

# EMC Test Report

Product: Cordless jigsaw

Model: TE-JS 18 Li

Applicant: ISC GmbH International Service Center

Eschenstraße 6, 94405 Landau/Isar, Germany



**Add value.  
Inspire trust.**

In accordance with EN IEC 55014-1 and  
EN IEC 55014-2

## COMMERCIAL-IN-CONFIDENCE

Issue Date: Mar 01, 2024

Report Number: 708882400998-00

RESPONSIBLE FOR	NAME	SIGNATURE	DATE
Approved By	Dengqing TANG		Mar.01.2024
Prepared By	Ling XU		Mar.01.2024

Signatures in this approval box have checked this document in line with the requirements of TÜV SÜD Product Service control rules.

### EXECUTIVE SUMMARY

A sample of this product was tested and found to be in compliance with EN IEC 55014-1:2021 and EN IEC 55014-2:2021

### DISCLAIMER AND COPYRIGHT

This non-binding report has been prepared by TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch with all reasonable skill and care. The reports apply only to the specific samples tested under stated test conditions. The document is confidential to the potential Client and TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch. No part of this document may be reproduced without the prior written approval of TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch.



## Contents

<b>1</b>	<b>Report Summary .....</b>	<b>3</b>
1.1	Report Modification Record.....	3
1.2	Introduction.....	3
1.3	Brief Summary of Results .....	4
1.4	Product Information .....	5
1.5	Deviations from the Standard.....	6
1.6	Test Location.....	6
<b>2</b>	<b>Test Details .....</b>	<b>7</b>
2.1	Radiated disturbance (30 MHz to 1 GHz) .....	7
2.2	Electrostatic discharge immunity test.....	13
2.3	Radiated, radio-frequency, electromagnetic field immunity test .....	16
<b>3</b>	<b>Test Equipment and Software Information.....</b>	<b>19</b>
3.1	General Test Equipment and Software Used .....	19
<b>4</b>	<b>Measurement Uncertainty .....</b>	<b>20</b>
<b>5</b>	<b>Photographs .....</b>	<b>21</b>



# 1 Report Summary

## 1.1 Report Modification Record

Alterations and additions to this report will be issued to the holders of each copy in the form of a complete document.

Report No.	Description of Change	Date of Issue
-00	First Issue	03/01/2024

## 1.2 Introduction

The information contained in this report is intended to show verification of the EMC Qualification Approval Testing of the requirements of the standards for the tests listed in Section 1.3.

Applicant	ISC GmbH International Service Center
Address	Eschenstraße 6, 94405 Landau/Isar, Germany
Manufacturer	Same as above
Address	Same as above
Factory	Same as above
Address	Same as above
Model Number(s)	TE-JS 18 Li
Rated Voltage	18 Vd.c.
Rated no load speed	0-2400/min
Sample Number(s)	SHA-790456-1
Number of Samples Tested	1
Test Specification	EN IEC 55014-1:2021 and EN IEC 55014-2:2021
Date of Receipt of EUT	02/21/2024
Start of Test	02/26/2024
Finish of Test	02/26/2024
Name of Engineer(s)	Ling XU



**1.3 Brief Summary of Results**

The sample's mentioned in this report is/are submitted/ supplied/ manufactured by client. The laboratory therefore assumes no responsibility for accuracy of information on the brand name, model number, origin of manufacture, consignment or any information supplied.

A brief summary of the tests carried out in accordance with EN IEC 55014-1 and EN IEC 55014-2, is shown below.

Section	Specification	Clause	Test Description	Result	Comments/Base Standard
DC Powered Power on, max & mid speed.					
2.1	EN IEC 55014-1:2021	4.3.4.5	Radiated Disturbance	Pass (Minimum limit margin: >6 dB)	
DC Powered Power on, mid speed.					
2.2	EN IEC 55014-2:2021	5.1	Electrostatic discharge immunity test	Pass	IEC 61000-4-2
2.3	EN IEC 55014-2:2021	5.5	Radiated, radio-frequency, electromagnetic field immunity test	Pass	IEC 61000-4-3



**1.4 Product Information**

**1.4.1 Technical Description**

The Equipment Under Test (EUT) was a Cordless jigsaw and the clock frequency of EUT was less than 108MHz.

Pre-tests were performed under max speed and mid speed, only the maximum emission was recorded.

**1.4.2 EUT Port/Cable Identification**

Port	Max Cable Length specified	Usage	Type	Screened
DC Powered Power on				
NA	NA	NA	NA	NA

**1.4.3 Test Configuration**

Configuration	Description
DC Powered	DC 18V by battery pack.

**1.4.4 Modes of Operation**

Mode	Description
Power on	EUT was powered on and working normally, max & mid speed.

**1.4.5 Monitoring of Performance**

The EUT works normally, the motor speed changed less than 10%.

**1.4.6 Performance Criteria**

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

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

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



**1.5 Deviations from the Standard**

No deviations from the applicable test standard were made during testing.

**1.6 Test Location**

The following tests were performed at TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai branch

Address:

No.16, Lane 1951, Duhui Road  
Shanghai, 201108, P.R.China

Test Name	Name of Engineer(s)
Radiated Disturbance	Chengjie GUO
Electrostatic discharge immunity test	Chengjie GUO
Radiated, radio-frequency, electromagnetic field immunity test	Chengjie GUO

## 2 Test Details

### 2.1 Radiated disturbance (30 MHz to 1 GHz)

#### 2.1.1 Specification Reference

EN IEC 55014-1:2021, Clause 4.3.4.5

#### 2.1.2 Equipment Under Test

TE-JS 18 Li

#### 2.1.3 Date of Test

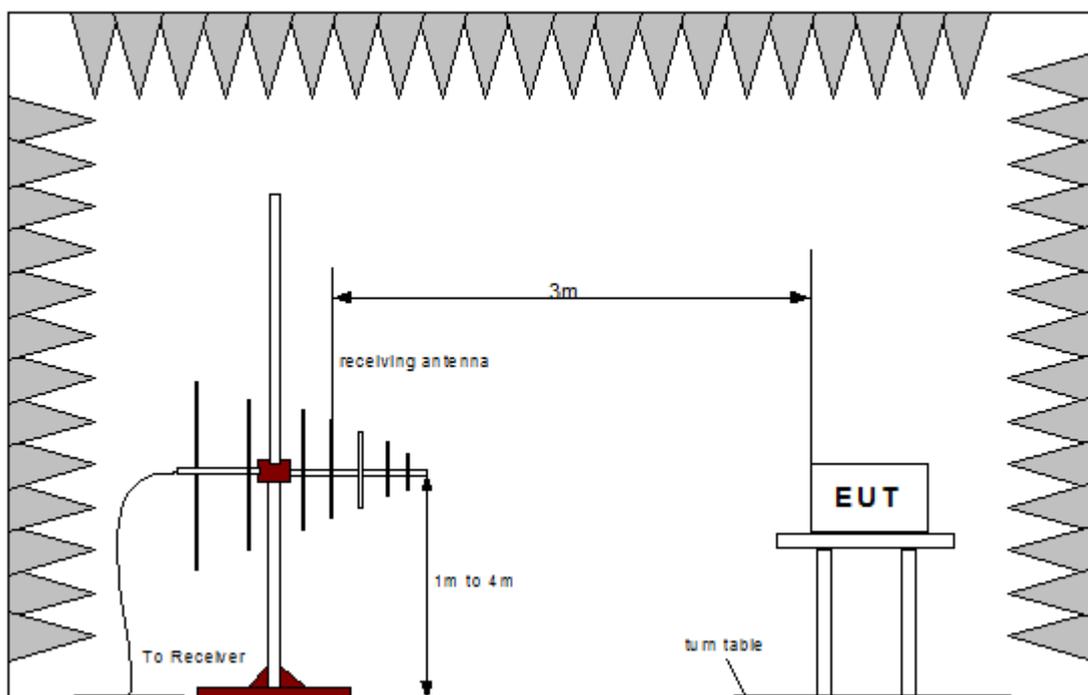
02/26/2024

#### 2.1.4 Test Method

The EUT was set up in a semi-anechoic chamber on a remotely controlled turntable. Table top EUT was placed at  $(0,8 \pm 0,05)$  m above the reference plane of the test site selected for measurement (see Figure 16, Figure 17 and Figure 18 of EN IEC 55014-1:2021).

Floor standing EUT was placed at  $(0,12 \pm 0,04)$  m above the reference plane of the test site selected for measurement (see Figure 19 of EN IEC 55014-1:2021).

A prescan of the EUT emissions profile was made while varying the antenna-to-EUT azimuth and antenna-to-EUT polarization using a peak detector; measurements were taken at a 3m distance. Using the prescan list of the highest emissions detected, their bearing and associated antenna polarization, the EUT was then formally measured using a Quasi-Peak detector. The readings were maximized by adjusting the antenna height, polarization and turntable azimuth, in accordance with the specification.





### 2.1.5 Environmental Conditions

Ambient Temperature 21.5 °C  
Relative Humidity 52.6 %  
Atmospheric Pressure 1032.0 mbar

### 2.1.6 Specification Limits

Radiated disturbance limits and test method for the frequency range 30MHz to 1000MHz at a measuring distance of 3 m	
Frequency range MHz	Quasi-peak limits dB(µV/m)
30 to 230	40
230 to 1000	47

### 2.1.7 Test Results

Results for Configuration and Mode: DC Powered/Power on, mid speed.

Performance assessment of the EUT made during this test: Pass.

Detailed results are shown below.

Frequency Range of Test: 30 MHz to 1 GHz.



# 30-1000MHz Radiated Disturbance Test

## EUT Information

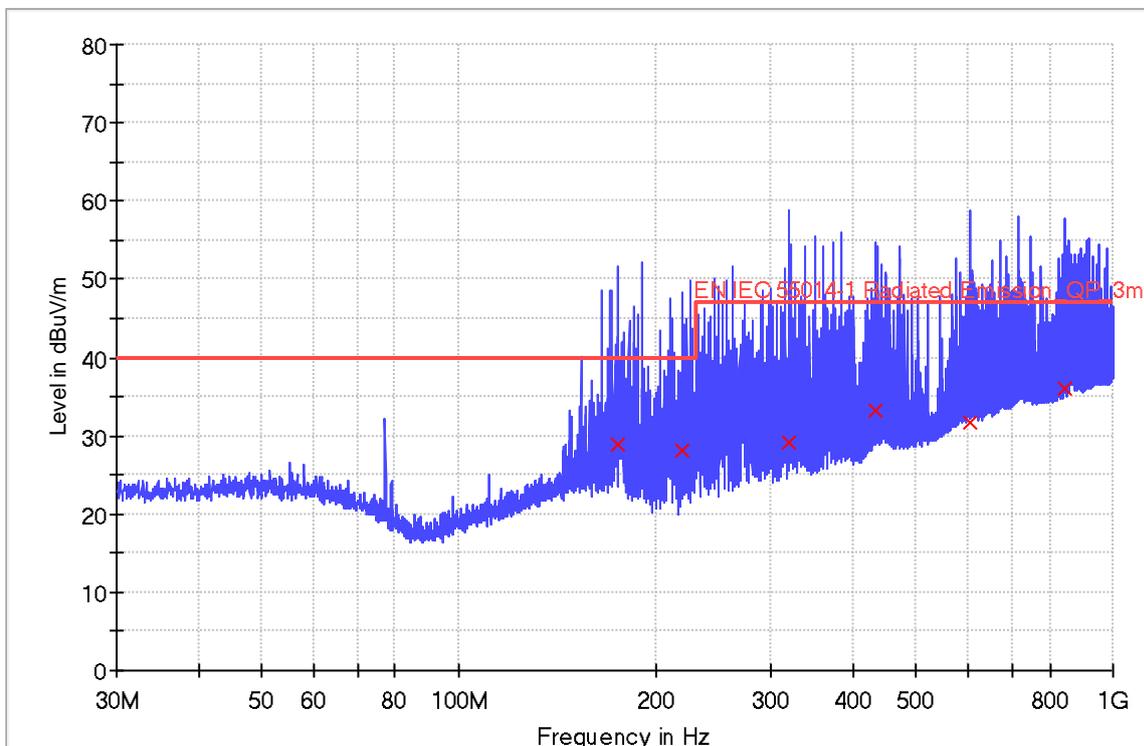
EUT Name: Cordless jigsaw  
 Model: TE-JS 18 Li  
 Client: ISC GmbH International Service Center  
 Op Cond: Power on, mid speed, DC 18V, T21.5, H52.6%, P103.2kPa  
 Operator: Chengjie GUO  
 Test Spec: EN IEC 55014-1  
 Comment: Horizontal  
 Sample No: SHA-790456-1

## Sweep Setup: RE\_VULB9168\_pre\_Cont\_EN IEC 55014\_30-1000 [EMI radiated]

Hardware Setup: RE\_VULB9168  
 Receiver: [ESR 3]  
 Level Unit: dBuV/m

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
30 MHz - 1 GHz	48.5 kHz	PK+	120 kHz	0.2 s	20 dB

RE\_VULB9168\_pre\_Cont\_EN IEC 55014\_30-1000





## Limit and Margin

Frequency (MHz)	QuasiPeak (dBuV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Margin - QPK (dB)
175.480000	29.0	1000.0	120.000	188.0	H	311.0	19.8	11.0
219.600000	28.1	1000.0	120.000	198.0	H	164.0	17.5	11.9
320.560000	29.1	1000.0	120.000	124.0	H	215.0	22.2	18.0
432.080000	33.3	1000.0	120.000	127.0	H	215.0	25.4	13.7
605.680000	31.6	1000.0	120.000	187.0	H	275.0	29.2	15.4
843.120000	36.0	1000.0	120.000	216.0	H	175.0	32.5	11.0

Frequency (MHz)	Limit - QPK (dBuV/m)	Comment
175.480000	40.0	
219.600000	40.0	
320.560000	47.0	
432.080000	47.0	
605.680000	47.0	
843.120000	47.0	



# 30-1000MHz Radiated Disturbance Test

## EUT Information

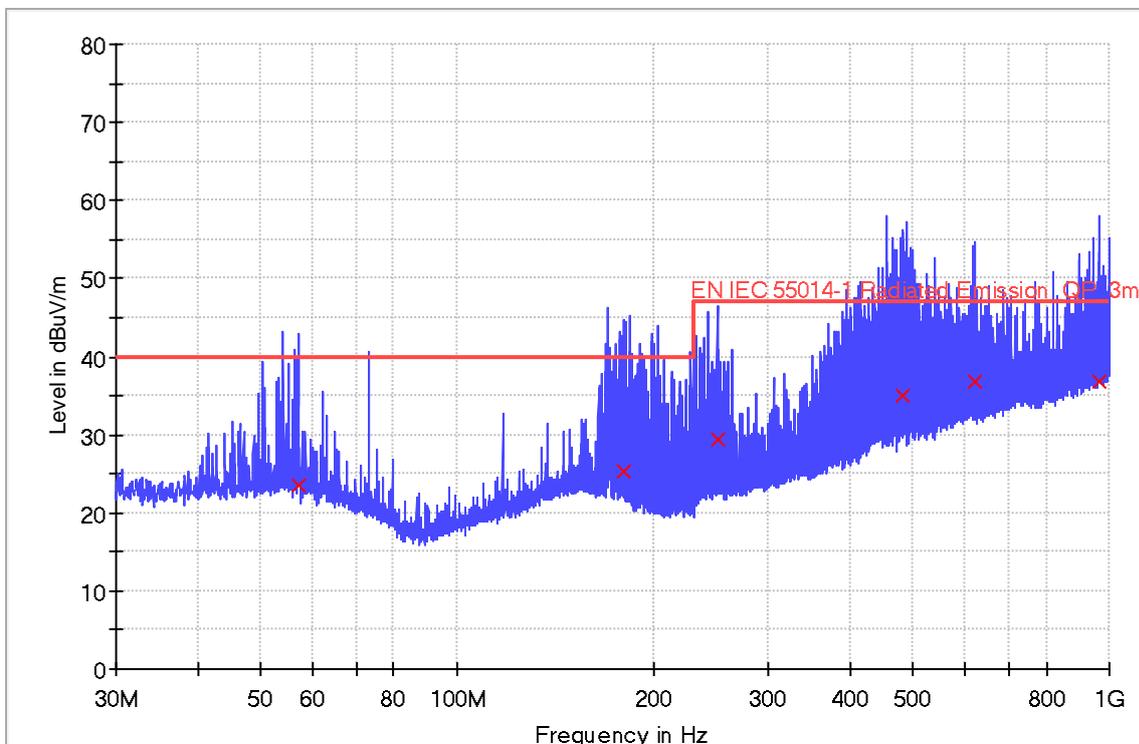
EUT Name: Cordless jigsaw  
 Model: TE-JS 18 Li  
 Client: ISC GmbH International Service Center  
 Op Cond: Power on, mid speed, DC 18V, T21.5, H52.6%, P103.2kPa  
 Operator: Chengjie GUO  
 Test Spec: EN IEC 55014-1  
 Comment: Vertical  
 Sample No: SHA-790456-1

## Sweep Setup: RE\_VULB9168\_pre\_Cont\_EN IEC 55014\_30-1000 [EMI radiated]

Hardware Setup: RE\_VULB9168  
 Receiver: [ESR 3]  
 Level Unit: dBuV/m

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
30 MHz - 1 GHz	48.5 kHz	PK+	120 kHz	0.2 s	20 dB

RE\_VULB9168\_pre\_Cont\_EN IEC 55014\_30-1000



## Limit and Margin

Frequency (MHz)	QuasiPeak (dBuV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - QPK (dB)
57.080000	23.6	1000.0	120.000	164.0	V	213.0	20.3	16.4
179.800000	25.4	1000.0	120.000	132.0	V	152.0	19.4	14.6
250.400000	29.4	1000.0	120.000	166.0	V	177.0	19.9	17.7
483.560000	35.1	1000.0	120.000	164.0	V	168.0	26.3	11.9
622.520000	36.7	1000.0	120.000	178.0	V	18.0	29.2	10.3
962.880000	36.8	1000.0	120.000	155.0	V	115.0	34.0	10.2

Frequency (MHz)	Limit - QPK (dBuV/m)	Comment
57.080000	40.0	
179.800000	40.0	
250.400000	47.0	
483.560000	47.0	
622.520000	47.0	
962.880000	47.0	



Test Setup

### 2.1.8 Test Location

This test was carried out in 3-meter semi-anechoic chamber.

## 2.2 Electrostatic discharge immunity test

### 2.2.1 Specification Reference

EN IEC 55014-2:2021, Clause 5.1

### 2.2.2 Equipment Under Test

TE-JS 18 Li

### 2.2.3 Date of Test

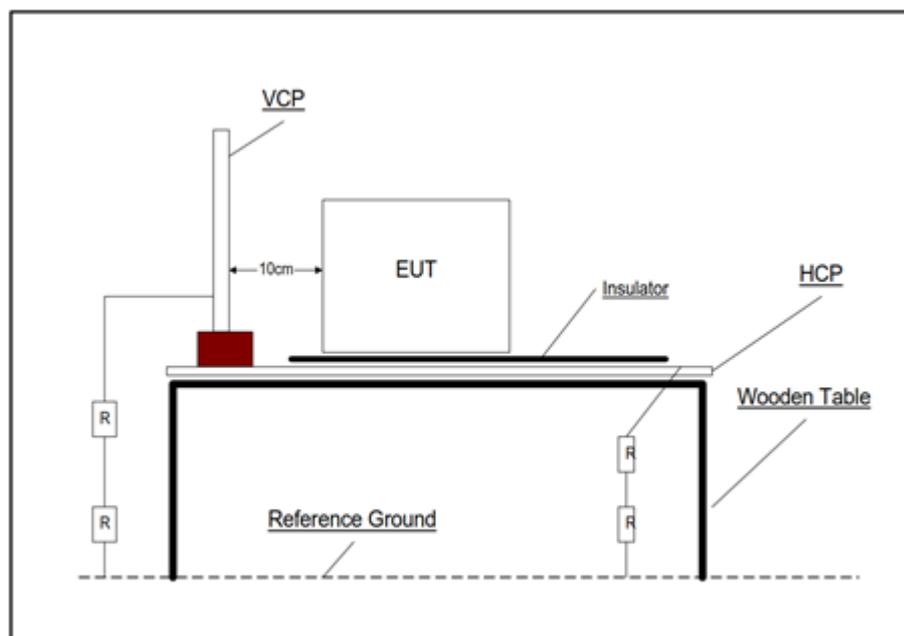
02/26/2024

### 2.2.4 Test Method

The equipment under test including associated cabling was configured on but insulated from, using a 0.5mm isolator, a horizontal coupling plane fitted to the top of a 0.8m non-conductive table for table-top equipment; and on a 0.1m insulated support for floor standing equipment; above a ground reference plane all within a test laboratory.

Using the air discharge method for non-metallic parts, contact discharge method for metallic parts with both vertical and horizontal couple plane discharge methods for the sides of the equipment under test, the required electrostatic discharge voltage levels in both voltage polarities were applied at the detailed pulse repartition rate.

During this testing any anomalies in the equipment under tests performance was recorded.





**2.2.5 Environmental Conditions**

Ambient Temperature 21.7 °C  
 Relative Humidity 47.8 %  
 Atmospheric Pressure 1006.0 mbar

**2.2.6 Specification Limits**

Required Test Levels				Performance Criteria
Discharge type	Discharge Level (kV)		Number of discharges per location (each polarity)	
	Positive	Negative		
Air – Direct	8	8	<10>	B
Contact – Direct	4	4	<10>	B
Contact – Indirect	4	4	<10>	B

**2.2.7 Test Results**

Results for Configuration and Mode: DC Powered/Power on, mid speed.

Performance assessment of the EUT made during this test: Pass.

Detailed results are shown below.

ID	Test Point	Discharge	Results										
			2kV		4kV		6kV		8kV		15kV		
			+	-	+	-	+	-	+	-	+	-	
A	Vertical coupling plane	Contact			✓	✓							
B	Horizontal coupling plane	Contact			✓	✓							
C	Screw	Contact			✓	✓							
D	Metal Enclosure	Contact			✓	✓							
E	Plastic Enclosure	Air							✓	✓			
F	Gap	Air							✓	✓			

**Note:**

✓	The EUTs performance was not impacted when the ESD pulse was applied.
✓*	No discharge occurred at this point when the ESD pulse was applied.
Ox	Observation number A, B, ...etc.



**Test Setup**

**2.2.8 Test Location**

This test was carried out in shielded room Z118.

**2.3 Radiated, radio-frequency, electromagnetic field immunity test**

**2.3.1 Specification Reference**

EN IEC 55014-2:2021, Clause 5.5

**2.3.2 Equipment Under Test**

TE-JS 18 Li

**2.3.3 Date of Test**

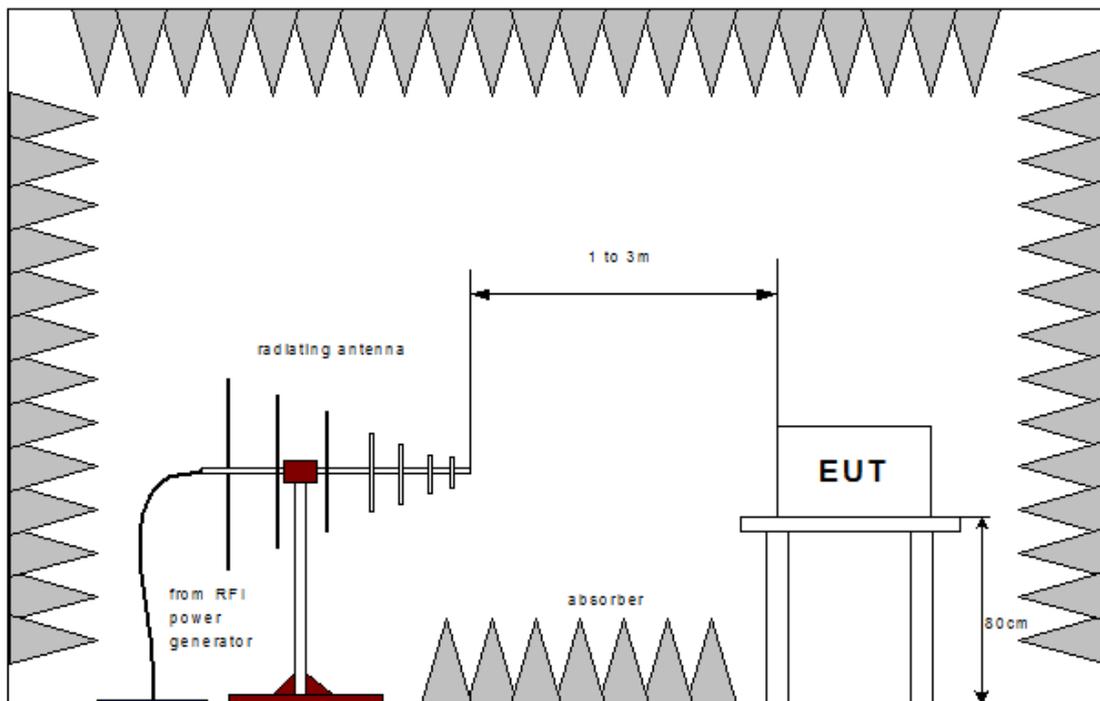
02/26/2024

**2.3.4 Test Method**

The equipment under test including associated cabling was configured, on a 0.8 m non-conductive table for table-top equipment and on a 0.1 m insulated support for floor standing equipment; with a pre-calibrated semi anechoic chamber.

All four side of the equipment under test were subjected to the required RF field strength, modulated as described, swept over the frequency range of test with the antenna positioned in both horizontal and vertical polarizations.

During this testing any anomalies in the equipment under tests performance was recorded.





**2.3.5 Environmental Conditions**

Ambient Temperature 22.1 °C  
 Relative Humidity 49.8 %  
 Atmospheric Pressure 1008.0 mbar

**2.3.6 Specification Limits**

Required Test Levels					Performance Criteria
Frequency Range (MHz)	Level (V/m)	Modulation	Step Size (%)	Dwell (s)	
80 to 1000	3	AM (80 %, 1 kHz, sine wave)	1	3	A

Note 1. EUT powered at one of the Nominal input voltages and frequencies

**2.3.7 Test Results**

Results for Configuration and Mode: DC Powered/ Power on, mid speed.

Performance assessment of the EUT made during this test: Pass.

Detailed results are shown below.

Test Results for RF Electromagnetic Field 80 - 1000 MHz				
Side of the equipment under test	Antenna polarization	Test Level	Dwell Time	Result
Front	Horizontal	3 V/m	3 s	Pass PC A
Front	Vertical	3 V/m	3 s	Pass PC A
Right	Horizontal	3 V/m	3 s	Pass PC A
Right	Vertical	3 V/m	3 s	Pass PC A
Rear	Horizontal	3 V/m	3 s	Pass PC A
Rear	Vertical	3 V/m	3 s	Pass PC A
Left	Horizontal	3 V/m	3 s	Pass PC A
Left	Vertical	3 V/m	3 s	Pass PC A

Remark: NA.



**Test Setup**

### **2.3.8 Test Location**

This test was carried out in anechoic chamber Z114.

### 3 Test Equipment and Software Information

#### 3.1 General Test Equipment and Software Used

Instrument	Manufacturer	Type No	TE No	Calibration Date	Calibration Due
Radiated Disturbance					
EMI test receiver	R & S	ESR3	S1503109-YQ-EMC	2023.8.1	2024.7.31
Trilog super broadband test antenna	SCHWARZBECK	VULB9168	S1808296-YQ-EMC	2021.9.23	2024.9.22
3 meter semi-anechoic chamber	TDK	3m	S1503231-YQ-EMC	2021.5.8	2024.5.7
Software	R & S	EMC32 V10.50.40	NA	NA	NA
Electrostatic discharge immunity test					
ESD Simulator	HAEFELY	ONYX 16	S1905298-YQ-EMC	2023.7.10	2024.7.9
T/H record	Shanghai meteorological instrument	ZJ1-2A	S1503201-YQ-EMC	2023.6.9	2024.6.8
Horizontal Coupling Plane	TÜV Product Service	---	---	---	---
Vertical Coupling Plane	TÜV Product Service	---	---	---	---
Radiated, radio-frequency, electromagnetic field immunity test					
Signal generator	R & S	SMB 100A	S1503055-YQ-EMC	2023.8.1	2024.7.31
Amplifier	AR	200W1000M7A	S2111427b-YQ-EMC	2023.2.10	2024.2.9
Power meter	R&S	NRP2	S1503062-YQ-EMC	2023.8.1	2024.7.31
Dual directional coupler	AR	DC6180AM1	S2111428b-YQ-EMC	2023.2.10	2024.2.9
High gain log-periodic antenna	R&S	HL046E	S1503083-SB-EMC	NA	NA
Average power sensor	R&S	NRP-Z91	S1503068-YQ-EMC	2023.8.1	2024.7.31
Average power sensor	R&S	NRP-Z91	S1503069-YQ-EMC	2023.8.1	2024.7.31
Software	R & S	EMC32 V10.50.40	NA	NA	NA



## 4 Measurement Uncertainty

For a 95% confidence level, the measurement uncertainties for defined systems are:

Test Name	Measurement Uncertainty
Radiated Disturbance	30MHz to 1GHz, 5.03dB (Horizontal) 5.12dB (Vertical)

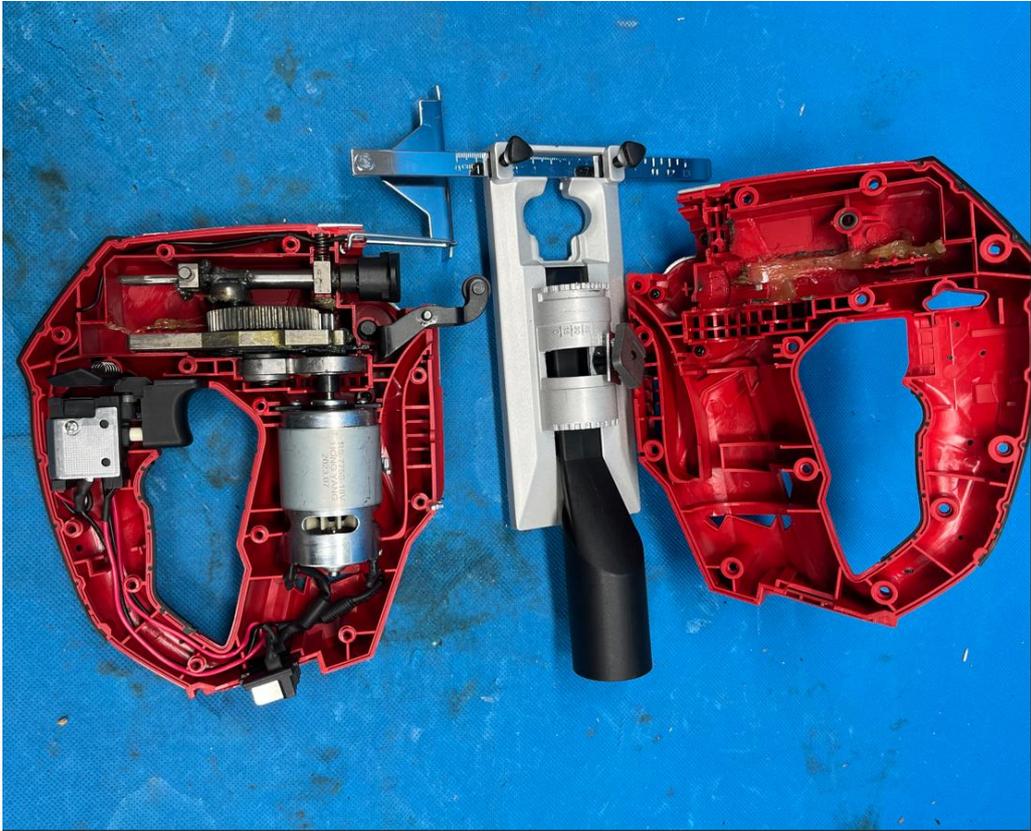
Measurement Uncertainty Decision Rule:

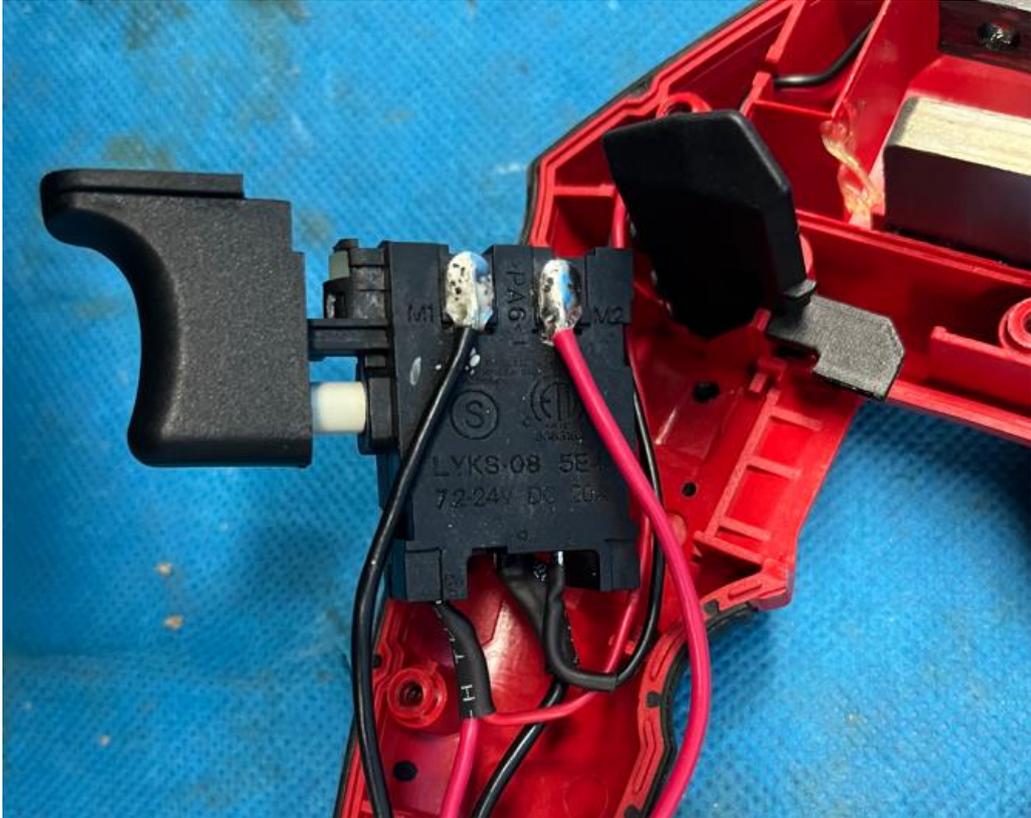
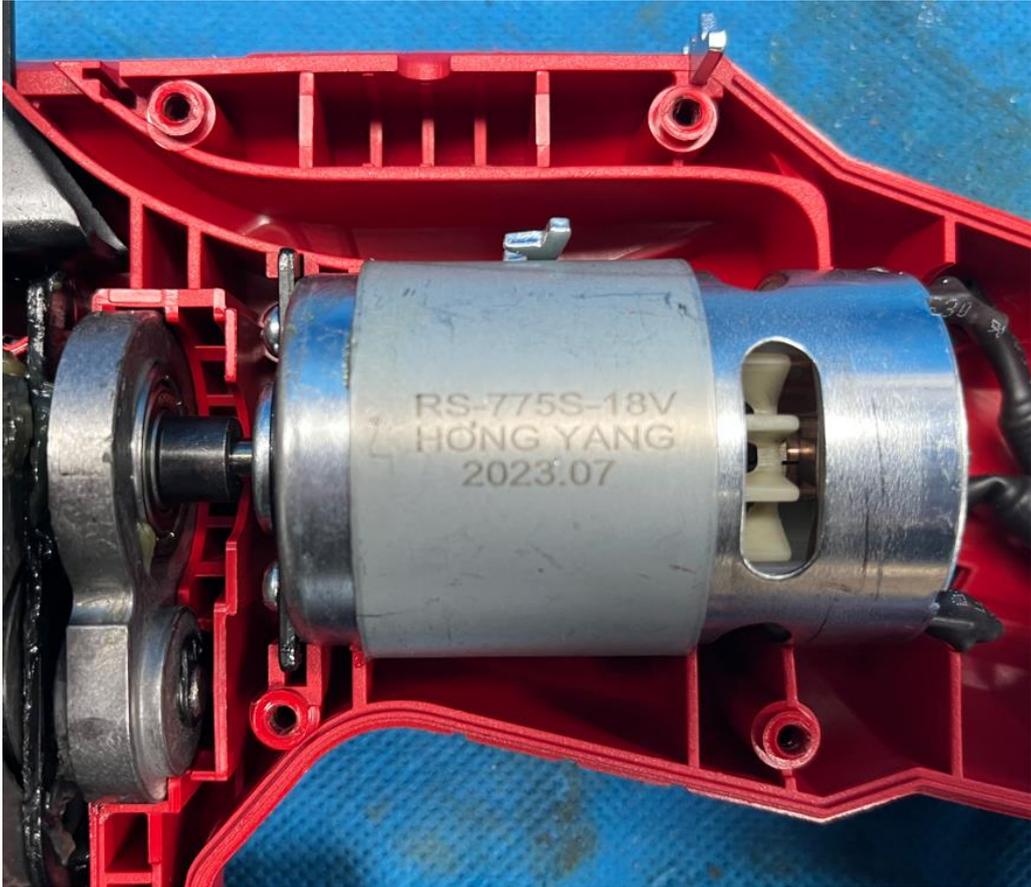
Determination of conformity with the specification limits is based on the decision rule according to IEC Guide 115: 2021, clause 4.4.3 and 4.5.1.

## 5 Photographs

TE-JS 18 Li









For battery pack 18V 5.2Ah (not included in product, provided by client)



-----End of Test Report-----