

Prüfbericht-Nr.: Test report no.:	50116607 002	Auftrags-Nr.: Order no.:	168467668	Seite 1 von 15 Page 1 of 15
Kunden-Referenz-Nr.: Client reference no.:	2066780	Auftragsdatum: Order date:	2024-01-19	
Auftraggeber: Client:	UNI-TREND TECHNOLOGY (CHINA) CO., LTD. No 6, Gong Ye Bei 1st Road, Songshan Lake National High-Tech Industrial Development Zone, Dongguan City, Guangdong, P. R. China			
Prüfgegenstand: Test item:	Professional Multimeter			
Bezeichnung / Typ-Nr.: Identification / Type no.:	UT191E, UT191T			
Auftrags-Inhalt: Order content:	TUV Rheinland - EMC service			
Prüfgrundlage: Test specification:	EN IEC 61326-1:2021 EN IEC 61326-2-2:2021 EN 55015:2019+A11 EN IEC 61547:2023			
Wareneingangsdatum: Date of sample receipt:	2024-01-23			
Prüfmuster-Nr.: Test sample no.:	A003649000-002			
Prüfzeitraum: Testing period:	Refer to test report			
Ort der Prüfung: Place of testing:	Refer to section 2.1			
Prüflaboratorium: Testing laboratory:	TÜV Rheinland (Shenzhen) Co., Ltd.			
Prüfergebnis*: Test result*:	Pass			
geprüft von: tested by: Kevin Zhou		genehmigt von: authorized by: Felix Tao		
Datum: Date: 2024-03-21		Ausstellungsdatum: Issue date: 2024-03-21		
Stellung / Position:	Project Engineer	Stellung / Position:	Reviewer	
Sonstiges / Other:	This report is issued for standards upgrade as above based on previous report 50116607 001. After evaluation, additional RS & RE tests according to the new test requirements were carried out again, for other test results, refer to previous test report 50116607 001 for details, standard upgrade will not influence the test conclusion.			
Zustand des Prüfgegenstandes bei Anlieferung: Condition of the test item at delivery:	Prüfmuster vollständig und unbeschädigt Test item complete and undamaged			
* Legende: P(ass) = entspricht o.g. Prüfgrundlage(n) F(ail) = entspricht nicht o.g. Prüfgrundlage(n) N/A = nicht anwendbar N/T = nicht getestet				
* Legend: P(ass) = passed a.m. test specification(s) F(ail) = failed a.m. test specification(s) N/A = not applicable N/T = not tested				
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. This test report only relates to the above mentioned test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.				

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Anmerkungen <i>Remarks</i>		
1	Alle eingesetzten Prüfmittel waren zum angegebenen Prüfzeitraum gemäß eines festgelegten Kalibrierungsprogramms unseres Prüfhauses kalibriert. Sie entsprechen den in den Prüfprogrammen hinterlegten Anforderungen. Die Rückverfolgbarkeit der eingesetzten Prüfmittel ist durch die Einhaltung der Regelungen unseres Managementsystems gegeben. Detaillierte Informationen bezüglich Prüfkonditionen, Prüfequipment und Messunsicherheiten sind im Prüflabor vorhanden und können auf Wunsch bereitgestellt werden. <i>The equipment used during the specified testing period was calibrated according to our test laboratory calibration program. The equipment fulfils the requirements included in the relevant standards. The traceability of the test equipment used is ensured by compliance with the regulations of our management system. Detailed information regarding test conditions, equipment and measurement uncertainty is available in the test laboratory and could be provided on request.</i>	
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3	Prüfklausel mit der Note * wurden an qualifizierte Unterauftragnehmer vergeben und sind unter der jeweiligen Prüfklausel des Berichts beschrieben. Abweichungen von Prüfspezifikation(en) oder Kundenanforderungen sind in der jeweiligen Prüfklausel im Bericht aufgeführt. <i>Test clauses with remark of * are subcontracted to qualified subcontractors and described under the respective test clause in the report.</i> <i>Deviations of testing specification(s) or customer requirements are listed in specific test clause in the report.</i>	
4	Die Entscheidungsregel für Konformitätserklärungen basierend auf numerischen Messergebnissen in diesem Prüfbericht basiert auf der "Null-Grenzwert-Regel" und der "Einfachen Akzeptanz" gemäß ILAC G8:2019 und IEC Guide 115:2021, es sei denn, in der auf Seite 1 dieses Berichts genannten angewandten Norm ist etwas anderes festgelegt oder vom Kunden gewünscht. Dies bedeutet, dass die Messunsicherheit nicht berücksichtigt wird und daher auch nicht im Prüfbericht angegeben wird. Zu weiteren Informationen bezüglich des Risikos durch diese Entscheidungsregel siehe ILAC G8:2019. <i>The decision rule for statements of conformity, based on numerical measurement results, in this test report is based on the "Zero Guard Band Rule" and "Simple Acceptance" in accordance with ILAC G8:2019 and IEC Guide 115:2021, unless otherwise specified in the applied standard mentioned on Page 1 of this report or requested by the customer. This means that measurement uncertainty is not taken in account and hence also not declared in the test report. For additional information to the resulting risk based of this decision rule please refer to ILAC G8:2019.</i>	

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TEST SUMMARY

5.1.1 RADIATED ELECTROMAGNETIC DISTURBANCES

RESULT: Passed

6.2.1 RADIO-FREQUENCY ELECTROMAGNETIC FIELD AMPLITUDE MODULATED (RS)

RESULT: Passed

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1. General Remarks

1.1 Complementary Materials

All attachments are integral parts of this test report. This applies especially to the following appendix:

Appendix 1: Test Result

Appendix 2: Measurement Uncertainties

2. Test Sites

2.1 Test Facilities

TÜV Rheinland (Shenzhen) Co., Ltd. EMC Testing Center

No. 362 Huanguan Road Middle, Longhua District 518110, Shenzhen, P.R. China

2.2 List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment

Kind of Equipment	Manufacturer	Type	S/N	Calibrated until
Radiated Immunity (TÜV)				
3m FAC	ETS-Lindgren	FAC3	CT001632-Q1360	2024-04-26
Signal Generator	R&S	SMB100A	115183	2024-07-30
Power Amplifier	R&S	BBA150-BC250	103102	2024-07-31
Power Amplifier	R&S	BBA150-D110E100	103117	2024-08-27
NRP6AN Average power sensor	R&S	NRP6AN	101161	2024-07-30
NRP6AN Average power sensor	R&S	NRP6AN	101162	2024-07-30
Stacked double Log.-Per. Antenna1825022	SCHWARZB ECK	STLP 9128E	0153	2024-12-29
Stacked Log.-Per. Antenna	SCHWARZB ECK	STLP 9149	00520	2024-12-29
EMC32 test software	R&S	EMC32(Ver.10.3 0.01)	N/A	N/A
Radiated Emission (TÜV)				
3m SAC	ETS-Lindgren	SAC3	CT001632-Q1362	2024-04-26
EMI Test Receiver	R&S	ESR7	102111	2024-11-09
Trilog-Broadband antenna	SCHWARZB ECK	VULB9168	0945	2024-08-19
EMC32 test software	R&S	EMC32(Ver.10.6 0.20)	N/A	N/A

3. General Product Information

3.1 Product Function and Intended Use

The EUT (Equipment Under Test) is Professional Multimeter for portable use.
Both models have similar circuit and PCB layout except function and model name for market.

Type No. Features	UT191E	UT191T
RANGE change	Auto	Auto
Measurement category	CAT III 600V	CAT III 600V
Voltage measurement	O	O
LOZ Voltage	O	O
Voltage True RMS	O	O
LPF measurement	O	O
Current measurement	O	O
Capacitor measurement	O	O
Resistance measurement	O	O
Continuity check	O	O
Diode measurement	O	O
Temperature measure	X	O
Hz % measurement	O	O
MAX/MIN mode	O	O
HOLD mode	O	O
REL mode	O	O
Sleep mode	O	O
Auto Back light	O	O
Low battery detect	O	O
Bar graph mode	O	O
Display driver	LCD	LCD
Batteries	9Vdc x 1pcs 6F22,1604A or 6LR61 type	
Remark: 'O' this function is available. 'X' this function is not available.		

Modifications:

- 1, standard upgrade from EN 61326-1:2013 to EN IEC 61326-1:2021
- 2, standard upgrade from EN 61326-2-2:2013 to EN IEC 61326-2-2:2021
- 3, standard upgrade from EN 55015:2013+A1 to EN 55015:2019+A11
- 4, standard upgrade from EN 61547:2009 to EN IEC 61547:2023

For more information, refer to the circuit diagram & instruction manual.

3.2 Ratings and System Details

System input voltage: DC 9V (Via build-in battery)

Rated Frequency: ---

Protection class: II (According to the product characteristics)

3.3 Independent Operation Modes

The basic operation modes are:

- A. On
 1. Voltage Measurement
 2. Current Measurement
 3. Resistance Measurement
- B. LED flashlight on mode
- C. Stand by
- D. Off

3.4 Noise Generating and Noise Suppressing Parts

Refer to the Circuit Diagram.

3.5 Submitted Documents

Refer to previous documents submitted by client.

4. Test Set-up and Operation Modes

4.1 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 instructions for use.

Immunity: The equipment under test (EUT) was configured to have its highest possible susceptibility against the tested phenomena. The test modes were adapted accordingly in reference to the instructions for use.

4.2 Test Operation and Test Software

Test operation refers to test setup in section 5 & 6.

Pre-test in all operation modes and find out the worst case for compliance test.

According to the product characteristics and model difference described in section 3.1, RE & RS tests were applied on model UT191T, for other test results, refer to previous test report 50116607 001 for details.

4.3 Special Accessories and Auxiliary Equipment

None.

4.4 Countermeasures to achieve EMC Compliance

The test sample which has been tested contained the noise suppression parts as described in the Constructional Data Form or the Technical Construction File. No additional measures were employed to achieve compliance.

5. Test Results EMISSION

5.1 Emission in the Frequency Range above 30 MHz

5.1.1 Radiated Electromagnetic Disturbances

RESULT:

Passed

Date of testing	:	Refer to Appendix 1
Test standard	:	EN IEC 55015:2019+A11
Basic standard	:	CISPR 16-2-3:2016
Frequency range	:	30 – 1000MHz
Limits	:	Table 10 of EN IEC 55015:2019+A11
Kind of test site	:	3m semi-anechoic chamber

Test setup:

Input Voltage	:	DC 9V
Operation Condition	:	According to Clause 7 & 9.3.4
Operation mode	:	B
Earthing	:	Not connected

Detailed test data refer to attached Appendix 1.

6. Test Results IMMUNITY

6.1 Classification of apparatus

According to EN IEC 61326-1:2021 & EN IEC 61326-2-2:2021, the EUT shall be tested in accordance with table A.1 of EN IEC 61326-1:2021, and comply with following performance criterion:

Continuous Disturbance

Radio-Frequency Electromagnetic Field Amplitude Modulated (RS)

Criterion A

For other test results, refer to previous test report 50116607 001 for details.

6.2 Continuous Disturbances

6.2.1 Radio-Frequency Electromagnetic Field Amplitude Modulated (RS)

RESULT:

Passed

Date of Testing	:	Refer to Appendix 1
Test Specification	:	EN IEC 61326-1:2021 & EN IEC 61326-2-2:2021
Basic Standard	:	IEC 61000-4-3:2006+A1+A2
Criterion	:	A
Frequency Range	:	80 - 1000MHz, 1.4- 6.0GHz
Test Level	:	3V/m (Unmodulated, r.m.s.) for 80 - 1000MHz 3V/m (Unmodulated, r.m.s.) for 1.4 - 6.0GHz 1V/m (Unmodulated, r.m.s.) for 2.0 - 6.0GHz
Modulation	:	AM 80%, 1kHz sine-wave

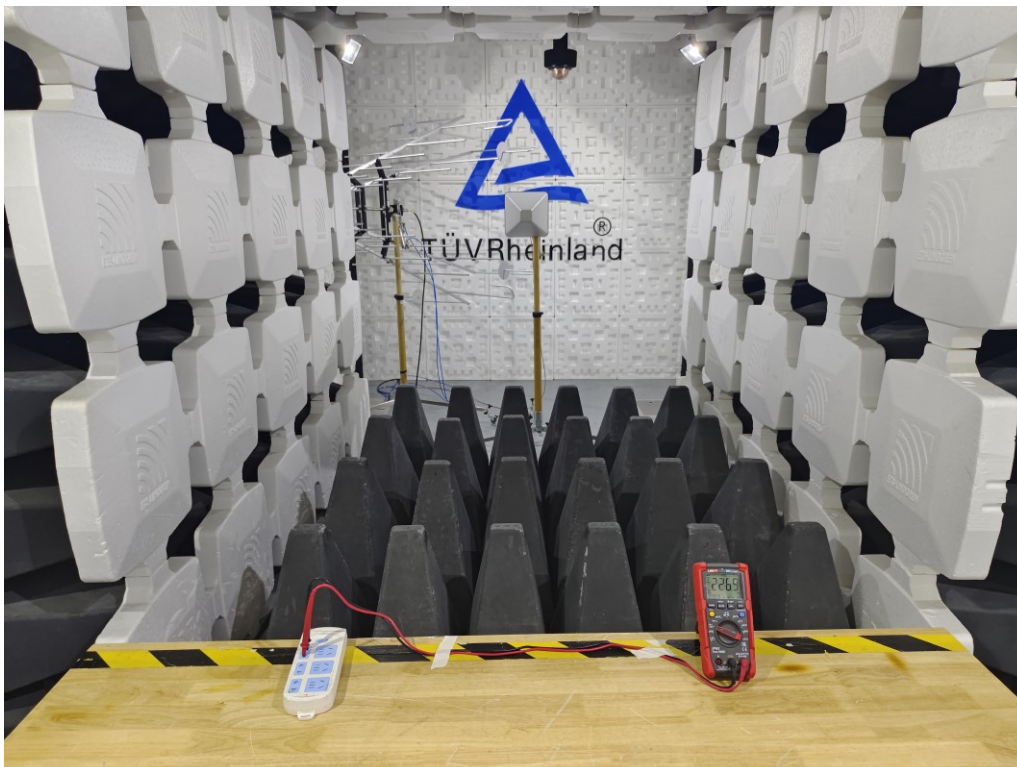
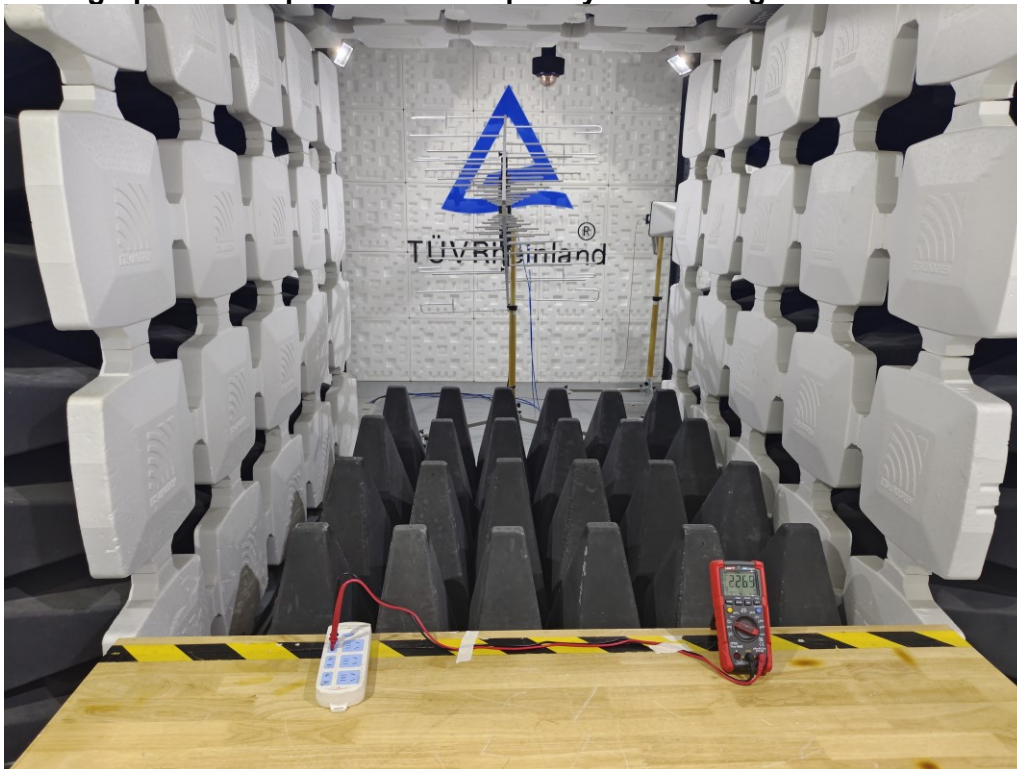
Test setup

Input Voltage	:	DC 9V
Operation Mode	:	A
Earthing	:	Not Connected
Ambient temperature	:	Refer to Appendix 1
Relative humidity	:	Refer to Appendix 1
Atmospheric pressure	:	101kPa

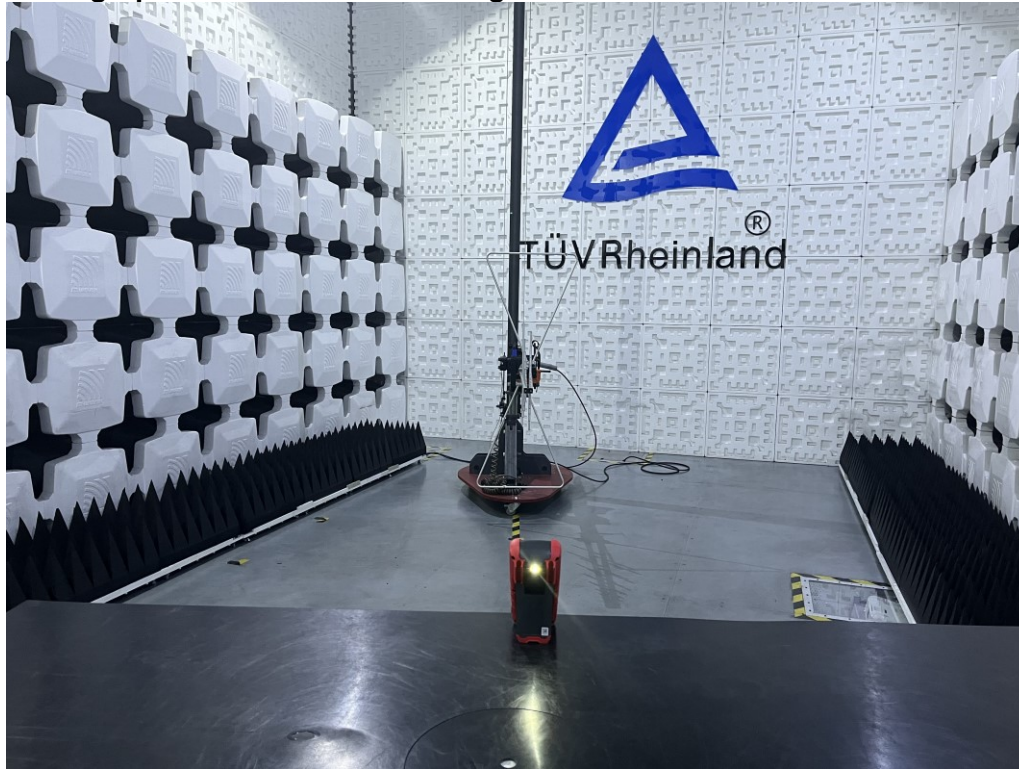
Refer to attached Appendix 1.

7. Photographs of the Test Set-Up

Photograph 1: Set-up for Radio-Frequency Electromagnetic Fields Susceptibility (RS)



Photograph 2: Radiated Electromagnetic Disturbances



8. List of Tables

Table 1: List of Test and Measurement Equipment6

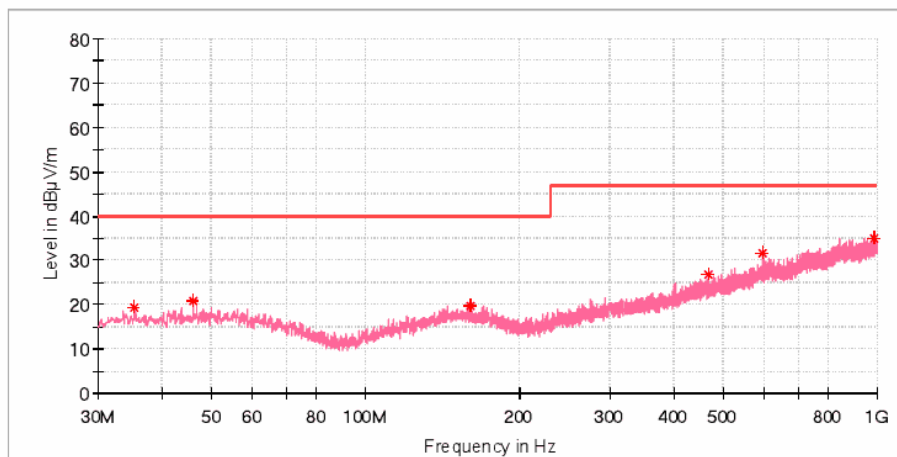
9. List of Photographs

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Test Report

EUT Information

EUT Name:	Professional Multimeter
Order Number:	168467668
Model:	UT191T
Test Mode:	LED flashlight on mode
Test Voltage:	DC 9V
Test Standard:	EN IEC 55015
Test By./Review By:	Guangshen Cen / Shower Dai
Tem./Hum./Pressure:	23.3°C/52.6%/101kPa
Remark:	3m chamber



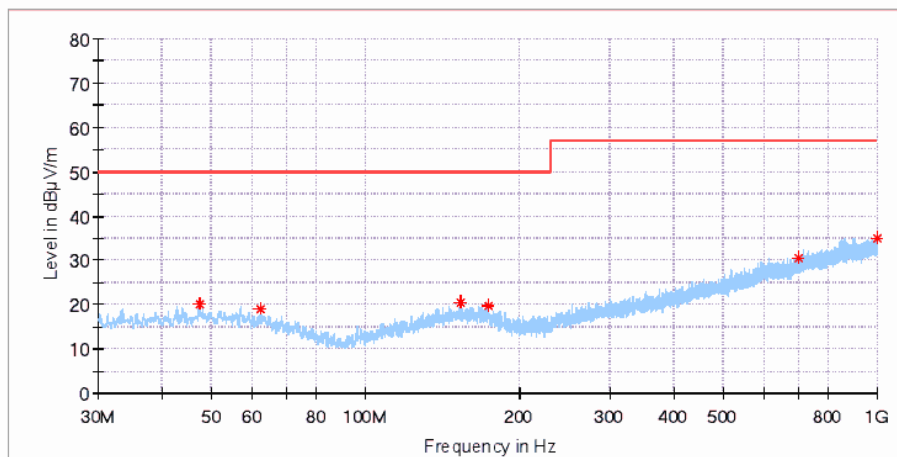
Critical Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
467.567000	26.84	47.00	20.16	100.0	V	77.0	26.0
597.838000	31.74	47.00	15.26	100.0	V	106.0	29.1
35.335000	19.35	40.00	20.65	100.0	V	318.0	19.6
46.102000	20.81	40.00	19.19	100.0	V	332.0	20.6
985.450000	35.04	47.00	11.96	200.0	V	282.0	34.5
159.883000	19.87	40.00	20.13	200.0	V	318.0	20.8

Test Report

EUT Information

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Test By:/Review By:	Guangshen Cen / Shower Dai
Tem./Hum./Pressure:	23.3°C/52.6%/101kPa
Remark:	3m chamber



Critical Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
47.363000	19.93	50.00	30.07	200.0	H	294.0	20.7
62.398000	19.02	50.00	30.98	200.0	H	217.0	19.7
152.996000	20.51	50.00	29.49	200.0	H	92.0	20.8
173.851000	19.70	50.00	30.30	200.0	H	68.0	20.1
701.143000	30.57	57.00	26.43	100.0	H	273.0	30.7
999.903000	35.07	57.00	21.93	100.0	H	80.0	34.5



Client: UNI-TREND
Appliance: Professional Multimeter
Model No.: UT191T
Sample No.: A003649000-002

Test record sheet for IEC 61000-4-3
Test site at TÜV Rheinland Shenzhen EMC laboratory

Test site / Equipment used		
Description	Manufacturer	Model
☒ 3m Fully-Anechoic Chamber	ETS	---
☒ Signal Generator	Rohde & Schwarz	SMB100A
☒ Power Amplifier	Rohde & Schwarz	BBA150-BC250
☒ Power Amplifier	Rohde & Schwarz	BBA150-D110E100
☒ RF Power Meter	Rohde & Schwarz	NRP6AN
☒ RF Power Meter	Rohde & Schwarz	NRP6AN
☒ Stacked double Log.-Per. Antenna	SCHWARZBECK	STLP 9128 E
☒ Stacked double Log.-Per. Antenna	SCHWARZBECK	STLP 9149
☐ Isotropic Field Probe	SCHWARZBECK	FL7006/KIT
☐ 10m Chamber	ETS	---
☐ Signal Generator	Rohde & Schwarz	SMB100A
☐ Power Amplifier	Rohde & Schwarz	BBA150-BC250
☐ Power Amplifier	Rohde & Schwarz	BBA150-D110E100
☐ RF Power Meter	Rohde & Schwarz	NRP6AN
☐ RF Power Meter	Rohde & Schwarz	NRP6AN
☐ Stacked double Log.-Per. Antenna	SCHWARZBECK	STL 9128 E
☐ Stacked double Log.-Per. Antenna	SCHWARZBECK	STL 9149
☐ Isotropic Field Probe	SCHWARZBECK	FL7006/KIT

Temperature	24.2 °C
Relative Humidity	49.0 %
Frequency range	☒ 80 MHz – 1GHz ☒ 1.4– 6.0 GHz
Test level	☐ 1V/m ☐ 1V/m ☒ 3V/m ☒ 3V/m ☐ 10V/m ☐ 10V/m
Step size	☒ 1 % ☐ 10 %
Dwell Time	☐ 1 s ☒ 3 s
Modulation	Sine wave 80% AM at 1kHz
Side	Front Rear Left Right
Horizontal	☒ Pass ☐ Fail ☒ Pass ☐ Fail ☒ Pass ☐ Fail ☒ Pass ☐ Fail
Vertical	☒ Pass ☐ Fail ☒ Pass ☐ Fail ☒ Pass ☐ Fail ☒ Pass ☐ Fail
Operating modes tested	On, mode A
Test Voltage	DC 9V
Performance criterion	☒ A ☐ N/A
Overall result	☒ Pass ☐ Fail
Observation / remark	☒ No observable change ☐


.....2024-03-19
Tested by (Signature / Date)


.....2024-03-19
Checked by (Signature / Date)

Measurement Uncertainties

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus.

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor of $k=2$, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Table 1: Measurement Uncertainty levels

Test	Parameters	Expanded uncertainty (U_{lab})	Expanded uncertainty (U_{cisp})
Conducted Emission	Level accuracy (9kHz to 150kHz) (150kHz to 30MHz)	± 3.70 dB ± 3.30 dB	± 3.8 dB ± 3.4 dB
Disturbance Power	Level accuracy (30MHz to 300MHz)	± 4.27 dB	± 4.5 dB
Electromagnetic Radiated Emission (Triple-loop)	Level accuracy (9kHz to 30MHz)	± 2.67 dB	N/A
Radiated Emission (3m SAC)	Level accuracy (30MHz to 1000MHz)	± 4.52 dB	± 6.3 dB
	Level accuracy (above 1000MHz)	± 4.37 dB	N/A
Radiated Emission (10m SAC)	Level accuracy (30MHz to 1000MHz)	± 4.66 dB	± 6.3 dB
	Level accuracy (above 1000MHz)	± 4.35 dB	N/A
Mains Harmonic	Current	$\pm 4.60\%$	N/A
Voltage Fluctuations & Flicker	Voltage	$\pm 0.64\%$	N/A

As U_{lab} in all applicable tests listed above are less than U_{cisp} according to CISPR 16-4-2:2011+A1:2014+A2:2018,

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