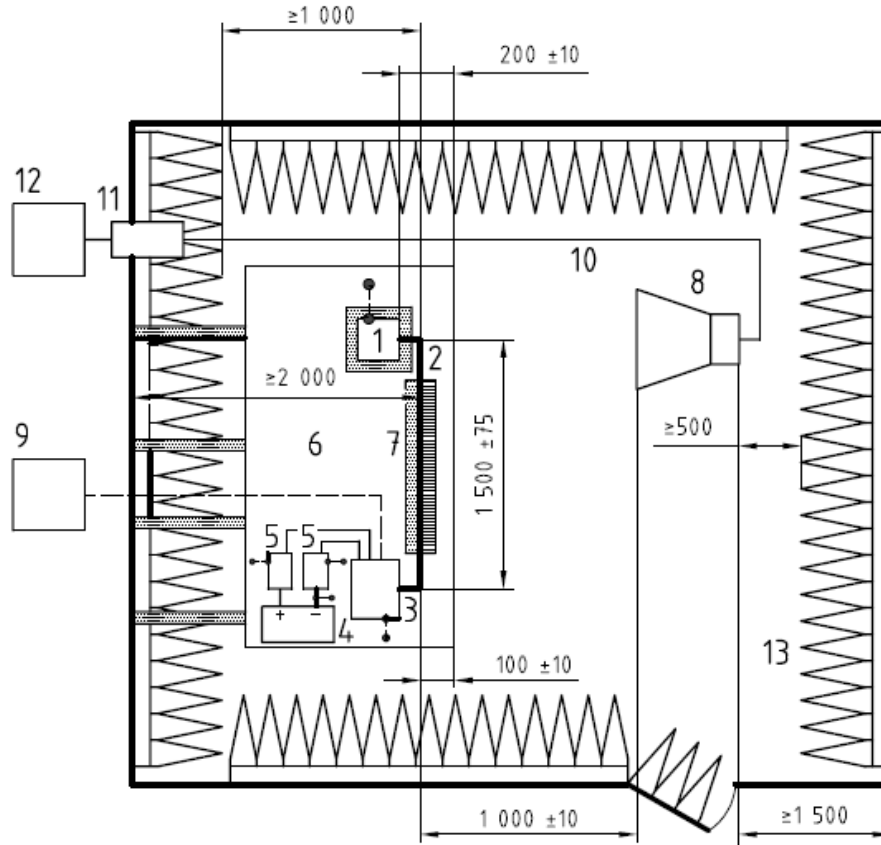
Key

- | | | |
|--|---|--|
| 1 DUT (grounded locally if required in test plan) | 6 ground plane (bonded to shielded enclosure) | 10 high quality double-shielded coaxial cable (50 Ω) |
| 2 test harness | 7 low relative permittivity support ($\epsilon_r \leq 1.4$) | 11 bulkhead connector |
| 3 load simulator (placement and ground: connection according to 7.5) | 8 log-periodic antenna | 12 RF signal generator and amplifier |
| 4 power supply (location optional) | 9 stimulation and monitoring system | 13 RF absorber material |
| 5 artificial network (AN) | | |

Figure — Example test set-up — Log-periodic antenna



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Key

- | | |
|--|---|
| 1 DUT (grounded locally if required in test plan) | 7 low relative permittivity support ($\epsilon_r \leq 1,4$) |
| 2 test harness | 8 horn antenna |
| 3 load simulator (placement and ground: connection according to 7.5) | 9 stimulation and monitoring system |
| 4 power supply (location optional) | 10 high quality double-shielded coaxial cable (50 Ω) |
| 5 artificial network (AN) | 11 bulkhead connector |
| 6 ground plane (bonded to shielded enclosure) | 12 RF signal generator and amplifier |
| | 13 RF absorber material |

Figure — Example test set-up for frequencies above 1 GHz — Horn antenna

7.3.2 E.U.T. Operation

Operating Environment:

Temperature: 22.6 °C

Humidity: 52.0 % RH

Atmospheric Pressure: 1015 mbar



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7.3.3 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	DC 13.5V Power Supply_Keep EUT working normally.
Final test	01	DC 27V Power Supply_Keep EUT working normally.

7.3.4 Test Condition and Results:

Frequency (MHz)	Test Level (V/m)	EUT Face	Step Size	Dwell time	Result / Observations
400~800	30	Front	2%	2s	A
800~2000	30	Front	2%	2s	A

A: No degradation in the performance of the EUT was observed



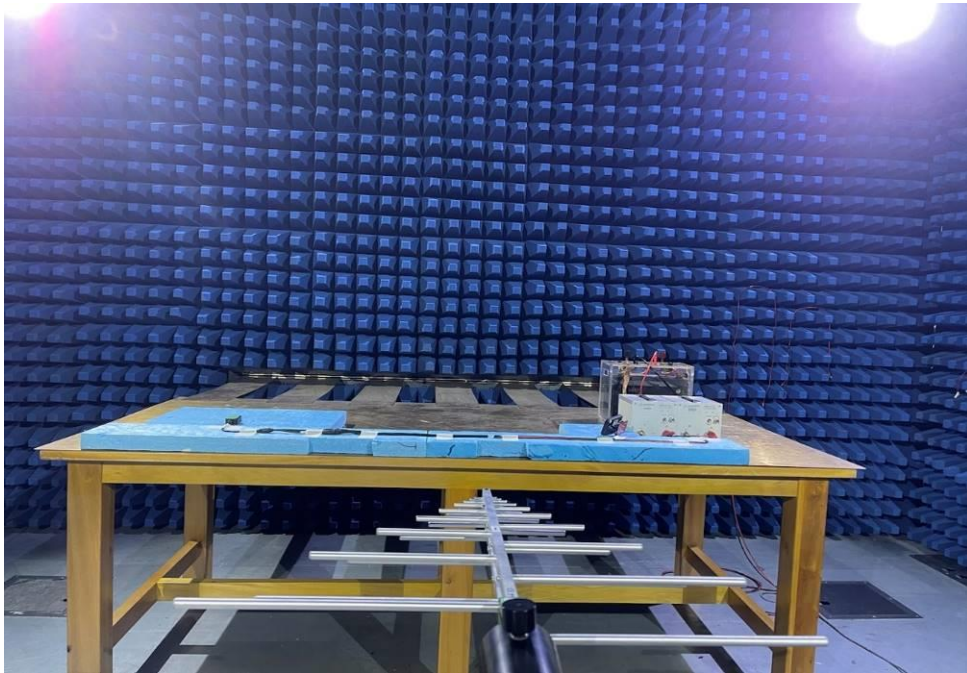
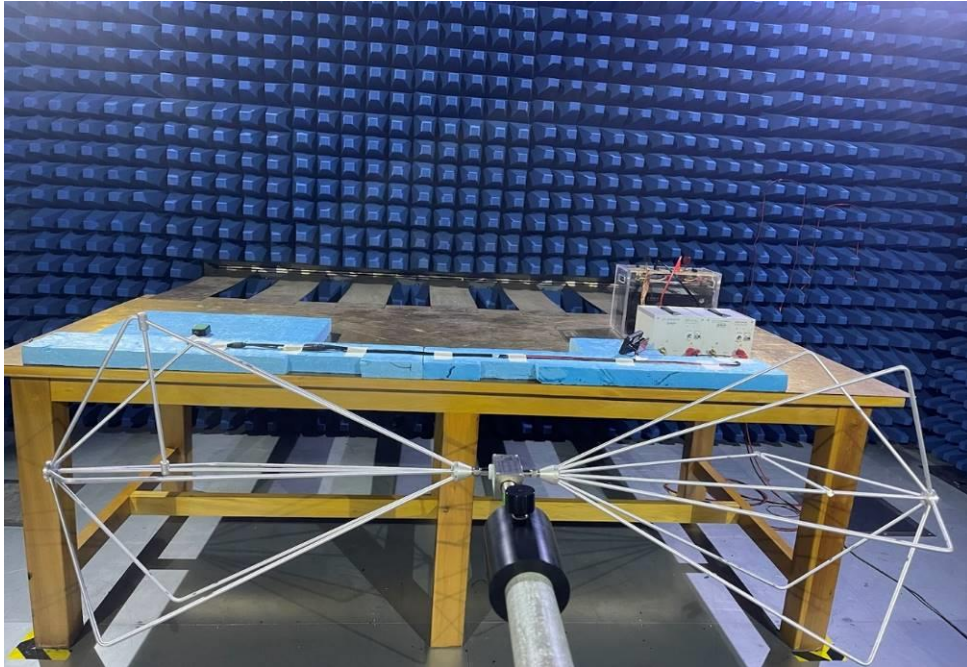
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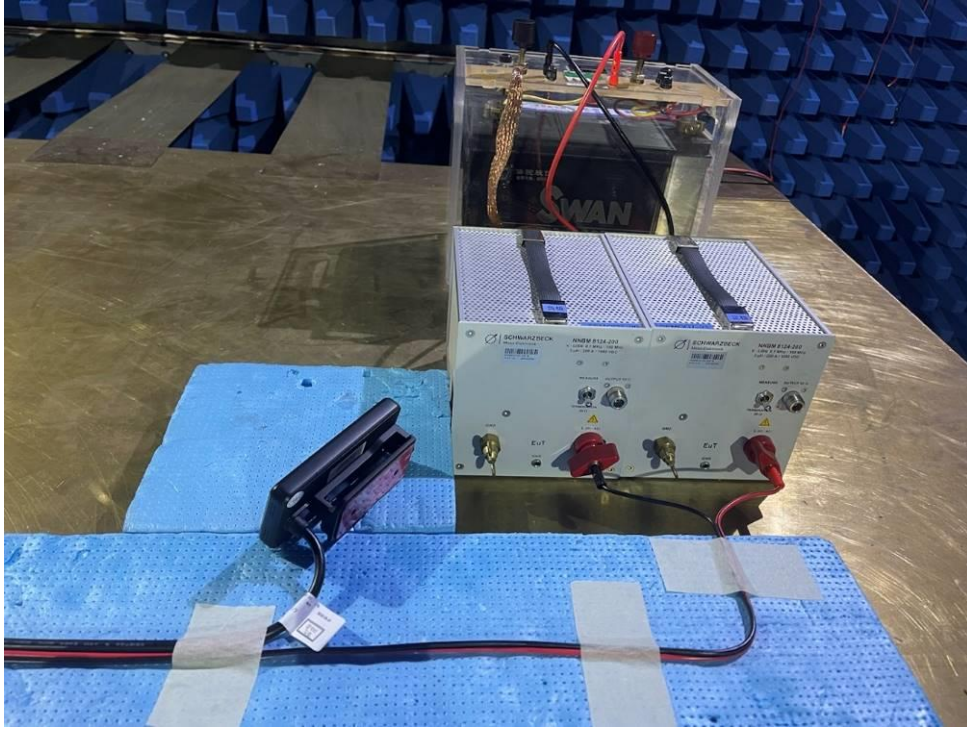
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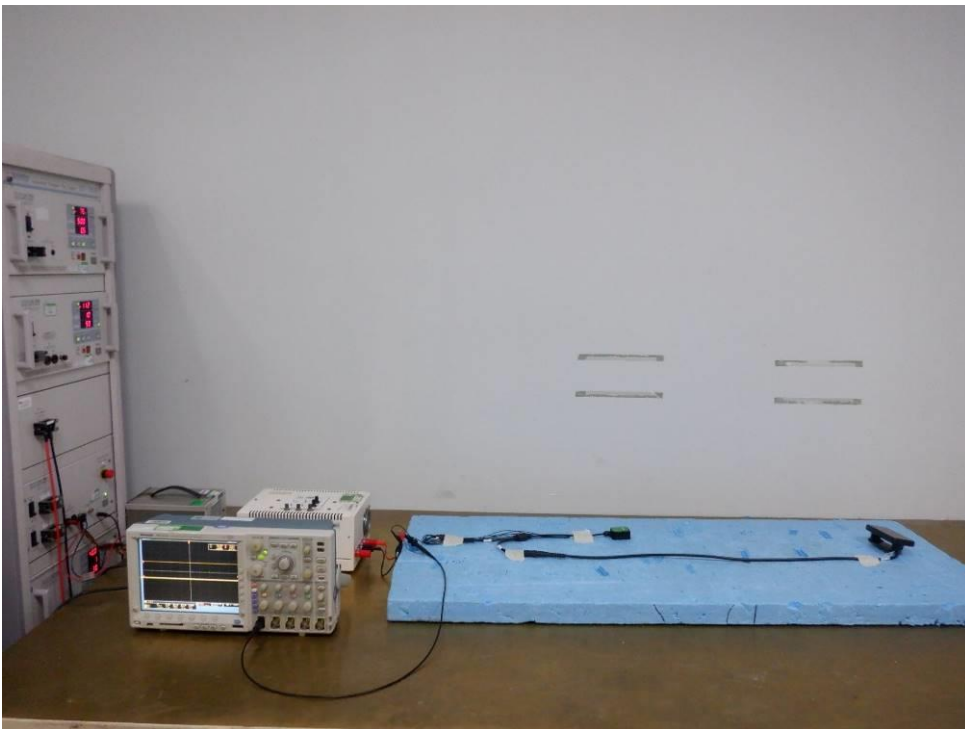
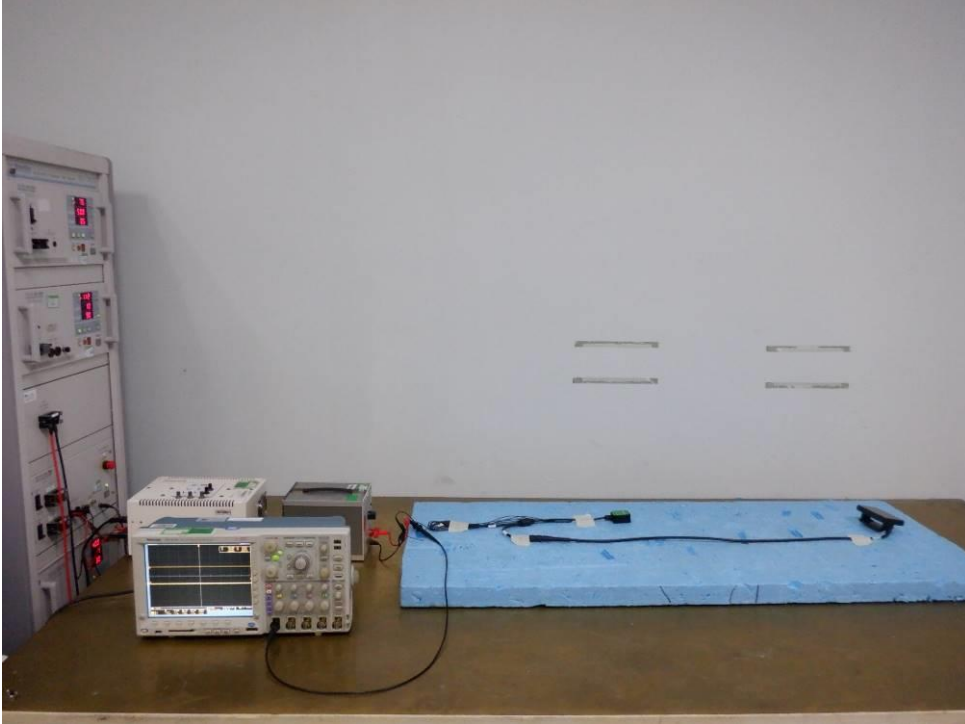
8 Test Setup Photo

Radiated Emission(30MHz-1GHz)





Conducted transient disturbances



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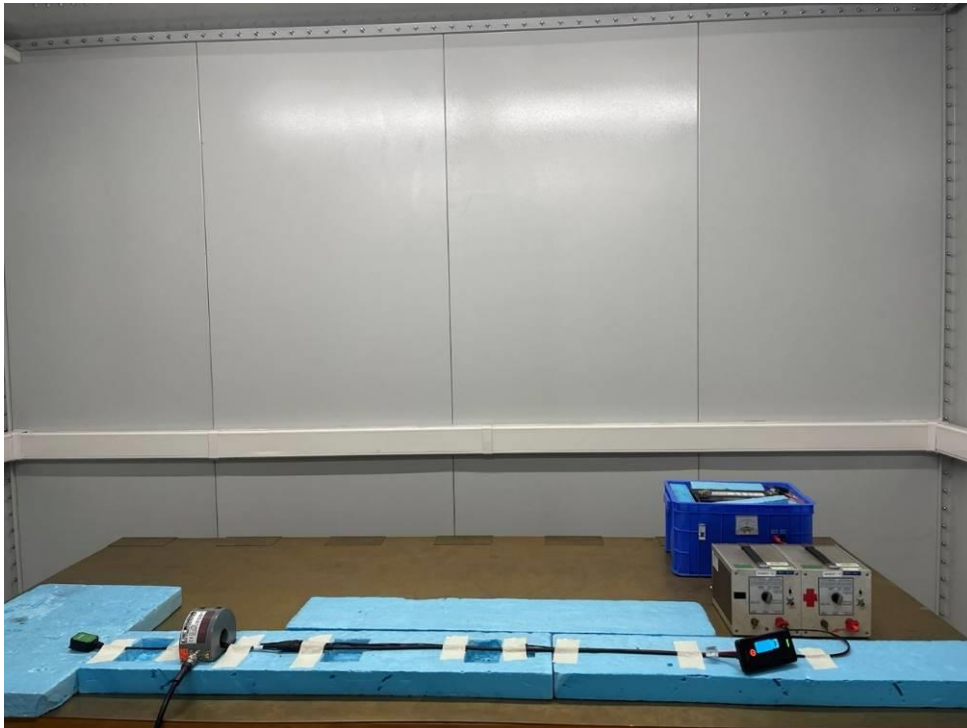
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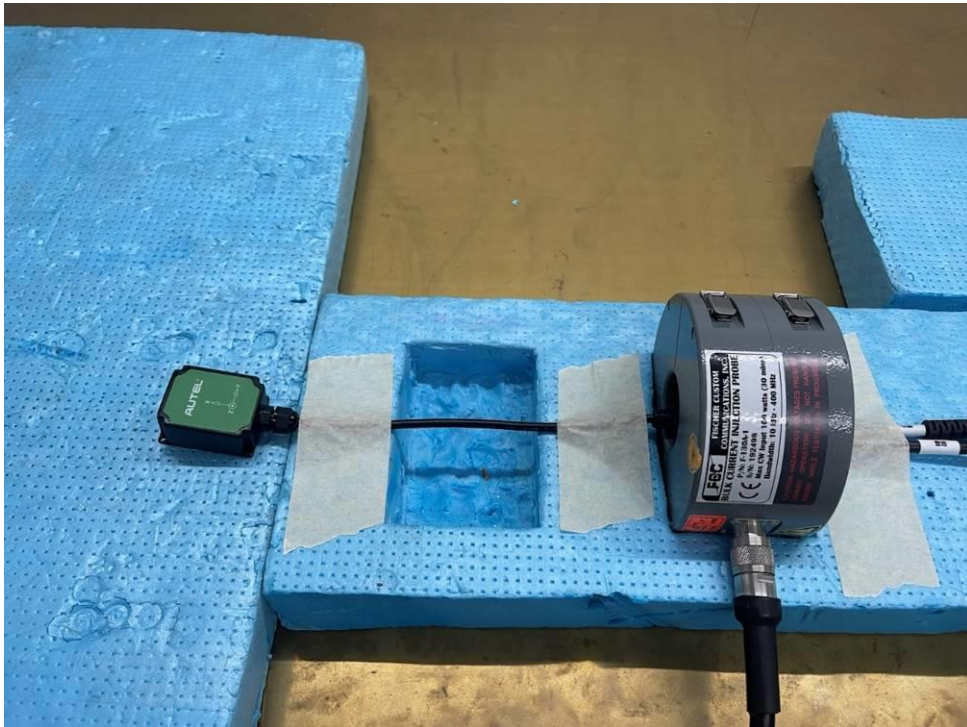
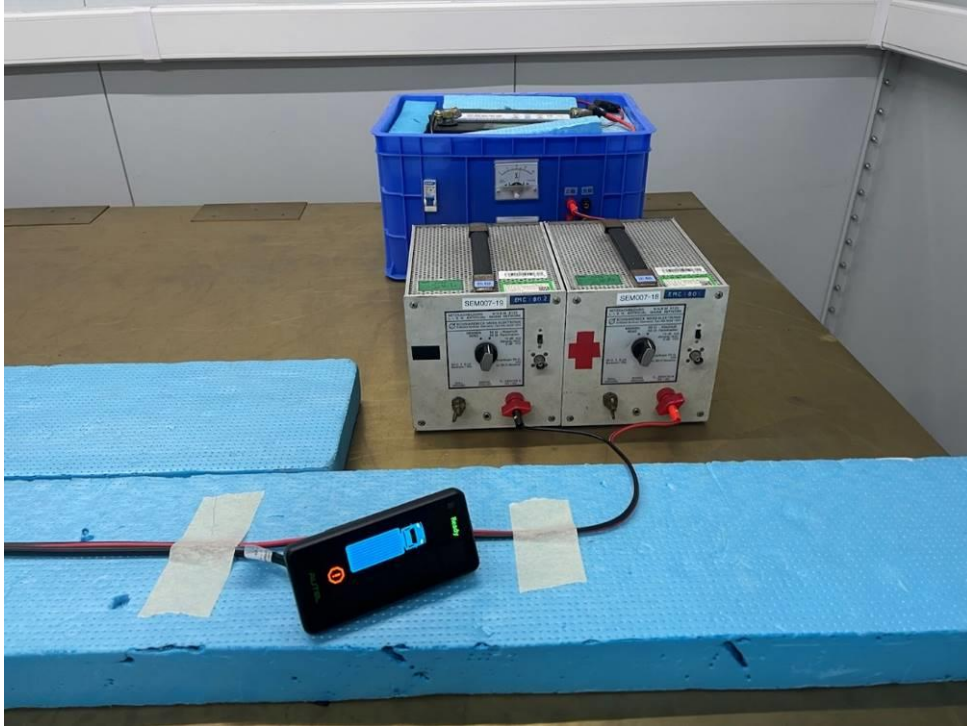
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Conducted transient immunity



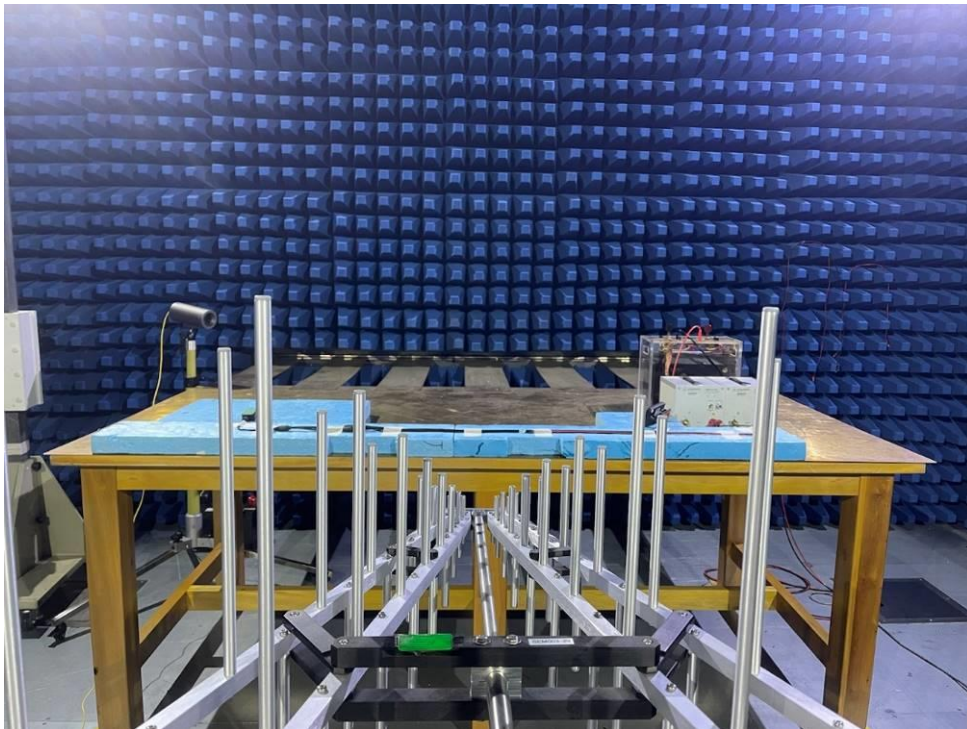
Bulk Current Injection(20MHz-400MHz)







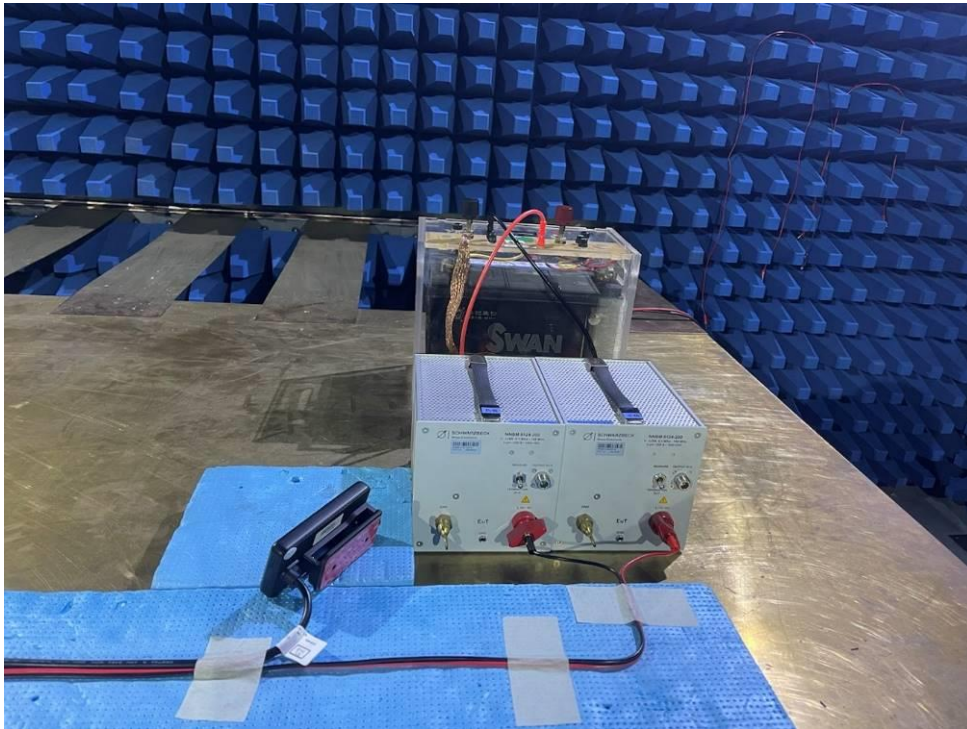
Radiation immunity-ALSE(400MHz-2GHz)

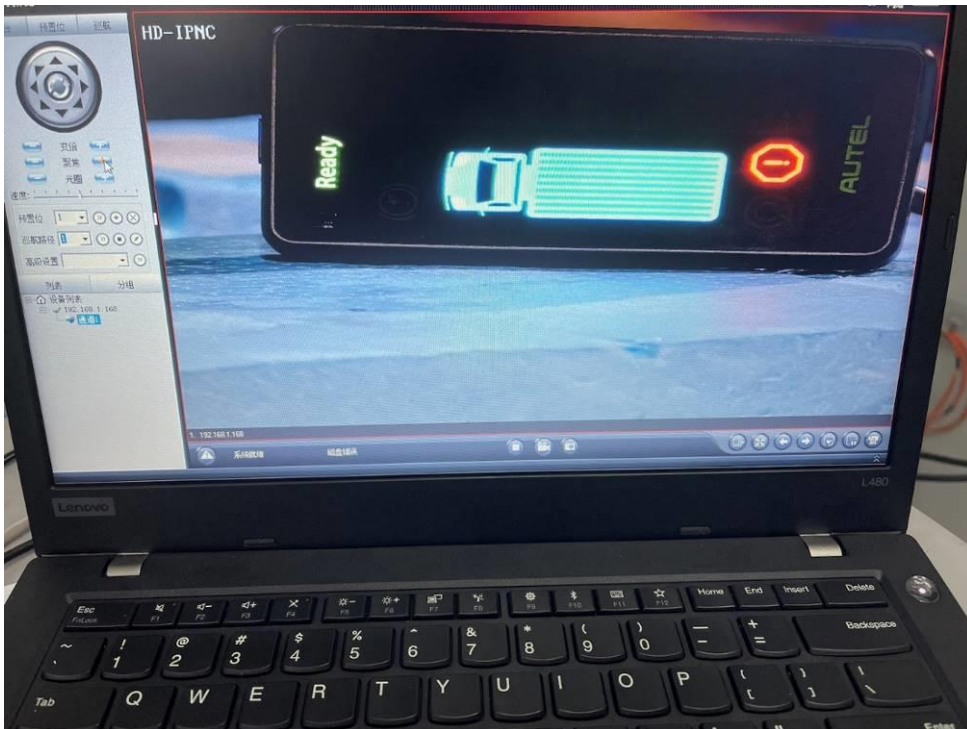
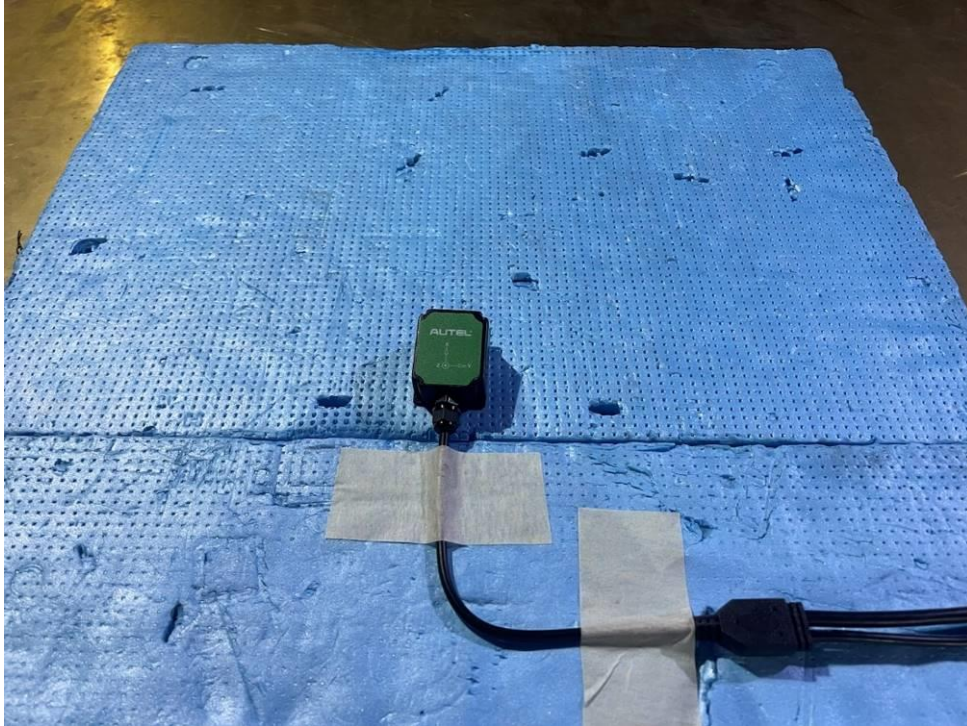


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9 EUT Construnctional Details (EUT Photos)



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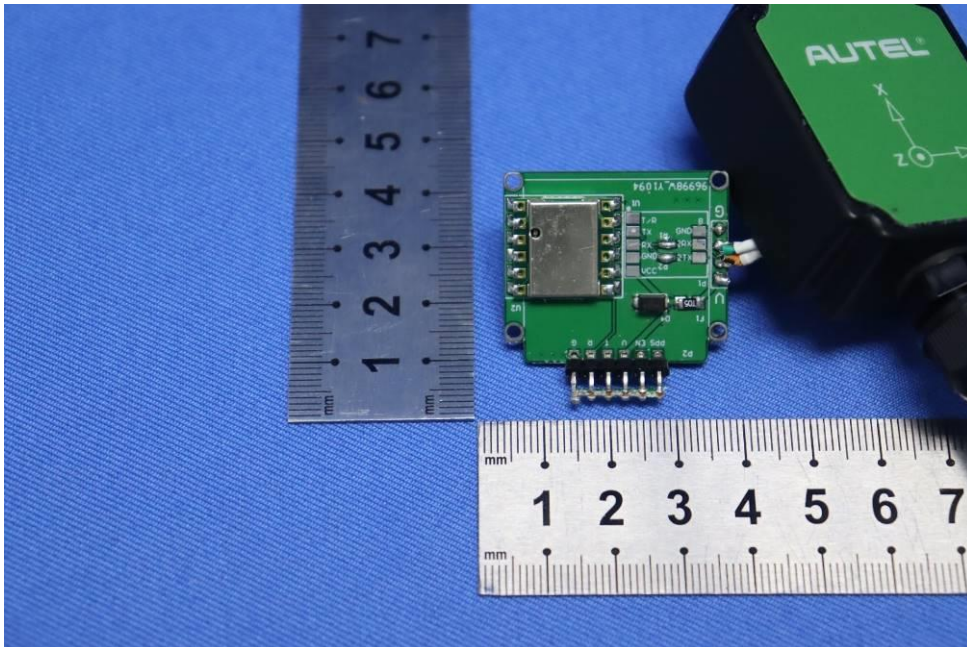
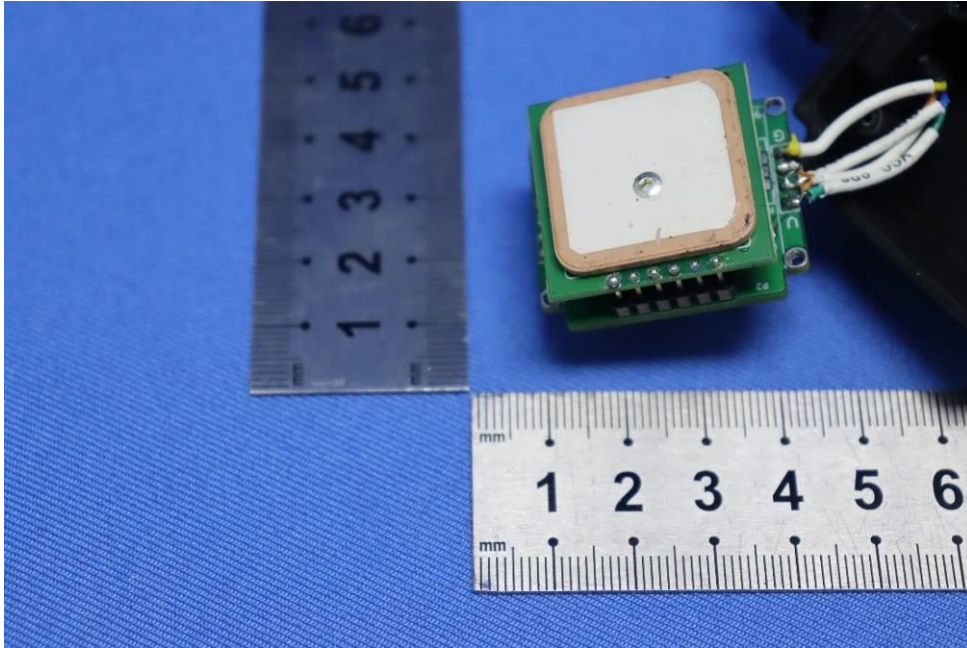
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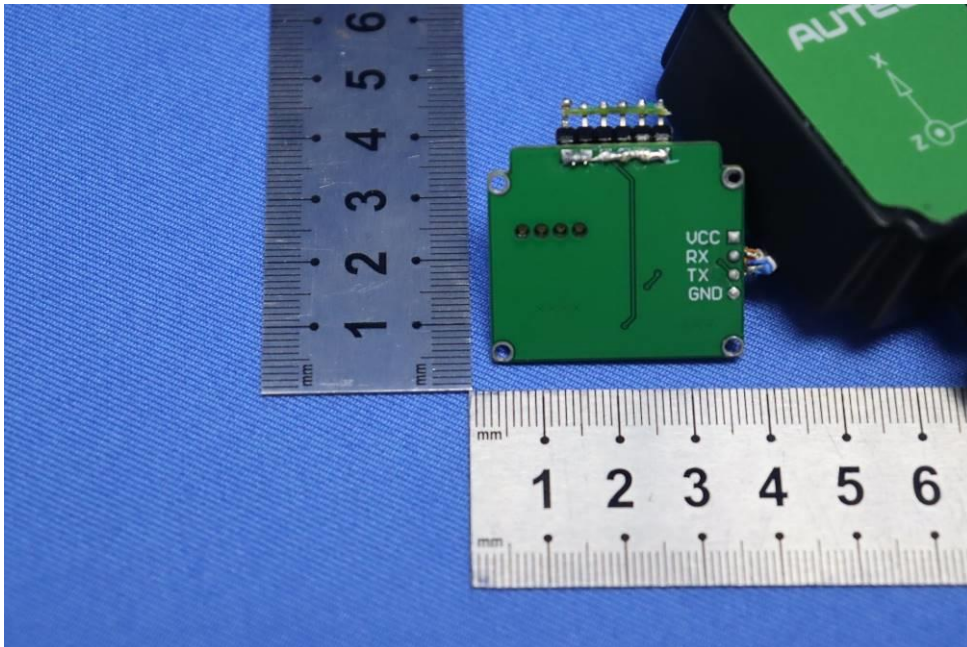
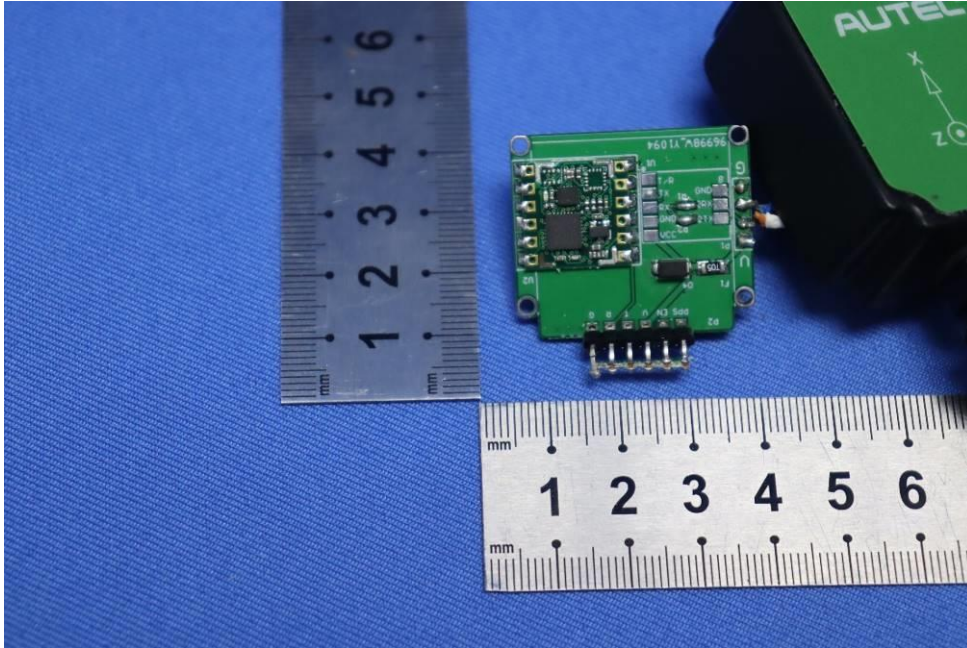


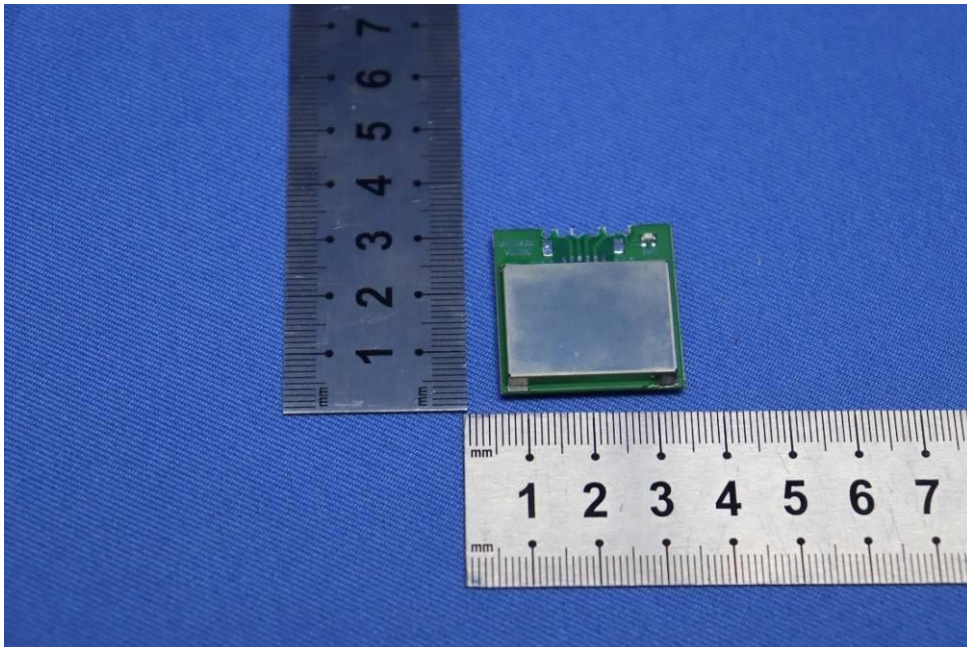
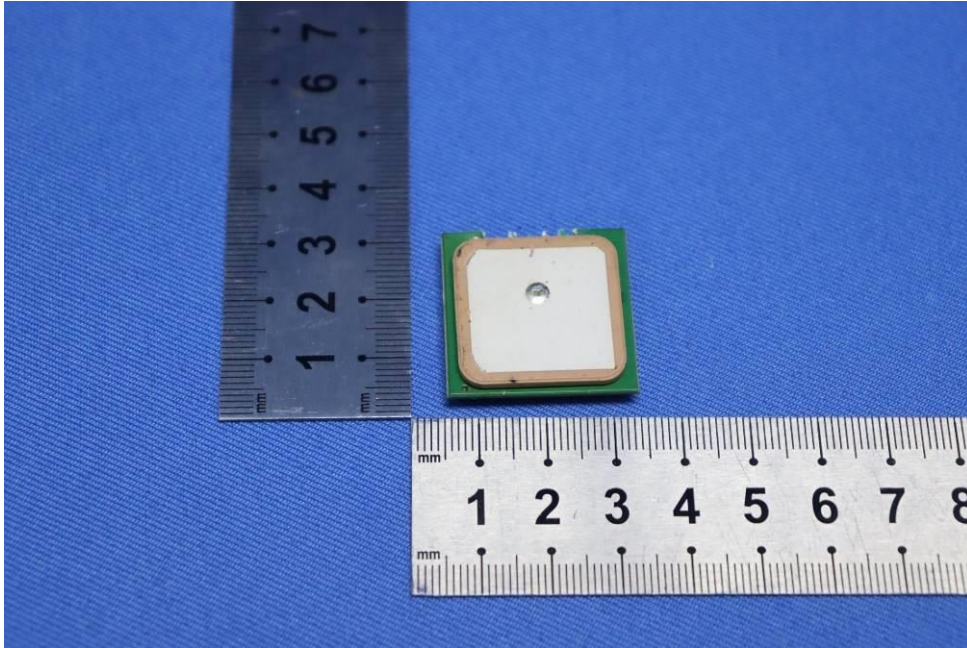
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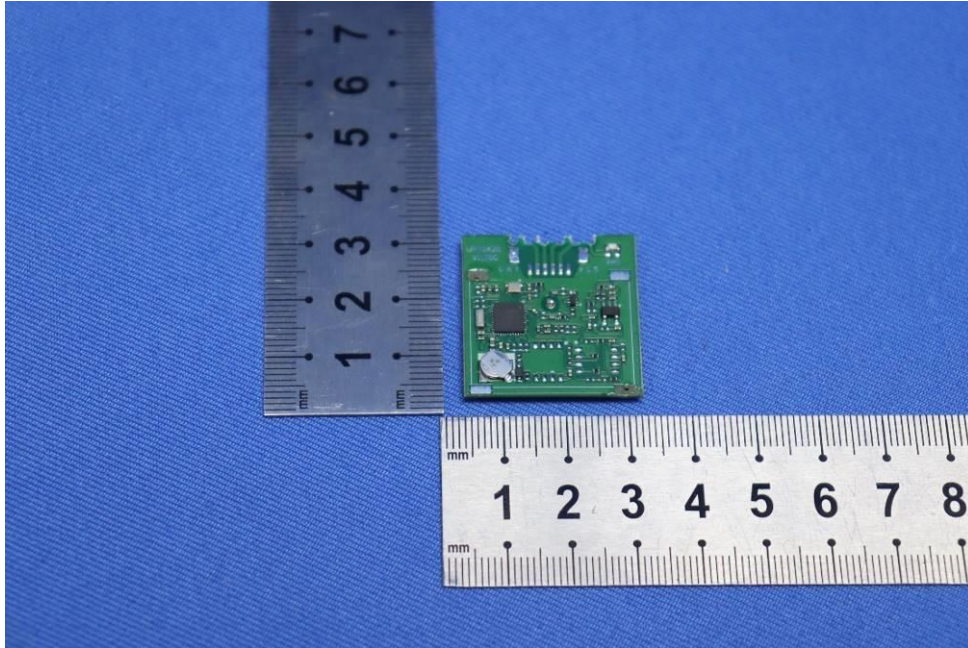
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- End of the Report -

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		Date: 25.08.2022
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Application for Type Approval Pursuant
To ECE R10.06
Relating to Electromagnetic compatibility of an ESA


For: Autel Intelligent Automobile Corp., Ltd.

Component: IMU module

Type: ASI-100

Place: Floor 8, Floor 7 and Floor 4, Building B1, Zhiyuan, No.1001 Xueyuan Avenue, Changyuan Community, Taoyuan Road, Nanshan District Shenzhen City, Guangdong Province, P.R. China


Post Code: 518055

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- | | | |
|------|--|---|
| 1. | Make (trade name of manufacturer) | Autel |
| 2. | Type | ASI-100 |
| 2.1. | Variant | n.a. |
| 3. | Means of identification of type, if marked on the component/separate technical unit | Type Designation |
| 3.1. | Location of that marking | On the bottom of the product |
| 4. | Name and address of manufacturer | Autel Intelligent Automobile Corp., Ltd.

Floor 8, Floor 7 and Floor 4, Building B1, Zhiyuan, No.1001 Xueyuan Avenue, Changyuan Community, Taoyuan Road, Nanshan District Shenzhen City, Guangdong Province, P.R. China Post Code: 518055 |
| | Name and address of authorized representative, if any | n.a. |
| 5. | In the case of components and separate technical units, location and method of affixing of the approval mark | adhesive label on the bottom of the product |
| 6. | Address (es) of assembly plant(s) | Autel Intelligent Automobile Corp., Ltd.

Workroom 103 104. 105. 106. 108. 1st Floor, Building A9, Tianliao Industrial Zone, Taoyuan Road, Nanshan District, Shenzhen City, Guangdong Province, P.R. China |
| 7. | This ESA shall be approved as a | Component |
| 8. | Any restrictions of use and conditions for fitting | Supports installation in any direction (sensor inclination should not exceed 30°). |

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9.	Electrical system rated voltage	DC12V/24V negative grounded
10.	Charger: on board/external	n.a.
11.	Charging current: direct current/alternating current (number of phases/frequency)	n.a.
12.	Maximal nominal current (in each mode if necessary)	n.a.
13.	Nominal charging voltage	n.a.
14.	Basic ESA interface functions:	n.a.
15.	Minimum Rsce value (see paragraph 7.11. of this Regulation)	n.a.

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Appendix 1: Description of the ESA

1. Input range : DC5V via IMU DC12V/24V power supply
2. Consumption power : <0.25W
3. Resource of X-tal or oscillator : n.a.
4. Main dimensions : 40X50X21.9mm
- 5 Description/Manual:
 - 1) Voltage: 5V
 - 2) Current: <50mA
 - 3) .Measurement dimensions: acceleration: 3 dimensions, angular velocity: 3 dimensions, angle: 3 dimensions, GPS: 3 dimensions
 - 4) Range: XZ axis angle $\pm 180^\circ$, Y axis angle $\pm 90^\circ$.
 - 5) Stability: Acceleration: 0.01g, angular velocity 0.05°/s.
 - 6) Attitude measurement stability: 0.01°.
 - 7) Angle accuracy: static 0.05°, dynamic 0.1°.
 - 8) Data output content: time, acceleration, angular velocity, angle, latitude and longitude, ground speed.
 - 9) Data output frequency 0.2Hz~200Hz.
 - 10) Data interface: serial port (TTL level, baud rate supports 4800, 9600, 19200, 38400, 57600, 115200, 230400, 460800, 921600)
 - 11) GPS: GPS+Beidou signal
 - 12) Applicable environment: dynamic and static.
 - 13) Antenna: Built-in.

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14) Inertial Navigation: Built-in inertial navigation algorithm

Content			
C/A code	1.023mhz stream		
Receive band	BDS/GPS/GLONASS/GALILEO/QZSS/SBAS		
Receive channel	3-channel RF, support BDS, GPS and GLONASS simultaneous reception		
S11SWR	≤1.3	S22SWR	≤1.3
S2Log Mag	≥20.0dB	S11Smith	50Ω±5%
Horizontal position accuracy	<2.5m{autonomous}<2m{sbas} (cep,50%,24h static, signal strength, -130dbm, about 6 available satellites)		
Rate	<0.1m/s		<0.5Degrees
Timing accuracy	30ns	Reference coordinate system	WGS-84
Altitude range	50000m	Max speed	50000m/s
Acceleration:	≤4g		
Track sensitivity	-162dbm	Capture sensitivity	-148dbm
Cold start sensitivity	-148dmb	Hot start sensitivity	-156dbm
Cold start time	35s	Warm start time	32S
Hot start time	1s		
Clock pulse	0.25Hz~1Khz		
Location rate	1Hz~110Hz (Default 1Hz) UART/TTLPort interface		

Inertial measurement unit (IMU for short) is a device that measures the three-axis attitude angle (or angular rate) and acceleration of an object

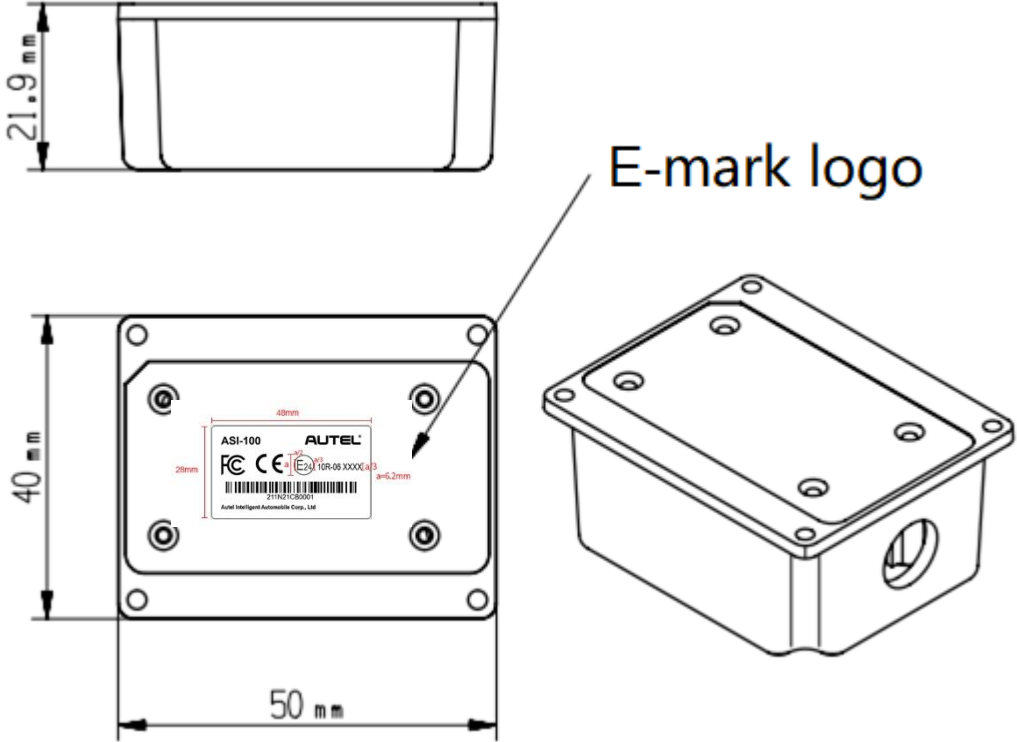
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Attachment 1: Photo of the ESA



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Attachment 2: Dimensional drawing





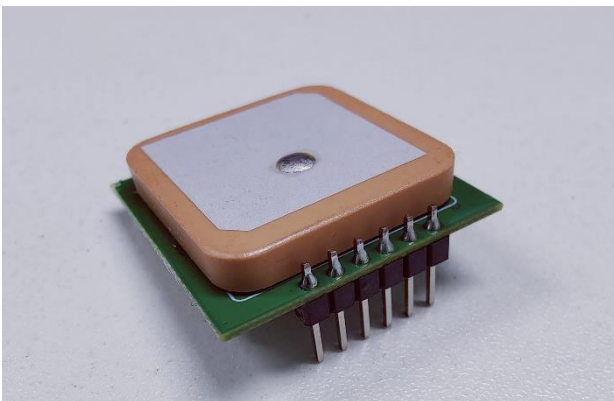
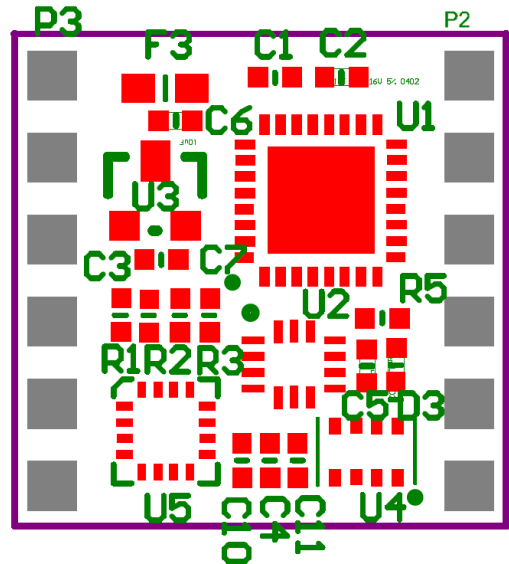
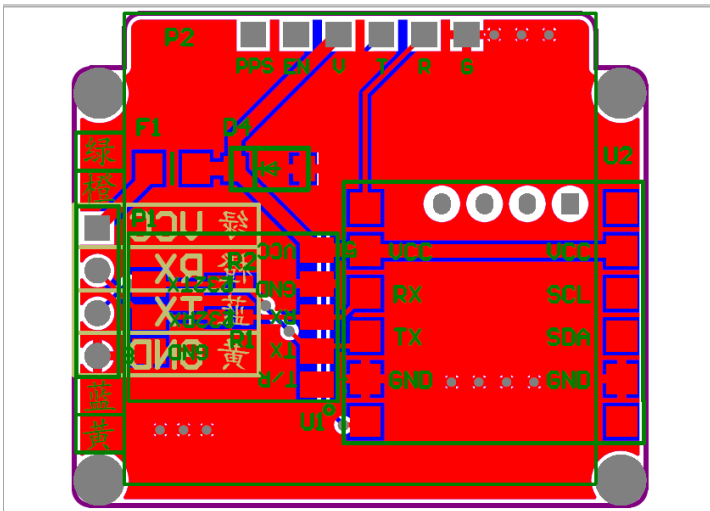
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Attachment 3: Photo of the PCB





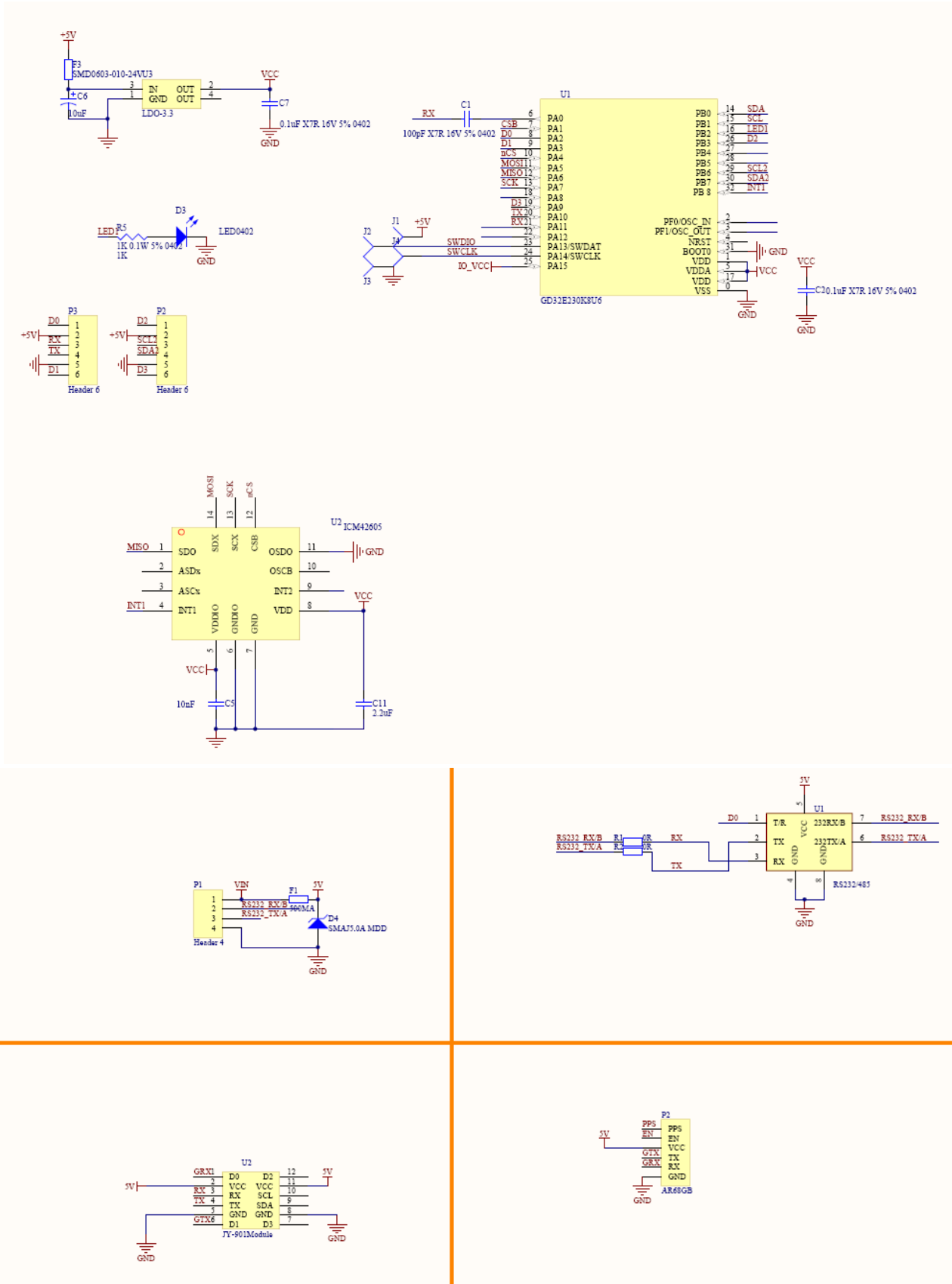
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Attachment 4: Electric Circuit Diagram



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Attachment 5: Bill of Materials

SMAJ5.0A MDD	Zener Diode	D4	sma	D Zener	1
500MA 保险丝	Resistor	F1	1206	Res2	1
Header 4	Header, 4-Pin	P1	HDR1X4	Header 4	1
GPS-Module	Header, 6-Pin	P2	GPS	Header 6	1
0R	Resistor	R1, R2	0603	Res2	2
RS232/485		U1	232-485	RS232/485	1
JY-901Module	JY-901	U2	JY901S	JY-901	1