



CERTIFICATE OF RED COMPLIANCE

According to Directive: **2014/53/EU**

Ref. No.: **S24042502508**

Product: SwitchBot Roller Shade
 Trade Mark: SwitchBot
 Applicant: Woan Technology (Shenzhen) Co., Ltd.
 Address: Room 1101, Qiancheng Commercial Center, No. 5 Haicheng Road, Mabu Community, Xixiang Sub-district, Bao'an District, Shenzhen, Guangdong, P.R.China, 518100
 Manufacturer : Woan Technology (Shenzhen) Co., Ltd.
 Address: Room 1101, Qiancheng Commercial Center, No. 5 Haicheng Road, Mabu Community, Xixiang Sub-district, Bao'an District, Shenzhen, Guangdong, P.R.China, 518100
 Model: W5000000; W5000001, W5000002, W5000003, W5000004, W5000005, W5000006

The test sample of product has passed the test according to requirements of the following standards:

Standard(s):Refer to attachment Test report(s) No.: Refer to attachment

Based on the voluntary assessment of the product sample and technical file, we confirm that the above-mentioned product meets the requirements of the EU directive.

The CE mark as show below can be used, under the responsibility of the manufacturer or the importer, after completion of an EU declaration of conformity and compliance with all relevant EU directives.



Approved by/Date:

Allen
 Department Manager

Jul 02, 2024

Shenzhen NTEK Testing Technology Co., Ltd.

Address: 1&5/F, Building C, 1&2/F, Building E, Fenda Science Park, Sanwei Community, Hangcheng Street, Baoan District, Shenzhen, Guangdong, China

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Ref. No.: **S24042502508**

Attachment:

Standard(s):		Test report(s) No.:
Article 3.1a)	EN60335-1:2012+A11:2014+A13:2017+A1:2019+A14:2019+A2:2019+A15:2021	S24042502503001
	EN 60335-2-97: 2006+ A2:2010+A11:2008+A12:2015	
	EN 62479:2010	S24042502508002
Article 3.1b)	ETSI EN 301 489-1 V2.2.3 (2019-11)	S24042502501001
	ETSI EN 301 489-17 V3.2.4 (2020-09)	
	EN IEC 61000-3-2:2019+A1:2021	
	EN 61000-3-3:2013+A2:2021	
	EN IEC 55014-1:2021	S24042502502001
	EN IEC 55014-2:2021	
Article 3.2	ETSI EN 300 328 V2.2.2 (2019-07)	S24042502508001

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EMC TEST REPORT

ETSI EN 301 489-1 V2.2.3 (2019-11)
ETSI EN 301 489-17 V3.2.4 (2020-09)
EN IEC 61000-3-2:2019+A1:2021
EN 61000-3-3:2013+A2:2021

Product : SwitchBot Roller Shade

Trade Mark : SwitchBot

Model Name : W5000000

Family Model : W5000001, W5000002, W5000003,
W5000004, W5000005, W5000006

Report No. : S24042502501001

Prepared for

Woan Technology (Shenzhen) Co., Ltd

Room 1101, Qiancheng Commercial Center, No. 5 Haicheng Road, Mabu Community, Xixiang
Sub-district, Bao'an District, Shenzhen, Guangdong, P.R.China, 518100

Prepared by

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TEST RESULT CERTIFICATION

Applicant's Name: Woan Technology (Shenzhen) Co., Ltd.
Address: Room 1101, Qiancheng Commercial Center, No. 5 Haicheng Road, Mabu Community, Xixiang Sub-district, Bao'an District, Shenzhen, Guangdong, P.R.China, 518100
Manufacturer's Name: Woan Technology (Shenzhen) Co., Ltd.
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Product description

Product name: SwitchBot Roller Shade
Trade Mark: SwitchBot
Model Name: W5000000
Family Model: W5000001, W5000002, W5000003, W5000004, W5000005, W5000006
Standards: ETSI EN 301 489-1 V2.2.3 (2019-11)
ETSI EN 301 489-17 V3.2.4 (2020-09)
EN IEC 61000-3-2:2019+A1:2021; EN 61000-3-3:2013+A2:2021

This device described above has been tested by NTEK, and the test results show that the equipment under test (EUT) is in compliance with the of article 3.1(b) of the Directive 2014/53/EU requirements. And it is applicable only to the tested sample identified in the report.

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Test Sample Number: S240425025001
Date of Test:
Date (s) of performance of tests: Mar 31 ~ Jun 21, 2024
Date of Issue: Jun 21, 2024
Test Result: **Pass**

Prepared By: Estelle Chen
Estelle Chen
(Project Engineer)

Reviewed By: Sky Zhang
Sky Zhang
(Supervisor)

Approved By: Alex Li
Alex Li
(Manager)



Table of Contents

Page

1 . TEST SUMMARY	5
1.1 TEST FACILITY	7
1.2 MEASUREMENT UNCERTAINTY	7
2 . GENERAL INFORMATION	9
2.1 GENERAL DESCRIPTION OF EUT	9
2.2 DESCRIPTION OF TEST MODES	10
2.3 DESCRIPTION OF TEST SETUP	11
2.4 DESCRIPTION TEST PERIPHERAL AND EUT PERIPHERAL	12
2.5 MEASUREMENT INSTRUMENTS LIST	13
3 . EMC EMISSION TEST	17
3.1 CONDUCTED EMISSION MEASUREMENT	17
3.1.1 POWER LINE CONDUCTED EMISSION	17
3.1.2 TELECOMMUNICATION PORT CONDUCTED EMISSION(VOLTAGE LIMITS)	18
3.1.3 TEST PROCEDURE	20
3.1.4 TEST SETUP	20
3.1.5 EUT OPERATING CONDITIONS	20
3.1.6 TEST RESULTS	21
3.2 RADIATED EMISSION MEASUREMENT	23
3.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT	23
3.2.2 LIMITS OF RADIATED EMISSION MEASUREMENT	24
3.2.3 TEST PROCEDURE	24
3.2.4 TEST SETUP	25
3.2.5 EUT OPERATING CONDITIONS	25
3.2.6 TEST RESULTS (30-1000MHz)	26
3.2.7 TEST RESULTS(1000-6000MHz)	28
3.3 HARMONICS CURRENT	29
3.3.1 LIMITS OF HARMONICS CURRENT	29
3.3.2 TEST PROCEDURE	30
3.3.3 EUT OPERATING CONDITIONS	30
3.3.4 TEST SETUP	30
3.3.5 TEST RESULTS	31
3.4 VOLTAGE FLUCTUATION AND FLICKERS	32
3.4.1 LIMITS OF VOLTAGE FLUCTUATION AND FLICKERS	32
3.4.2 TEST PROCEDURE	32
3.4.3 EUT OPERATING CONDITIONS	32
3.4.4 TEST SETUP	33
3.4.5 TEST RESULTS	34

Table of Contents

Page

4 . EMC IMMUNITY TEST	35
4.1 GENERAL PERFORMANCE CRITERIA	35
4.1.1 PERFORMANCE CRITERIA	35
4.2 GENERAL PERFORMANCE CRITERIA TEST SETUP	37
4.3 ESD TESTING	38
4.3.1 TEST SPECIFICATION	38
4.3.2 TEST PROCEDURE	38
4.3.3 TEST SETUP	39
4.3.4 TEST RESULTS	40
4.4 RS TESTING	42
4.4.1 TEST SPECIFICATION	42
4.4.2 TEST PROCEDURE	42
4.4.3 TEST SETUP	43
4.4.4 TEST RESULTS	44
4.5 EFT/BURST TESTING	46
4.5.1 TEST SPECIFICATION	46
4.5.2 TEST PROCEDURE	46
4.5.3 TEST SETUP	47
4.5.4 TEST RESULTS	48
4.6 SURGE TESTING	50
4.6.1 TEST SPECIFICATION	50
4.6.2 TEST PROCEDURE	50
4.6.3 TEST SETUP	51
4.6.4 TEST RESULTS	52
4.7 INJECTION CURRENT TESTING	54
4.7.1 TEST SPECIFICATION	54
4.7.2 TEST PROCEDURE	54
4.7.3 TEST SETUP	54
4.7.4 TEST RESULTS	56
4.8 VOLTAGE INTERRUPTION/DIPS TESTING	57
4.8.1 TEST SPECIFICATION	57
4.8.2 TEST PROCEDURE	57
4.8.3 TEST SETUP	57
4.8.4 TEST RESULTS	58
5 . EUT TEST PHOTO	59

1. TEST SUMMARY

Test procedures according to the technical standards:

ETSI EN 301 489-1 V2.2.3 (2019-11)

ETSI EN 301 489-17 V3.2.4 (2020-09)

EN IEC 61000-3-2:2019+A1:2021; EN 61000-3-3:2013+A2:2021

EMC Emission

Standard	Test Item	Limit	Judgment	Remark
EN 55032:2015+A1:2020	Conducted Emission On AC And Telecom Port 150kHz to 30MHz	Class B	N/A	
	Disturbance Voltage at The Antenna Terminals (30MHz To 2150MHz)	-----	N/A	
	Wanted signal and disturbance voltage at the RF output terminals (30MHz To 2150MHz)	-----	N/A	
	Radiated Emission 30MHz to 1000MHz	Class B	PASS	
	Radiated Emission 1GHz to 6GHz	Class B	PASS	
EN IEC 61000-3-2: 2019+A1:2021	Harmonic Current Emission	Class A	N/A	
EN 61000-3-3:2013+A2: 2021	Voltage Fluctuations & Flicker	-----	PASS	

EMC Immunity

Section EN 55035:2017+A11:2020	Test Item	Performance Criteria	Judgment	Remark
EN 61000-4-2:2009	Electrostatic Discharge	B	PASS	
EN 61000-4-3:2006+ A1:2008+A2:2010	RF electromagnetic field	A	PASS	NOTE (4)
EN 61000-4-4:2012	Fast transients	B	PASS	
EN 61000-4-5:2014+ A1:2017	Surges	B	PASS	
EN 61000-4-6:2014	Continuous radio frequency disturbances or Injected Current	A	PASS	
EN 61000-4-8:2010	Power Frequency Magnetic Field	A	N/A	NOTE (3)
EN 61000-4-11:2004	Volt. Interruptions Volt. Dips	B / B / C / C NOTE (2)	PASS	

NOTE:

- (1) "N/A" denotes test is not applicable in this Test Report
- (2) Voltage dip: 100% reduction – Performance Criteria **B**
Voltage dip: 30% reduction – Performance Criteria **C**
Voltage Interruption: 100% Interruption – Performance Criteria **C**
- (3) Applicable only to equipment containing devices intrinsically susceptible to magnetic fields, such as CRT monitors, Hall effect elements, electro-dynamic microphones, magnetic field sensors or audio frequency transformers.
- (4) The test site is located in site B.
- (5) For client's request and manual description, the test will not be executed.

1.1 TEST FACILITY

Shenzhen NTEK Testing Technology Co., Ltd.

Add. (Site A): 1/F, Building E, Fenda Science Park, Sanwei Community, Xixiang Street Bao'an District, Shenzhen 518126 P.R. China

Add.(Site B) : Building 30, Furong Third Road, Furong Industrial Zone, Xinqiao Street, Bao 'an District, Shenzhen, Guangdong, China

CNAS-Lab. : The Certificate Registration Number is L5516

IC-Registration : The Certificate Registration Number is 9270A
CAB identifier:CN0074

FCC- Accredited : Test Firm Registration Number: 463705
Designation Number: CN1184

A2LA-Lab. : The Certificate Registration Number is 4298.01

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately **95 %**.

Test Item	Measurement Frequency Range	K	U(dB)
AC Mains Conducted Emission	0.009kHz ~ 0.15MHz	2	2.66
AC Mains Conducted Emission	0.15MH ~ 30MHz	2	2.80
Telecom Conducted Emission (Cat 3)	0.15MHz ~ 30MHz	2	2.40
Telecom Conducted Emission (Cat 5)	0.15MHz ~ 30MHz	2	2.58
Radiated Emission	30MHz ~ 1000MHz	2	2.64
Radiated Emission	1000MHz ~ 6000MHz	2	2.40
Radiated Emission	6000MHz ~ 18000MHz	2	2.52

Revision History

[illegible]

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	SwitchBot Roller Shade
Trade Mark	SwitchBot
Model Name	W5000000
Family Model	W5000001, W5000002, W5000003, W5000004, W5000005, W5000006
Model Difference	All models are the same except for the model names and appearance lengths
Frequency Bands:	2402~2480 MHz
Modulation Type:	BLE(1Mbps/2Mbps): GFSK
Adapter	N/A
Battery	DC 7.3V 2600mAh 18.98Wh
Rating	DC 5V/1A from adapter; Max 24MHz or 7.3V from battery
Connecting I/O Port(s)	Please refer to the User's Manual
Antenna	PIFA Antenna
Hardware Version	N/A
Software Version	N/A

2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	Charging + Working(outward / inward)
Mode 2	BT LINK

For Conducted Test	
Final Test Mode	Description
Mode 1	Charging + Working(outward / inward)

For Radiated Test	
Final Test Mode	Description
Mode 1	Charging + Working(outward / inward)

For EMS Test	
Pretest Mode	Description
Mode 1	Charging + Working(outward / inward)
Mode 2	BT LINK

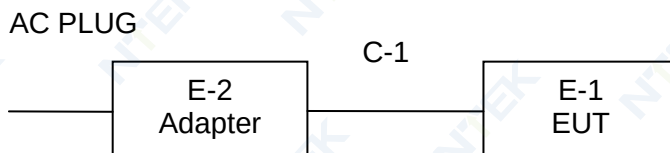
NOTE: The test modes were carried out for all operation modes. The final test mode of the EUT was the worst test mode for EMI, and its test data was showed.

2.3 DESCRIPTION OF TEST SETUP

CE



RE



2.4 DESCRIPTION TEST PERIPHERAL AND EUT PERIPHERAL

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Model/Type No.	Series No.	Note
E-1	SwitchBot Roller Shade	W5000000	N/A	EUT
E-2	Adapter	N/A	N/A	Peripherals

Item	Cable Type	Shielded Type	Ferrite Core	Length	Note
C-1	Type-C Cable	NO	NO	1.0m	

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.

2.5 MEASUREMENT INSTRUMENTS LIST

2.5.1 CONDUCTED EMISSION

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Test Cable	N/A	C01	N/A	2023.05.06	2026.05.05	3 year
2	Test Cable	N/A	C02	N/A	2023.05.06	2026.05.05	3 year
3	Test Cable	N/A	C03	N/A	2023.05.06	2026.05.05	3 year
4	Pulse Limiter	SCHWARZBECK	VTSD 9561F	9716	2022.06.17	2025.06.16	3 year
5	50Ω Switch	ANRITSU CORP	MP59B	6200983704	2023.05.06	2026.05.05	3 year
6	EMI Test Receiver	R&S	ESCI	101160	2024.03.12	2025.03.11	1 year
7	Universal radio communication tester	R&S	CMU200	1100.008.02	2024.04.26	2025.04.25	1 year
8	Wideband Radio Communication Tester Specifications	R&S	CMW500	148500	2024.04.26	2025.04.25	1 year
9	LISN	SCHWARZBECK	NNLK 8129	8129245	2024.03.12	2025.03.11	1 year
10	LISN	R&S	ENV216	101313	2024.03.12	2025.03.11	1 year

2.5.2 RADIATED TEST SITE

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Antenna Mast	EM	SC100_1	N/A	N/A	N/A	N/A
2	Turn Table	EM	SC100	060531	N/A	N/A	N/A
3	EMI Test Receiver	R&S	ESCI-7	101318	2024.03.12	2025.03.11	1 year
4	50Ω Switch	Anritsu Corp	MP59B	6200983705	2023.05.06	2026.05.05	3 year
5	Spectrum Analyzer	Aglient	E4440A	MY41000130	2024.03.12	2025.03.11	1 year
6	Universal radio communication tester	R&S	CMU200	1100.008.02	2024.04.25	2025.04.24	1 year
7	Wideband Radio Communication Tester Specifications	R&S	CMW500	148500	2024.04.25	2025.04.24	1 year
8	Test Cable	N/A	R-01	N/A	2022.06.17	2025.06.16	3 years
9	Test Cable	N/A	R-02	N/A	2022.06.17	2025.06.16	3 years
10	Bilog Antenna	TESEQ	CBL6111D	31216	2024.03.11	2025.03.12	1 year
11	Horn Antenna	EM	EM-AH-10180	2011071402	2022.03.31	2025.03.30	3 year
12	Amplifier	EMC	EMC051835SE	980246	2024.01.23	2025.01.22	1 year

2.5.3 HARMONICS AND FILCK

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Harmonic & Flicker	EM TEST	DPA500	0303-04	2024.03.18	2025.03.17	1 year
2	AC Power Source	EM TEST	ACS500	0203-01	2024.03.12	2025.03.11	1 year
3	Unversal radio communication tester	R&S	CMU200	1100.008.0 2	2024.04.26	2025.04.25	1 year
4	Wideband Radio Communication Tester Specifications	R&S	CMW500	148500	2024.04.26	2025.04.25	1 year

2.5.4 ESD

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Unversal radio communication tester	R&S	CMU200	1100.008.0 2	2024.04.26	2025.04.25	1 year
2	Wideband Radio Communication Tester Specifications	R&S	CMW500	148500	2024.04.26	2025.04.25	1 year
3	Electrostatic Discharge Generator	Lioncel	ESD-203B	ESD203B0 150402	2023.08.11	2024.08.10	1 year

2.5.5 RS

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Unversal radio communication tester	R&S	CMU200	1100.008.0 2	2024.04.26	2025.04.25	1 year
2	Wideband Radio Communication Tester Specifications	R&S	CMW500	148500	2024.04.26	2025.04.25	1 year
3	Audio Power Amplifier	Brüel & Kjær	4602B	2185667	2024.04.26	2025.04.25	1 year
4	Mouth Simulator	Brüel & Kjær	2669	2143265	2024.04.26	2025.04.25	1 year
5	Sound Calibrator	Brüel & Kjær	4185	2194825	2024.04.26	2025.04.25	1 year
6	1/2" Pressure-field Microphone	Brüel & Kjær	735	2641678	2024.04.26	2025.04.25	1 year
7	Telephone Test Head	Brüel & Kjær	4185	2631728	2024.04.26	2025.04.25	1 year
8	Audio Analyzer	R&S	UPV	100419	2024.04.26	2025.04.25	1 year

9	Ear Simulator for Telephonometry	Brüel & Kjær	4185	2553612	2024.03.12	2025.03.11	1 year
10	Bilog Antenna	ETS	3142E(Frequency range 30MHz to 6 GHz)	00214344	2023.11.07	2026.11.06	3 year
11	Broadband Amplifier	AR	60S1G6	0350414	2024.03.12	2025.03.11	1 year
12	PSG Analog Signal Generator	Agilent	E8257D	MY51110112	2024.04.25	2025.04.24	1 year
13	Power Amplifier	rflight	NTWPA-00810200	17063153	2024.04.25	2025.04.24	1 year
14	Power Amplifier	AR	25S1G4A	308598	2024.04.26	2025.04.25	1 year
15	Power Meter	Agilent	E4419B	MY45102538	2024.04.25	2025.04.24	1 year
16	Power Sensor	Agilent	E9301A	MY41495644	2024.04.25	2025.04.24	1 year
17	Power Sensor	Agilent	E9301A	US39212148	2024.04.25	2025.04.24	1 year

2.5.6 SURGE, EFT/BURST, VOLTAGE INTERRUPTION/DIPS

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Surge Generator	EVERFINE	EMS61000-5A-V1	1101002	2023.07.04	2024.07.03	1 year
2	DIPS Generator	EVERFINE	EMS61000-11K	1011002	2023.07.04	2024.07.03	1 year
3	EFT/B Generator	EVERFINE	EMS61000-4A-V2	1012005	2023.07.04	2024.07.03	1 year
4	Universal radio communication tester	R&S	CMU200	1100.008.02	2024.04.26	2025.04.25	1 year
5	Wideband Radio Communication Tester Specifications	R&S	CMW500	148500	2024.04.26	2025.04.25	1 year

2.5.7 INJECTION CURRENT

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Attenuator	TESEQ	ATN 6075	38411	N/A	N/A	N/A
2	RF Cable	TESEQ	RF Cable	N/A	N/A	N/A	N/A
3	Signal Generator	R&S	SML03	100954	2023.09.14	2024.09.13	1 year
4	Power Amplifier	TESEQ	CBA 230M-080	T44376	2023.08.08	2024.08.07	1 year
5	EM Clamp	FCC	F-203I-23M M	504	2023.09.14	2024.09.13	1 year
6	Audio Power Amplifier	Brüel & Kjær	4602B	2185667	2024.03.12	2025.03.11	1 year
7	Mouth Simulator	Brüel & Kjær	2669	2143265	2023.09.14	2024.09.13	1 year
8	Sound Calibrator	Brüel & Kjær	4185	2194825	2023.09.14	2024.09.13	1 year
9	1/2" Pressure-field Microphone	Brüel & Kjær	735	2641678	2023.09.14	2024.09.13	1 year
10	Audio Analyzer	R&S	UPV	100419	2023.09.14	2024.09.13	1 year
11	Ear Simulator for Telephonometry	Brüel & Kjær	4185	2553612	2024.04.26	2025.04.25	1 year
12	Telephone Test Head	Brüel & Kjær	4185	2631728	2024.04.26	2025.04.25	1 year
13	Universal radio communication tester	R&S	CMU200	1100.008.02	2024.04.26	2025.04.25	1 year
14	Wideband Radio Communication Tester Specifications	R&S	CMW500	148500	2024.04.26	2025.04.25	1 year
15	Coupling and Decoupling Network	TESEQ	CDN M016	38722	2024.04.26	2025.04.25	1 year

3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 POWER LINE CONDUCTED EMISSION (Frequency Range 150kHz-30MHz)

Table A.8 – Requirements for conducted emissions from the AC mains power ports of Class A equipment

Applicable to				
1. AC mains power ports (3.1.1)				
Table clause	Frequency range MHz	Coupling device (see Table A.7)	Detector type / bandwidth	Class A limits dB(μV)
A8.1	0,15 – 0,5	AMN	Quasi Peak / 9 kHz	79
	0,5 – 30			73
A8.2	0,15 – 0,5	AMN	Average / 9 kHz	66
	0,5 – 30			60
Apply A8.1 and A8.2 across the entire frequency range.				

Table A.9 – Requirements for conducted emissions from the AC mains power ports of Class B equipment

Applicable to				
1. AC mains power ports (3.1.1)				
Table clause	Frequency range MHz	Coupling device (see Table A.7)	Detector type / bandwidth	Class B limits dB(μV)
A9.1	0,15 – 0,5	AMN	Quasi Peak / 9 kHz	66 – 56
	0,5 – 5			56
	5 – 30			60
A9.2	0,15 – 0,5	AMN	Average / 9 kHz	56 – 46
	0,5 – 5			46
	5 – 30			50

Apply A9.1 and A9.2 across the entire frequency range.

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

3.1.2 TELECOMMUNICATION PORT CONDUCTED EMISSION(VOLTAGE LIMITS) (Frequency Range 150kHz-30MHz)

Table A.10 – Requirements for asymmetric mode conducted emissions from Class A equipment

Applicable to					
1. wired network ports (3.1.30) 2. optical fibre ports (3.1.24) with metallic shield or tension members 3. antenna ports (3.1.3)					
Table clause	Frequency range MHz	Coupling device (see Table A.7)	Detector type / bandwidth	Class A voltage limits dB(μV)	Class A current limits dB(μA)
A10.1	0,15 – 0,5	AAN	Quasi Peak / 9 kHz	97 – 87	n/a
	0,5 – 30			87	
	0,15 – 0,5	AAN	Average / 9 kHz	84 – 74	
	0,5 – 30			74	
A10.2	0,15 – 0,5	CVP and current probe	Quasi Peak / 9 kHz	97 – 87	53 – 43
	0,5 – 30			87	43
	0,15 – 0,5	CVP and current probe	Average / 9 kHz	84 – 74	40 – 30
	0,5 – 30			74	30
A10.3	0,15 – 0,5	Current Probe	Quasi Peak / 9 kHz	n/a	53 – 43
	0,5 – 30				43
	0,15 – 0,5	Current Probe	Average / 9 kHz		40 – 30
	0,5 – 30				30
The choice of coupling device and measurement procedure is defined in Annex C.					
AC mains ports that also have the function of a wired network port shall meet the limits given in Table A.8.					
The test shall cover the entire frequency range.					
The application of the voltage and/or current limits is dependent on the measurement procedure used. Refer to Table C.1 for applicability.					
Testing is required at only one EUT supply voltage and frequency.					
Applicable to ports listed above and intended to connect to cables longer than 3 m.					

Table A.12 – Requirements for conducted differential voltage emissions from Class B equipment

Applicable to						
1. TV broadcast receiver tuner ports (3.1.8) with an accessible connector						
2. RF modulator output ports (3.1.27)						
3. FM broadcast receiver tuner ports (3.1.8) with an accessible connector						
Table clause	Frequency range MHz	Detector type/ bandwidth	Class B limits dB(μV) 75 Ω			Applicability
			Other	Local Oscillator Fundamental	Local Oscillator Harmonics	
A12.1	30 – 950	For frequencies ≤1 GHz	46	46	46	See a)
	950 – 2 150		46	54	54	
A12.2	950 – 2 150	Quasi Peak/ 120 kHz	46	54	54	See b)
A12.3	30 – 300		46	54	50	See c)
	300 – 1 000				52	
A12.4	30 – 300	For frequencies ≥1 GHz	46	66	59	See d)
	300 – 1 000				52	
A12.5	30 – 950	Peak/ 1 MHz	46	76	46	See e)
	950 – 2 150			n/a	54	

a) Television receivers (analogue or digital), video recorders and PC TV broadcast receiver tuner cards working in channels between 30 MHz and 1 GHz, and digital audio receivers.

b) Tuner units (not the LNB) for satellite signal reception.

c) Frequency modulation audio receivers and PC tuner cards.

d) Frequency modulation car radios.

e) Applicable to EUTs with RF modulator output ports (for example DVD equipment, video recorders, camcorders and decoders etc.) designed to connect to TV broadcast receiver tuner ports.

Testing is required at only one EUT supply voltage and frequency.

The term 'other' refers to all emissions other than the fundamental and the harmonics of the local oscillator.

The test shall be performed with the device operating at each reception channel.

The test shall cover the entire frequency range.

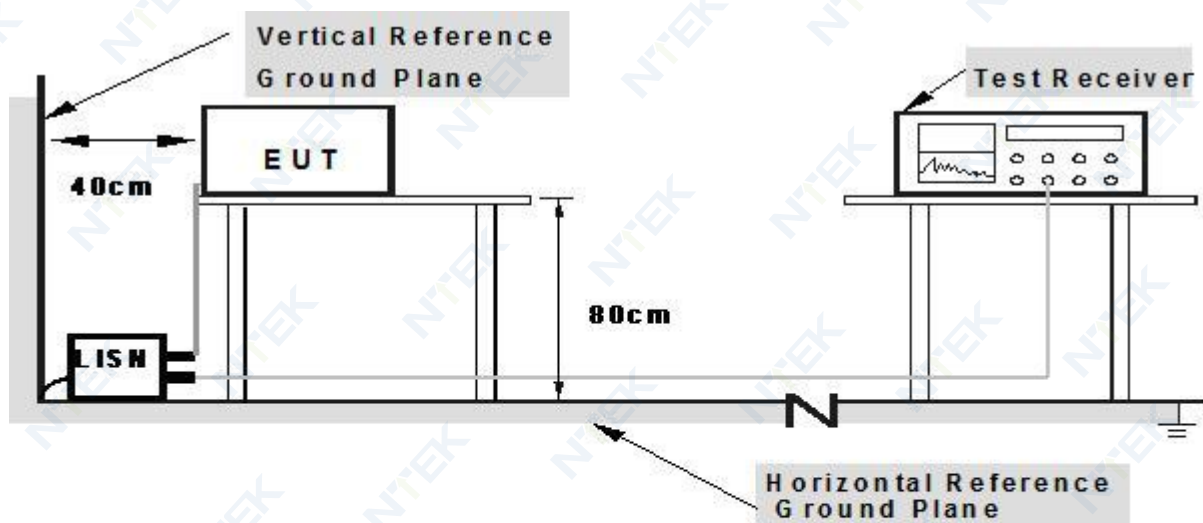
The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

3.1.3 TEST PROCEDURE

- The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- LISN at least 80 cm from nearest part of EUT chassis.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.1.4 TEST SETUP



Note: 1.Support units were connected to second LISN.

2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

3.1.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.2 Unless otherwise a special operating condition is specified in the follows during the testing.

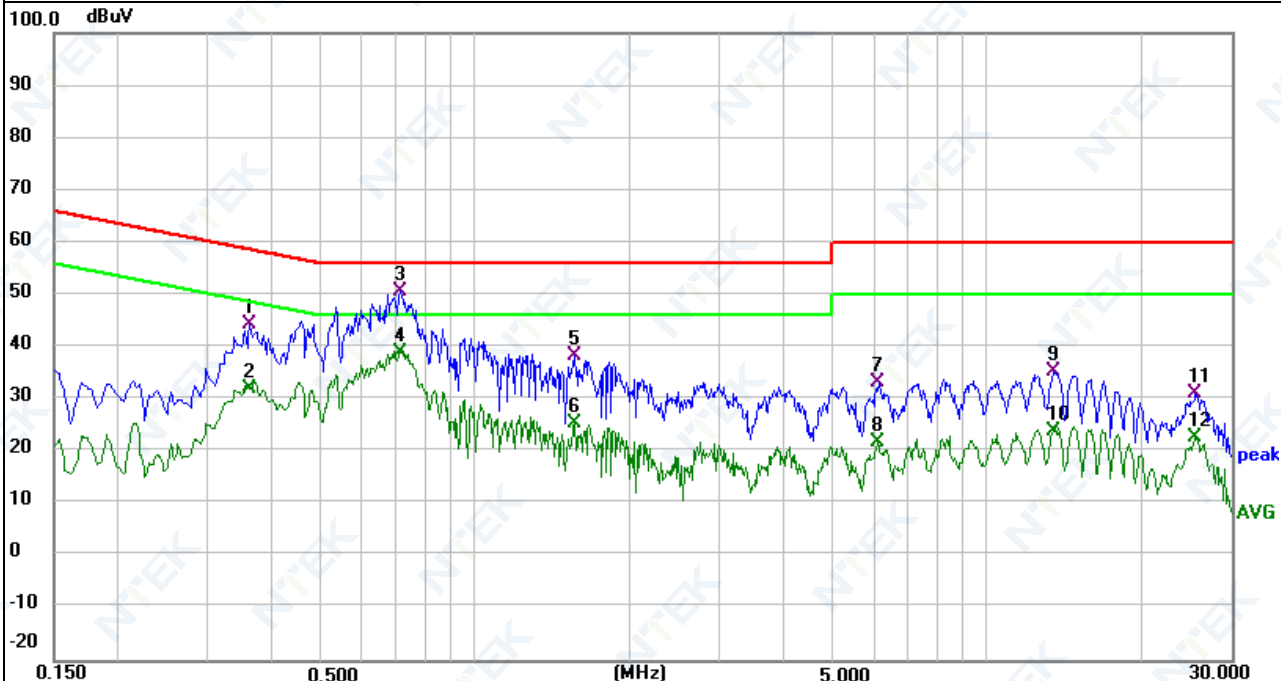
3.1.6 TEST RESULTS

EUT:	SwitchBot Roller Shade	Model Name:	W5000000
Temperature:	19.2℃	Relative Humidity:	54%
Pressure:	1010hPa	Phase:	L
Test Voltage:	DC 5V from adapter AC 230V	Test Mode:	Mode 1

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV)	Limits (dBμV)	Margin (dB)	Remark
0.3620	33.99	10.36	44.35	58.68	-14.33	QP
0.3620	21.83	10.36	32.19	48.68	-16.49	AVG
0.7140	39.47	11.07	50.54	56.00	-5.46	QP
0.7140	27.92	11.07	38.99	46.00	-7.01	AVG
1.5620	25.49	12.78	38.27	56.00	-17.73	QP
1.5620	12.54	12.78	25.32	46.00	-20.68	AVG
6.1020	23.62	9.68	33.30	60.00	-26.70	QP
6.1020	12.15	9.68	21.83	50.00	-28.17	AVG
13.4700	25.66	9.70	35.36	60.00	-24.64	QP
13.4700	14.28	9.70	23.98	50.00	-26.02	AVG
25.5780	21.49	9.63	31.12	60.00	-28.88	QP
25.5780	13.03	9.63	22.66	50.00	-27.34	AVG

Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.

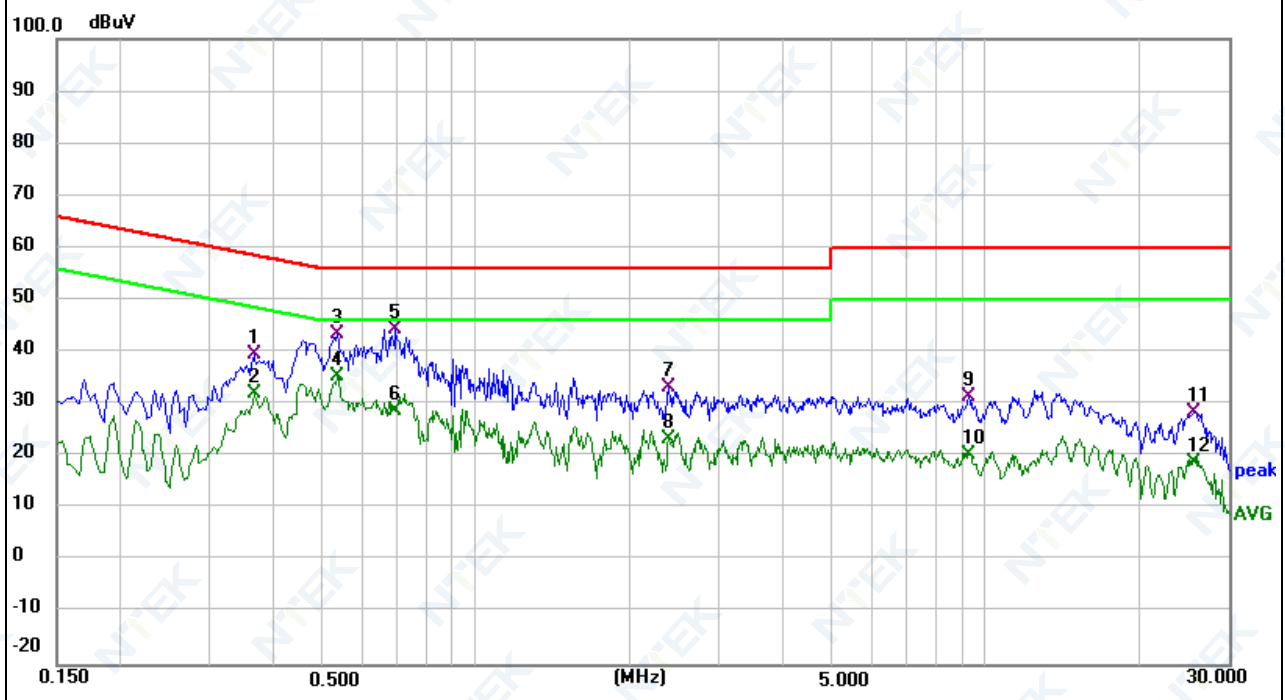


EUT:	SwitchBot Roller Shade	Model Name:	W5000000
Temperature:	19.2°C	Relative Humidity:	54%
Pressure:	1010hPa	Phase:	N
Test Voltage:	DC 5V from adapter AC 230V	Test Mode:	Mode 1

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV)	Limits (dBμV)	Margin (dB)	Remark
0.3660	29.09	10.38	39.47	58.59	-19.12	QP
0.3660	21.64	10.38	32.02	48.59	-16.57	AVG
0.5340	32.85	10.71	43.56	56.00	-12.44	QP
0.5340	24.75	10.71	35.46	46.00	-10.54	AVG
0.6940	33.27	11.03	44.30	56.00	-11.70	QP
0.6940	17.58	11.03	28.61	46.00	-17.39	AVG
2.3900	23.45	9.66	33.11	56.00	-22.89	QP
2.3900	13.59	9.66	23.25	46.00	-22.75	AVG
9.2860	21.67	9.69	31.36	60.00	-28.64	QP
9.2860	10.72	9.69	20.41	50.00	-29.59	AVG
25.6620	18.94	9.63	28.57	60.00	-31.43	QP
25.6620	9.30	9.63	18.93	50.00	-31.07	AVG

Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.



Note: The test modes were carried out for all operation modes. The worst test mode for test data was showed in the report.

3.2 RADIATED EMISSION MEASUREMENT

3.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT (Below 1000MHz)

Table A.2 – Requirements for radiated emissions at frequencies up to 1 GHz for Class A equipment

Table clause	Frequency range	Measurement		Class A limits dB(μV/m)
	MHz	Distance m	Detector type/ bandwidth	OATS/SAC (see Table A.1)
A2.1	30 – 230	10	Quasi Peak / 120 kHz	40
	230 – 1 000			47
A2.2	30 – 230	3		50
	230 – 1 000			57
Apply only A2.1 or A2.2 across the entire frequency range.				

Table A.4 – Requirements for radiated emissions at frequencies up to 1 GHz for Class B equipment

Table clause	Frequency range MHz	Measurement		Class B limits dB(μV/m)
		Distance m	Detector type/ bandwidth	OATS/SAC (see Table A.1)
A4.1	30 – 230	10	Quasi Peak / 120 kHz	30
	230 – 1 000			37
A4.2	30 – 230	3		40
	230 – 1 000			47
Apply only table clause A4.1 or A4.2 across the entire frequency range.				

Table A.6 – Requirements for radiated emissions from FM receivers

Table clause	Frequency range MHz	Measurement		Class B limit dB(μV/m)	
		Distance m	Detector type/ bandwidth	Fundamental	Harmonics
				OATS/SAC (see Table A.1)	OATS/SAC (see Table A.1)
A6.1	30 – 230	10	Quasi peak/ 120 kHz	50	42
	230 – 300				42
	300 – 1 000				46
A6.2	30 – 230	3		60	52
	230 – 300				52
	300 – 1 000				56
Apply only A.6.1 or A.6.2 across the entire frequency range.					
These relaxed limits apply only to emissions at the fundamental and harmonic frequencies of the local oscillator. Signals at all other frequencies shall be compliant with the limits given in Table A.4.					

3.2.2 LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

Table A.3 – Requirements for radiated emissions at frequencies above 1 GHz for Class A equipment

Table clause	Frequency range MHz	Measurement		Class A limits dB(μV/m)
		Distance m	Detector type/ bandwidth	FSOATS (see Table A.1)
A3.1	1 000 – 3 000	3	Average / 1 MHz	56
	3 000 – 6 000			60
A3.2	1 000 – 3 000		Peak / 1 MHz	76
	3 000 – 6 000			80

Apply A3.1 and A3.2 across the frequency range from 1 000 MHz to the highest required frequency of measurement derived from Table 1.

Table A.5 – Requirements for radiated emissions at frequencies above 1 GHz for Class B equipment

Table clause	Frequency range MHz	Measurement		Class B limits dB(μV/m)
		Distance m	Detector type/ bandwidth	FSOATS (see Table A.1)
A5.1	1 000 – 3 000	3	Average/ 1 MHz	50
	3 000 – 6 000			54
A5.2	1 000 – 3 000		Peak/ 1 MHz	70
	3 000 – 6 000			74

Apply A5.1 and A5.2 across the frequency range from 1 000 MHz to the highest required frequency of measurement derived from Table 1.

Notes:

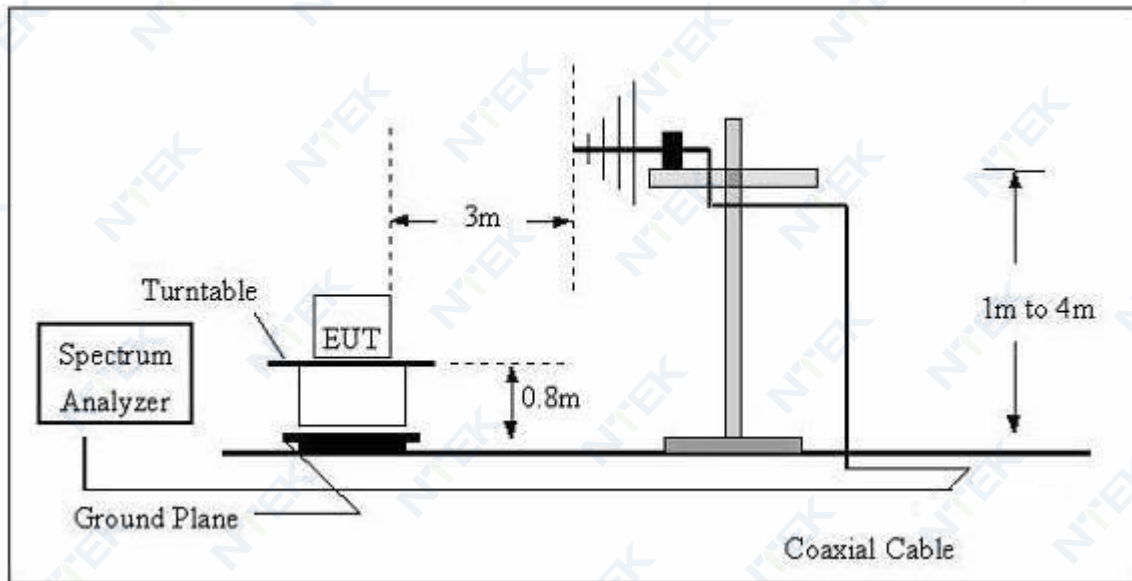
- (1) The limit for radiated test was performed according to as following: CISPR 32.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBμV/m)=20log Emission level (uV/m).

3.2.3 TEST PROCEDURE

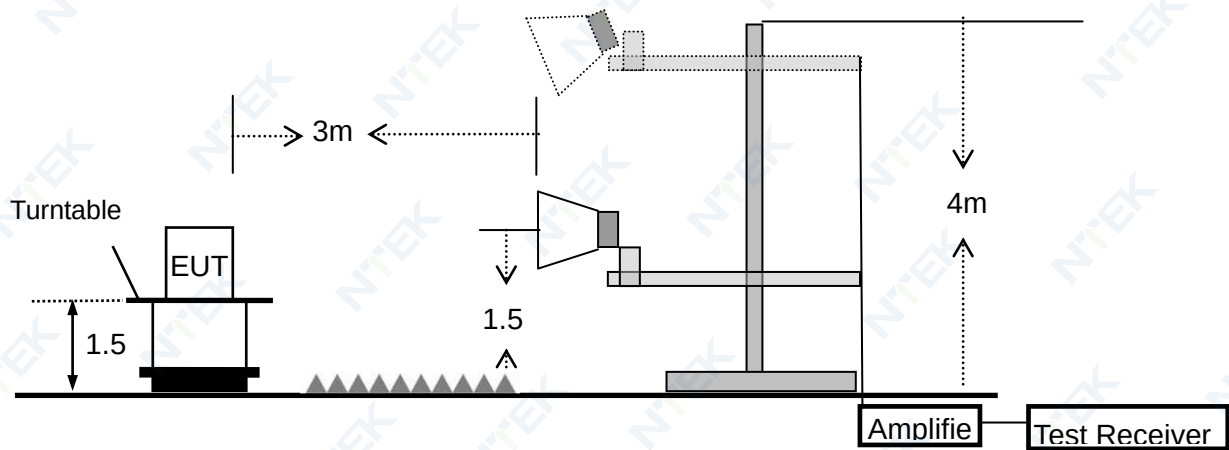
- a. The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- b. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.2.4 TEST SETUP

(A) Radiated Emission Test Set-Up Frequency Below 1 GHz



(B) Radiated Emission Test Set-Up Frequency Above 1GHz



3.2.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of **2.2** Unless otherwise a special operating condition is specified in the follows during the testing.

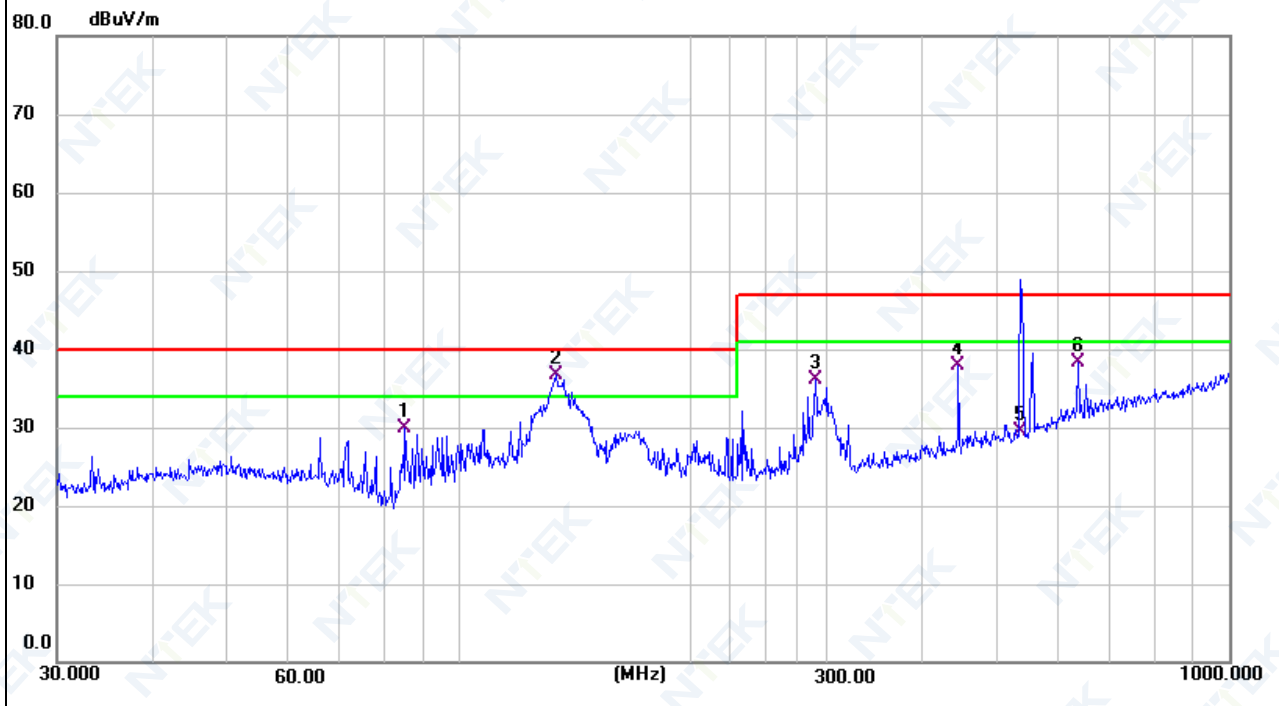
3.2.6 TEST RESULTS (30-1000MHz)

EUT:	SwitchBot Roller Shade	Model Name:	W5000000
Temperature:	25.3°C	Relative Humidity:	54%
Pressure:	1010 hPa	Polarization:	Horizontal
Test Power:	DC 5V from adapter AC 230V	Test Mode:	Mode 1

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
84.9995	14.08	15.88	29.96	40.00	-10.04	QP
133.6188	21.26	15.44	36.70	40.00	-3.30	QP
290.0172	16.08	20.02	36.10	47.00	-10.90	QP
444.8514	14.98	22.87	37.85	47.00	-9.15	QP
535.7073	5.20	24.32	29.52	47.00	-17.48	QP
636.1340	12.09	26.16	38.25	47.00	-8.75	QP

Remark:

1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.



EUT:	SwitchBot Roller Shade	Model Name:	W5000000
Temperature:	25.3°C	Relative Humidity:	54%
Pressure:	1010 hPa	Polarization:	Vertical
Test Power:	DC 5V from adapter AC 230V	Test Mode:	Mode 1

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
40.1347	15.01	19.59	34.60	40.00	-5.40	QP
95.0930	15.03	17.85	32.88	40.00	-7.12	QP
125.8863	17.22	16.13	33.35	40.00	-6.65	QP
256.5210	12.59	19.47	32.06	47.00	-14.94	QP
299.3158	12.09	20.04	32.13	47.00	-14.87	QP
629.4772	9.70	26.04	35.74	47.00	-11.26	QP

Remark:

1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.



Note: The test modes were carried out for all operation modes. The worst test mode for test data was showed in the report.

3.2.7 TEST RESULTS(1000-6000MHz)

EUT:	SwitchBot Roller Shade	Model Name:	W5000000
Temperature:	25.2℃	Relative Humidity:	53%
Pressure:	1010 hPa	Test Mode:	Mode 1
Test Power:	DC 5V from adapter AC 230V		

Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Remark
	(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
V	1375.000	72.48	-22.76	49.72	74.00	-24.28	peak
V	1775.000	66.44	-21.94	44.50	74.00	-29.50	peak
V	2460.000	58.30	-18.40	39.90	74.00	-34.10	peak
V	3345.000	58.39	-15.68	42.71	74.00	-31.29	peak
V	3735.000	56.93	-15.32	41.61	74.00	-32.39	peak
V	4705.000	55.81	-13.84	41.97	74.00	-32.03	peak
H	1385.000	69.21	-22.75	46.46	74.00	-27.54	peak
H	1530.000	72.05	-22.46	49.59	74.00	-24.41	peak
H	1890.000	61.11	-21.14	39.97	74.00	-34.03	peak
H	3005.000	58.20	-15.71	42.49	74.00	-31.51	peak
H	3370.000	58.93	-15.69	43.24	74.00	-30.76	peak
H	4850.000	54.67	-13.33	41.34	74.00	-32.66	peak

Remark:

Emission Level= Meter Reading+ Factor, Margin= Emission Level - Limit

Note: The test modes were carried out for all operation modes. The worst test mode for test data was showed in the report.

3.3 HARMONICS CURRENT

3.3.1 LIMITS OF HARMONICS CURRENT

Table 1 – Limits for Class A equipment

Harmonic order (n)	Maximum permissible harmonic current (A)
Odd harmonics	
3	2.3
5	1.14
7	0.77
9	0.4
11	0.33
13	0.21
$15 \leq n \leq 39$	$0.15 \cdot (15/n)$
Even harmonics	
2	1.08
4	0.43
6	0.30
$8 \leq n \leq 40$	$0.23 \cdot (8/n)$

Note: Reference standard of the table above: EN61000-3-2.

3.3.2 TEST PROCEDURE

a. The EUT was placed on the top of a wooden table 0.8 meters above the ground and operated to produce the maximum harmonic components under normal operating conditions.

b. The classification of EUT is according to section 5 of EN 61000-3-2. The EUT is classified as follows:

Class A: Balanced three-phase equipment, Household appliances excluding equipment as Class D, Tools excluding portable tools, Dimmers for incandescent lamps, audio equipment, equipment not specified in one of the three other classes.

Class B: Portable tools. Portable tools.; Arc welding equipment which is not professional equipment.

Class C: Lighting equipment.

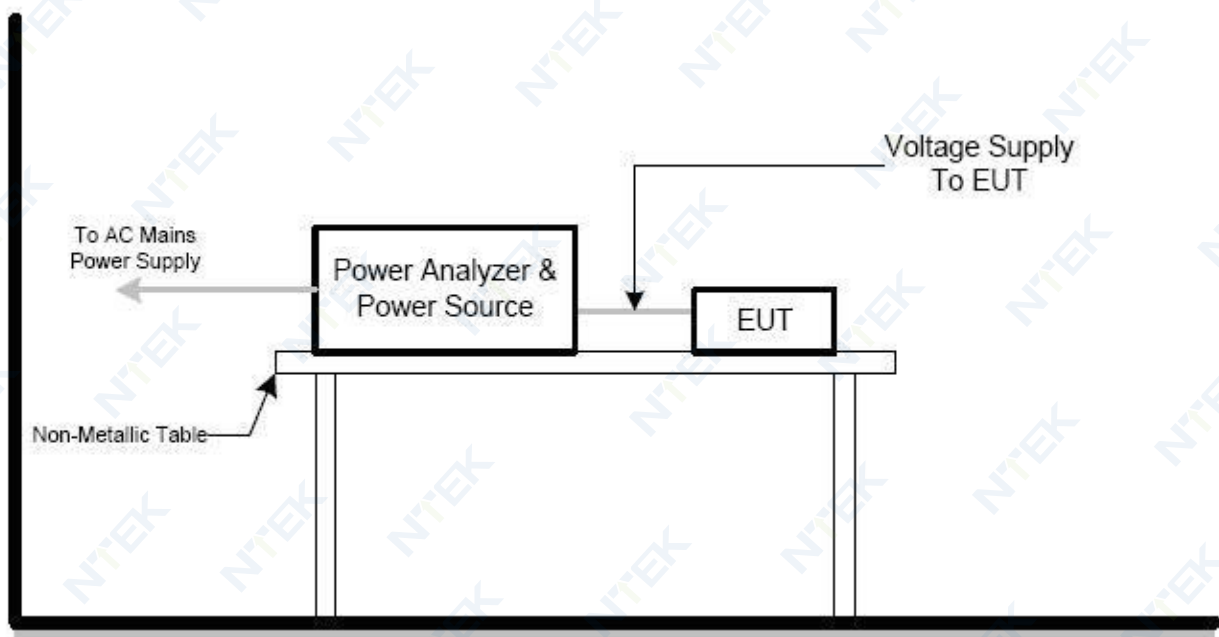
Class D: Equipment having a specified power less than or equal to 600W of the following types: Personal computers and personal computer monitors and television receivers.

c. The correspondent test program of test instrument to measure the current harmonics emanated from EUT is chosen. The measure time shall be not less than the time necessary for the EUT to be exercised.

3.3.3 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

3.3.4 TEST SETUP



3.3.5 TEST RESULTS

EUT:	SwitchBot Roller Shade	Model Name:	W5000000
Temperature:	21.1℃	Relative Humidity:	47%
Pressure:	1010hPa	Test duration:	150s
Classification:	Class A	Test Power:	N/A
Test Mode:	N/A		

Note: The active input power of the EUT is less than 75 W. No limits apply for equipment with an active input power up to and including 75W.

3.4 VOLTAGE FLUCTUATION AND FLICKERS

3.4.1 LIMITS OF VOLTAGE FLUCTUATION AND FLICKERS

Test items	Limits(EN61000-3-3)	Descriptions
P_{st}	$\leq 1.0, T_p=10\text{min}$	short-term flicker indicator
P_{lt}	$\leq 0.65, T_p=2\text{h}$	long-term flicker indicator
d_c	$\leq 3.3\%$	relative steady-state voltage change
d_{max}	$\leq 4\%$ (or 6% _{Note(1)} , 7% _{Note(2)})	maximum relative voltage change:
$d_{(t)}$	$\leq 3.3\%$, more than 500ms	relative voltage change characteristic

Note:

1. 6 % for equipment which is:
 - a. switched manually, or
 - b. switched automatically more frequently than twice per day, and also has either a delayed restart (the delay being not less than a few tens of seconds), or manual restart, after a power supply interruption.
2. 7 % for equipment which is
 - a. attended whilst in use (for example: hair dryers, vacuum cleaners, kitchen equipment such as mixers, garden equipment such as lawn mowers, portable tools such as electric drills), or
 - b. switched on automatically, or is intended to be switched on manually, no more than twice per day, and also has either a delayed restart (the delay being not less than a few tens of seconds) or manual restart, after a power supply interruption.

3.4.2 TEST PROCEDURE

a. Harmonic Current Test:

Test was performed according to the procedures specified in Sub-clause 6.2 of IEC/EN 61000-3-2 depend on which standard adopted for compliance measurement.

b. Fluctuation and Flickers Test:

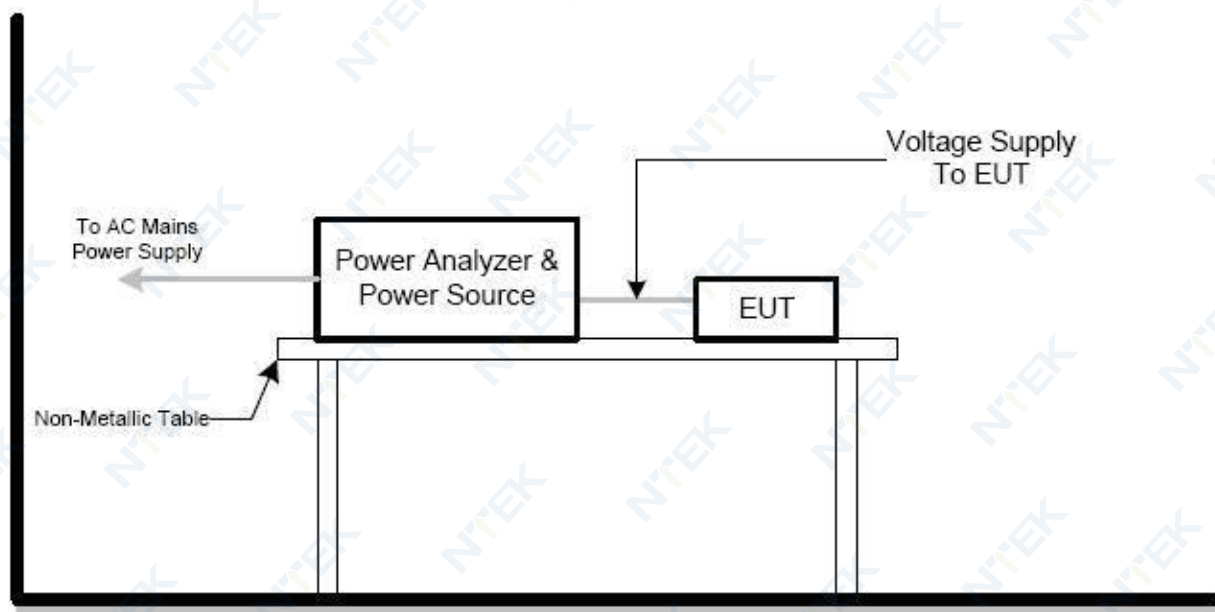
Tests was performed according to the Test Conditions/Assessment of Voltage Fluctuations specified in Clause 6.0/4.0 of IEC/EN 61000-3-3 depend on which standard adopted for compliance measurement.

c. All types of harmonic current and/or voltage fluctuation in this report are assessed by direct measurement using flicker-meter.

3.4.3 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

3.4.4 TEST SETUP



3.4.5 TEST RESULTS

EUT:	SwitchBot Roller Shade	Model Name:	W5000000
Temperature:	21.1℃	Relative Humidity:	47%
Pressure:	1010 hPa	Test Power:	DC 5V from adapter AC 230V
Test Mode:	Mode 1		

	EUT values	Limit	Result
Pst	0.021	1.00	PASS
Plt	0.009	0.65	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.000	4.00	PASS
Tmax [s]	0.000	0.50	PASS

4. EMC IMMUNITY TEST

4.1 GENERAL PERFORMANCE CRITERIA

4.1.1 PERFORMANCE CRITERIA

According to **EN 55035** standard, the general performance criteria as following:

Criterion A	The equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. 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 by what the user may reasonably expect from the equipment if used as intended.
Criterion B	After the test, the equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed, after the application of the phenomena below a performance level specified by the manufacturer, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is allowed. However, no change of operating state or stored data is allowed to persist after the test.
Criterion C	Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions. Functions, and/or information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

According to **EN 301 489-17** standard, the general performance criteria as following:

Criteria	During the test	After the test
A	Shall operate as intended (see note 1). Shall be no loss of function. Shall be no unintentional transmissions	Shall operate as intended. Shall be no degradation of performance (see note 3). Shall be no loss of function. Shall be no loss of stored data or user programmable functions
B	May show loss of function (one or more). May show degradation of performance (see note 2). Shall be no unintentional transmissions.	Functions shall be self-recoverable. Shall operate as intended after recovering. Shall be no degradation of performance (see note 3). Shall be no loss of stored data or user programmable functions.
C	May be loss of function (one or more)	Functions shall be recoverable by the operator. Shall operate as intended after recovering. Shall be no degradation of performance (see note 3).

NOTE 1: Operate as intended during the test allows a level of degradation not below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.

NOTE 2: Degradation of performance during the test is understood as a degradation to a level not below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance.

If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.

NOTE 3: No degradation of performance after the test is understood as no degradation below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. After the test no change of actual operating data or user retrievable data is allowed. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.

4.2 GENERAL PERFORMANCE CRITERIA TEST SETUP

The EUT tested system was configured as the statements of **2.2** Unless otherwise a special operating condition is specified in the follows during the testing.

4.3 ESD TESTING

4.3.1 TEST SPECIFICATION

Basic Standard:	IEC/EN 61000-4-2
Discharge Impedance:	330 ohm / 150 pF
Required Performance	B
Discharge Voltage:	Air Discharge: 2kV/4kV/8kV Contact Discharge: 2kV/4kV (Direct/Indirect)
Polarity:	Positive & Negative
Number of Discharge:	Air Discharge: min. 20 times at each test point Contact Discharge: min. 200 times in total
Discharge Mode:	A/C Discharge
Discharge Period:	1 second minimum

4.3.2 TEST PROCEDURE

The test generator necessary to perform direct and indirect application of discharges to the EUT in the following manner:

a. Indirect application of the discharge:

Vertical Coupling Plane (VCP):

At least 10 single discharges (in the most sensitive polarity) shall be applied to the centre of one vertical edge of the coupling plane. The coupling plane, of dimensions 0,5 m × 0,5 m, is placed parallel to, and positioned at a distance of 0,1 m from, the EUT.

Discharges shall be applied to the coupling plane, with sufficient different positions such that the four faces of the EUT are completely illuminated. One VCP position is considered to illuminate 0,5 m × 0,5 m area of the EUT surface.

Horizontal Coupling Plane (HCP):

Discharge to the HCP shall be made horizontally to the edge of the HCP.

At least 10 single discharges (in the most sensitive polarity) shall be applied at the front edge of each HCP opposite the centre point of each unit (if applicable) of the EUT and 0.1m from the front of the EUT. The long axis of the discharge electrode shall be in the plane of the HCP and perpendicular to its front edge during the discharge.

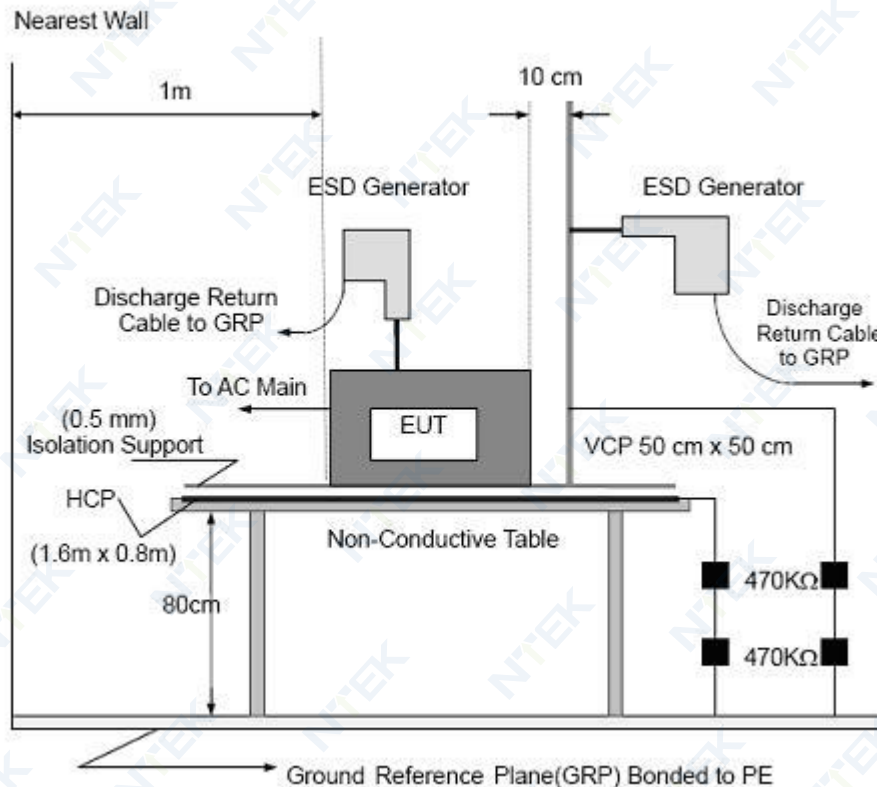
The discharge electrode shall be in contact with the edge of the HCP before the discharge switch is operated

b. Direct application of discharges to the EUT

The test shall be performed with single discharges. On each pre-selected point at least 10 single discharges (in the most sensitive polarity) shall be applied.

For the time interval between successive single discharges an initial value of 1 s is recommended. Longer intervals may be necessary to determine whether a system failure has occurred.

4.3.3 TEST SETUP



Note:

TABLE-TOP EQUIPMENT

The configuration consisted of a wooden table 0.8 meters high standing on the Ground Reference Plane. The GRP consisted of a sheet of aluminum at least 0.25mm thick, and 2.5 meters square connected to the protective grounding system. A Horizontal Coupling Plane (1.6m x 0.8m) was placed on the table and attached to the GRP by means of a cable with 940k total impedance. The equipment under test, was installed in a representative system as described in section 7 of IEC /EN 61000-4-2, and its cables were placed on the HCP and isolated by an insulating support of 0.5mm thickness. A distance of 1-meter minimum was provided between the EUT and the walls of the laboratory and any other metallic structure.

FLOOR-STANDING EQUIPMENT

The equipment under test was installed in a representative system as described in section 7 of IEC/EN 61000-4-2, and its cables were isolated from the Ground Reference Plane by an insulating support of 0.1-meter thickness. The GRP consisted of a sheet of aluminum that is at least 0.25mm thick, and 2.5meters square connected to the protective grounding system and extended at least 0.5 meters from the EUT on all sides.

4.3.4 TEST RESULTS

EUT:	SwitchBot Roller Shade	Model Name:	W5000000
Temperature:	21.1℃	Relative Humidity:	47%
Pressure:	1010 hPa	Test Power:	DC 5V from adapter AC 230V
Test Mode	Mode 1/2		

Mode	Contact Discharge (Indirect)							Criterion	Result		
Test level (kV)	Test Point	2		4		6					
Test Location		+	-	+	-	+	-				
HCP	Front	P	P	P	P			B	Complies		
	Rear	P	P	P	P						
	Left	P	P	P	P						
	Right	P	P	P	P						
VCP	Front	P	P	P	P						
	Rear	P	P	P	P						
	Left	P	P	P	P						
	Right	P	P	P	P						

Mode 2

Mode	Air Discharge								Contact Discharge								Observation	Criterion	Result
Test level(kV)	2		4		8		15		2		4		6		8				
Test Location	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-			
Button	P	P	P	P	P	P											TT,TR	B	Complies
Type-C port	P	P	P	P	P	P													
Screw									P	P	P	P							
Metal									P	P	P	P							

Mode 1

Mode	Air Discharge								Contact Discharge								Criterion	Result
Test level(kV)	2		4		8		15		2		4		6		8			
Test Location	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-		
Button	P	P	P	P	P	P											B	Complies
Type-C port	P	P	P	P	P	P												
Screw									P	P	P	P						
Metal									P	P	P	P						

Note:

- 1) +/- denotes the Positive/Negative polarity of the output voltage.
- 2) In the table: 'P' represents 'PASS'; 'F' represents 'FAIL'.

4.4 RS TESTING

4.4.1 TEST SPECIFICATION

Basic Standard:	IEC/EN 61000-4-3
Required Performance	A
Frequency Range:	According to EN 301 489-1: 80 MHz - 6000 MHz ; According to EN 55035: 80 MHz to 1000 MHz 1800 MHz 2600 MHz 3500 MHz 5000 MHz
Field Strength:	3 V/m
Modulation:	1kHz Sine Wave, 80%, AM Modulation
Frequency Step:	1 % of fundamental
Polarity of Antenna:	Horizontal and Vertical
Test Distance:	3 m
Antenna Height:	1.5 m
Dwell Time:	at least 3 seconds

4.4.2 TEST PROCEDURE

The EUT and support equipment, which are placed on a table that is 0.8 meter above ground and the testing was performed in a fully-anechoic chamber.

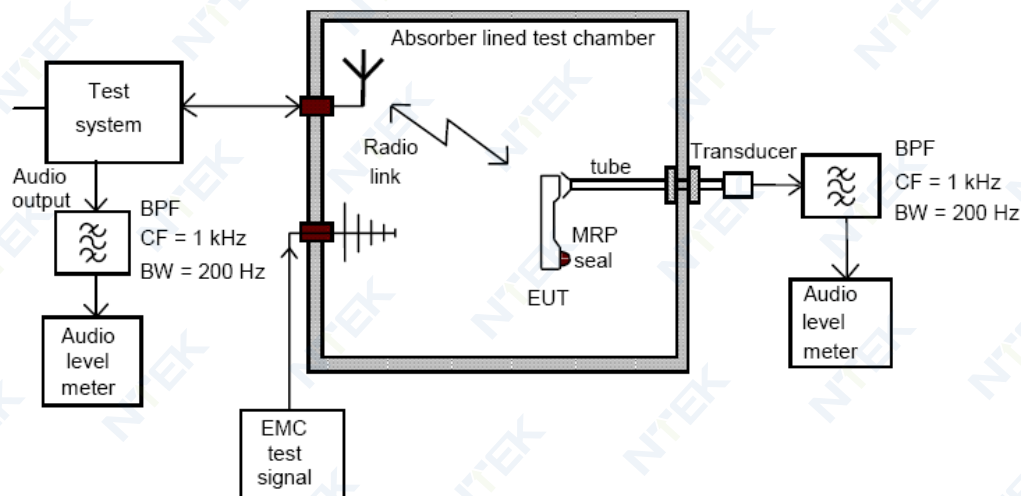
The testing distance from antenna to the EUT was 3 meters.

The other condition as following manner:

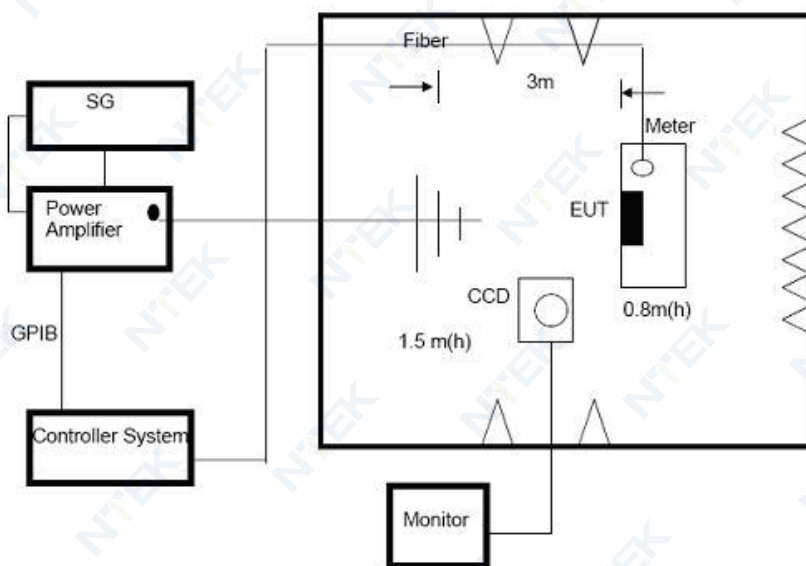
- The field strength level was 3V/m.
- The frequency range is swept from 80 MHz to 6000 MHz, 1800 MHz, 2600 MHz, 3500 MHz, 5000 MHz with the signal 80%amplitude modulated with a 1kHz sine wave. The rate of sweep did not exceed 1.5×10^{-3} decade/s. Where the frequency range is swept incrementally, the step size was 1% of fundamental.
- Sweep Frequency 900 MHz, with the Duty Cycle:1/8 and Modulation: Pulse 217 Hz(if applicable)
- The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.
- The test was performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.4.3 TEST SETUP

☐ Mobile Communication



☒ General Communication



Note:

For the actual test configuration, please refer to the related Item –EUT Test Photos.

TABLE-TOP EQUIPMENT

The EUT installed in a representative system as described in section 7 of IEC/EN 61000-4-3 was placed on a non-conductive table 0.8 meters in height. The system under test was connected to the power and signal wire according to relevant installation instructions.

FLOOR-STANDING EQUIPMENT

The EUT installed in a representative system as described in section 7 of IEC/EN 61000-4-3 was placed on a non-conductive wood support 0.1 meters in height. The system under test was connected to the power and signal wire according to relevant installation instructions.

4.4.4 TEST RESULTS

EUT:	SwitchBot Roller Shade	Model Name:	W5000000
Temperature:	22.6°C	Relative Humidity:	52%
Pressure:	1010 hPa	Test Power:	DC 5V from adapter AC 230V
Test Mode:	Mode 1/2		

TEST RESULT

Mode 2

Frequency Range (MHz)	RF Field Position	R.F. Field Strength	Azimuth	Observation	Perform. Criteria	Results
80~1000	H / V	3 V/m (rms) AM Modulated 1000Hz, 80%	Front	CT,CR	A	P
			Rear			
			Left			
			Right			

Frequency Range (MHz)	RF Field Position	R.F. Field Strength	Azimuth	Observation	Perform. Criteria	Results
1000~6000	H / V	3 V/m (rms) AM Modulated 1000Hz, 80%	Front	CT,CR	A	P
			Rear			
			Left			
			Right			

Note:

1. The exclusion band has not been tested in 80MHz~6GHz.

The exclusion band for immunity testing of equipment operating in the 2,4 GHz band shall be: • lower limit of exclusion band = lowest allocated band edge frequency -120 MHz, i.e. 2 280 MHz; • upper limit of exclusion band = highest allocated band edge frequency +120 MHz, i.e. 2 603,5MHz.

2. "A" stand for, during test, operate as intended no loss of function, no degradation of performance, no unintentional transmissions and after test, no degradation of performance, no loss of function, no loss of stored data or user programmable functions.

Mode 1

Frequency Range (MHz)	RF Field Position	R.F. Field Strength	Azimuth	Perform. Criteria	Results
80~1000	H / V	3 V/m (rms) AM Modulated 1000Hz, 80%	Front	A	P
1000~6000			Rear		
1800 MHz			Left		
2600 MHz			Right		
3500 MHz					
5000 MHz					

Note: "A" stand for, during test, operate as intended no loss of function, no degradation of performance, no unintentional transmissions and after test, no degradation of performance, no loss of function, no loss of stored data or user programmable functions.

Note:

- 1) N/A - denotes test is not applicable in this test report.
- 2) There was not any unintentional transmission in standby mode
- 3) In the table: 'P' represents 'PASS'; 'F' represents 'FAIL'.

4.5 EFT/BURST TESTING

4.5.1 TEST SPECIFICATION

Basic Standard:	IEC/EN 61000-4-4
Required Performance	B
Test Voltage:	Power Line: 1 kV DC/Signal/ wired network Line: 0.5 KV
Polarity:	Positive & Negative
Impulse Frequency:	For xDSL wired network ports: 100 kHz For DC/AC ports: 5 kHz
Impulse Wave shape :	5/50 ns
Burst Duration:	15 ms
Burst Period:	300 ms
Test Duration:	Not less than 1 min.

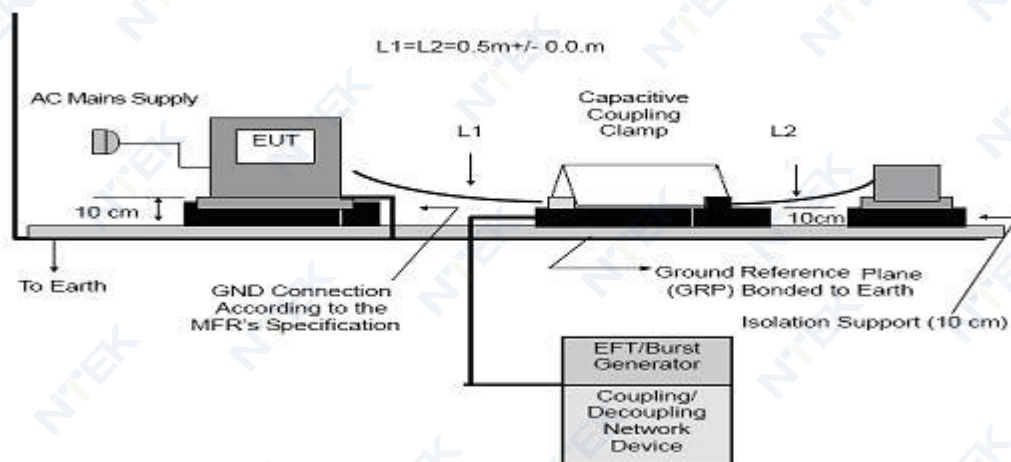
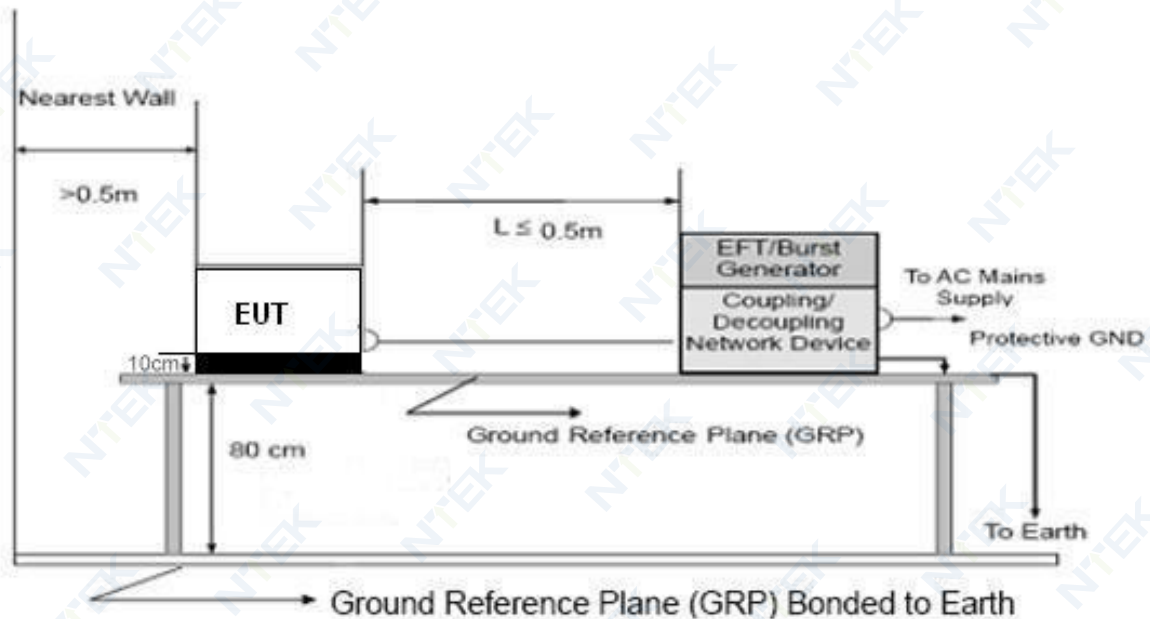
4.5.2 TEST PROCEDURE

The EUT and support equipment, are placed on a table that is 0.8 meter above a metal ground plane measured 1m*1m min. and 0.65mm thick min.

The other condition as following manner:

- The length of power cord between the coupling device and the EUT should not exceed 1 meter.
- Both positive and negative polarity discharges were applied.
- The duration time of each test sequential was 1 minute
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.5.3 TEST SETUP



Note:

TABLE-TOP EQUIPMENT

The configuration consisted of a wooden table (0.8m high) standing on the Ground Reference Plane. The GRP consisted of a sheet of aluminum (at least 0.25mm thick and 2.5m square) connected to the protective grounding system. A minimum distance of 0.5m was provided between the EUT and the walls of the laboratory or any other metallic structure.

FLOOR-STANDING EQUIPMENT

The EUT installed in a representative system as described in section 7 of IEC/EN 61000-4-4 and its cables, were isolated from the Ground Reference Plane by an insulating support that is 0.1-meter thick. The GRP consisted of a sheet of aluminum (at least 0.25mm thick and 2.5m square) connected to the protective grounding system.

4.5.4 TEST RESULTS

EUT:	SwitchBot Roller Shade	Model Name:	W5000000
Temperature:	21.1℃	Relative Humidity:	47%
Pressure:	1010 hPa	Test Power:	DC 5V from adapter AC 230V
Test Mode:	Mode 1/2		

TEST RESULT

Mode 1

Coupling Line		Test level (kV)								Criterion	Result
		0.5		1		2		4			
		+	-	+	-	+	-	+	-		
AC line	L	P	P	P	P					B	Complies
	N	P	P	P	P						Complies
	PE										
	L+N	P	P	P	P						Complies
	L+PE										
	N+PE										
	L+N+PE										
DC Line											
Signal Line											

Note:

- 1) There was not any unintentional transmission in standby mode
- 2) In the table: 'P' represents 'PASS'; 'F' represents 'FAIL'.

Mode 2

Coupling Line		Test level (kV)								Observation	Criterion	Result
		0.5		1		2		4				
		+	-	+	-	+	-	+	-			
AC line	L	P	P	P	P					TT,TR	B	Complies
	N	P	P	P	P							Complies
	PE											
	L+N	P	P	P	P							Complies
	L+PE											
	N+PE											
	L+N+PE											
DC Line												
Signal Line												

Note:

- 1) There was not any unintentional transmission in standby mode
- 2) In the table: 'P' represents 'PASS'; 'F' represents 'FAIL'.

4.6 SURGE TESTING

4.6.1 TEST SPECIFICATION

Basic Standard:	IEC/EN 61000-4-5
Required Performance	B
Wave-Shape:	Combination Wave 1.2/50 us Open Circuit Voltage 8 /20 us Short Circuit Current
Test Voltage:	Power Line:0.5 kV, 1 kV, 2 kV
Surge Input / Output:	L-N, L-PE, N-PE
Generator Source:	2 ohm between networks
Impedance:	12 ohm between network and ground
Polarity:	Positive/Negative
Phase Angle:	0 /90/180/270
Pulse Repetition Rate:	1 time / min. (maximum)
Number of Tests:	5 positive and 5 negative at selected points

4.6.2 TEST PROCEDURE

a. For EUT power supply:

The surge is to be applied to the EUT power supply terminals via the capacitive coupling network. Decoupling networks are required in order to avoid possible adverse effects on equipment not under test that may be powered by the same lines, and to provide sufficient decoupling impedance to the surge wave. The power cord between the EUT and the coupling/decoupling networks shall be 2meters in length (or shorter).

b. For test applied to unshielded unsymmetrically operated interconnection lines of EUT:

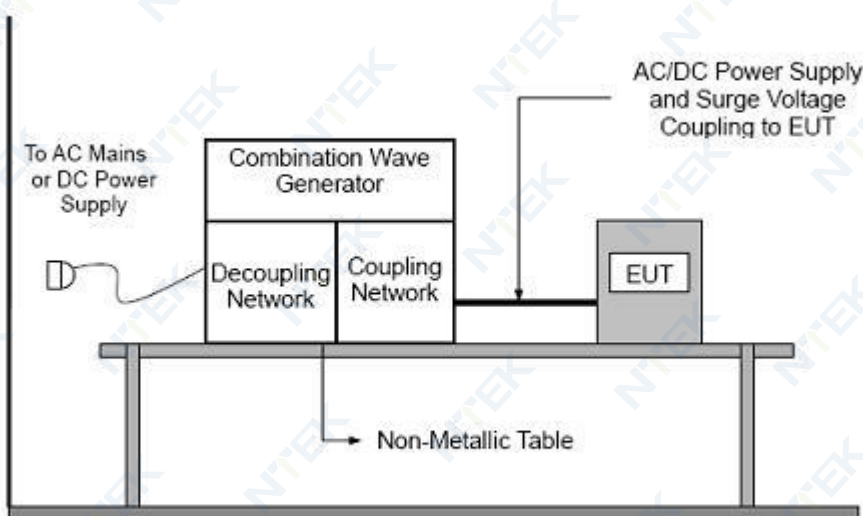
The surge is applied to the lines via the capacitive coupling. The coupling /decoupling networks shall not influence the specified functional conditions of the EUT. The interconnection line between the EUT and the coupling/decoupling networks shall be 2 meters in length (or shorter).

c. For test applied to unshielded symmetrically operated interconnection /telecommunication lines of EUT:

The surge is applied to the lines via gas arrestors coupling. Test levels below the ignition point of the coupling arrestor cannot be specified. The interconnection line between the EUT and the coupling/decoupling networks shall be 2 meters in length (or shorter).

d. For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.6.3 TEST SETUP



4.6.4 TEST RESULTS

EUT:	SwitchBot Roller Shade	Model Name:	W5000000
Temperature:	21.1℃	Relative Humidity:	47%
Pressure:	1010 hPa	Test Power:	DC 5V from adapter AC 230V
Test Mode:	Mode 1/2		

TEST RESULT

Mode 1

Coupling Line			Test level								Criterion	Result
			0.5 kV		1 kV		2 kV		4 kV			
			+	-	+	-	+	-	+	-		
AC line	L-N	0°	P	P	P	P					B	Complies
		90°	P	P	P	P						
		180°	P	P	P	P						
		270°	P	P	P	P						
	L-PE	0°										
		90°										
		180°										
		270°										
	N-PE	0°										
		90°										
		180°										
		270°										
DC Line												
Signal Line												

Note:

- 1) There was not any unintentional transmission in standby mode
- 2) In the table: 'P' represents 'PASS'; 'F' represents 'FAIL'.

Mode 2

Coupling Line			Test level								Observation	Criterion	Result
			0.5 kV		1 kV		2 kV		4 kV				
			+	-	+	-	+	-	+	-			
AC line	L-N	0°	P	P	P	P					TT,TR	B	Complies
		90°	P	P	P	P							
		180°	P	P	P	P							
		270°	P	P	P	P							
	L-PE	0°											
		90°											
		180°											
		270°											
	N-PE	0°											
		90°											
		180°											
		270°											
DC Line													
Signal Line													

Note:

- 1) There was not any unintentional transmission in standby mode
- 2) In the table: 'P' represents 'PASS'; 'F' represents 'FAIL'.

4.7 INJECTION CURRENT TESTING

4.7.1 TEST SPECIFICATION

Basic Standard:	IEC/EN 61000-4-6
Required Performance	A
Frequency Range:	0.15 MHz - 80 MHz
Field Strength:	3 Vr.m.s.
Modulation:	1kHz Sine Wave, 80%, AM Modulation
Frequency Step:	1 % of fundamental
Dwell Time:	at least 3 seconds

4.7.2 TEST PROCEDURE

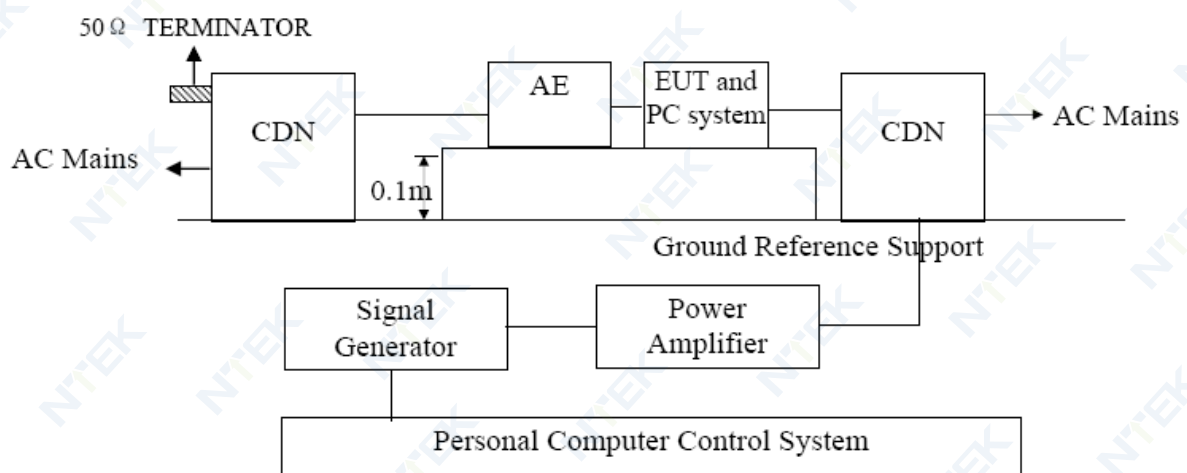
The EUT and support equipment, are placed on a table that is 0.8 meter above a metal ground plane measured 1m*1m min. and 0.65mm thick min.

The other condition as following manner:

- The field strength level was 3V.
- The frequency range is swept from 150 KHz to 80 MHz, with the signal 80%amplitude modulated with a 1kHz sine wave. The rate of sweep did not exceed 1.5×10^{-3} decade/s. Where the frequency range is swept incrementally, the step size was 1% of fundamental.
- The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.7.3 TEST SETUP

☐ Mobile Communication





4.7.4 TEST RESULTS

EUT:	SwitchBot Roller Shade	Model Name:	W5000000
Temperature:	21.1℃	Relative Humidity:	47%
Pressure:	1010 hPa	Test Power:	DC 5V from adapter AC 230V/50Hz
Test Mode:	Mode 1/2		

TEST RESULT

Mode 1

Test Ports (Mode)	Freq. Range (MHz)	Field Strength	Perform. Criteria	Results
Input/ Output AC. Power Port	0.15 ---80	3V(rms) AM Modulated 1000Hz, 80%	A	P
Input/ Output DC. Power Port	0.15 --- 80		N/A	N/A
Signal Line	0.15 --- 80		N/A	N/A

Note: "A" stand for, during test, operate as intended no loss of function, no degradation of performance, no unintentional transmissions and after test, no degradation of performance, no loss of function, no loss of stored data or user programmable functions.

Mode 2

Test Ports (Mode)	Freq. Range MHz)	Field Strength	Observation	Perform. Criteria	Results
Input/ Output AC. Power Port	0.15 ---80	3V(rms) AM Modulated 1000Hz, 80%	CT, CR	A	P
Input/ Output DC. Power Port	0.15 --- 80		N/A	N/A	N/A
Signal Line	0.15 --- 80		N/A	N/A	N/A

Note: "A" stand for, during test, operate as intended no loss of function, no degradation of performance, no unintentional transmissions and after test, no degradation of performance, no loss of function, no loss of stored data or user programmable functions.

4.8 VOLTAGE INTERRUPTION/DIPS TESTING

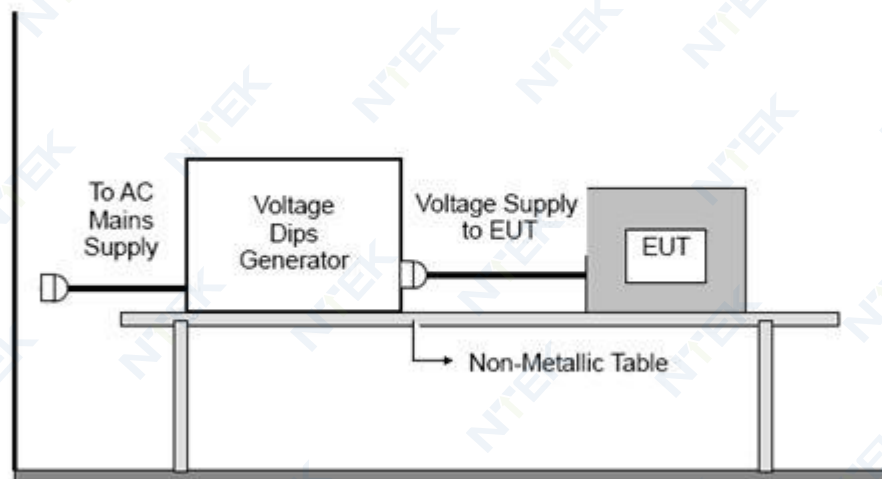
4.8.1 TEST SPECIFICATION

Basic Standard:	IEC/EN 61000-4-11
Required Performance	B (For 100% Voltage Dips) C (For 30% Voltage Dips) C (For 100% Voltage Interruptions)
Test Duration Time:	Minimum three test events in sequence
Interval between Event:	Minimum ten seconds
Phase Angle:	0°/45°/90°/135°/180°/225°/270°/315°/360°
Test Cycle:	3 times

4.8.2 TEST PROCEDURE

The EUT shall be tested for each selected combination of test levels and duration with a sequence of three dips/interruptions with intervals of 10 s minimum (between each test event). Each representative mode of operation shall be tested. Abrupt changes in supply voltage shall occur at zero crossings of the voltage waveform.

4.8.3 TEST SETUP



For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.8.4 TEST RESULTS

EUT:	SwitchBot Roller Shade	Model Name:	W5000000
Temperature:	21.1℃	Relative Humidity:	47%
Pressure:	1010 hPa	Test Power:	DC 5V from adapter AC 230V/50Hz
Test Mode:	Mode 1/2		

TEST RESULT

Mode 1

Voltage Reduction	Duration (ms)	Perform Criteria	Results
Voltage dip 0%	10	B	P
Voltage dip 0%	20	B	P
Voltage dip 70%	500	C	P
Voltage interruptions	5000	C	P

Mode 2

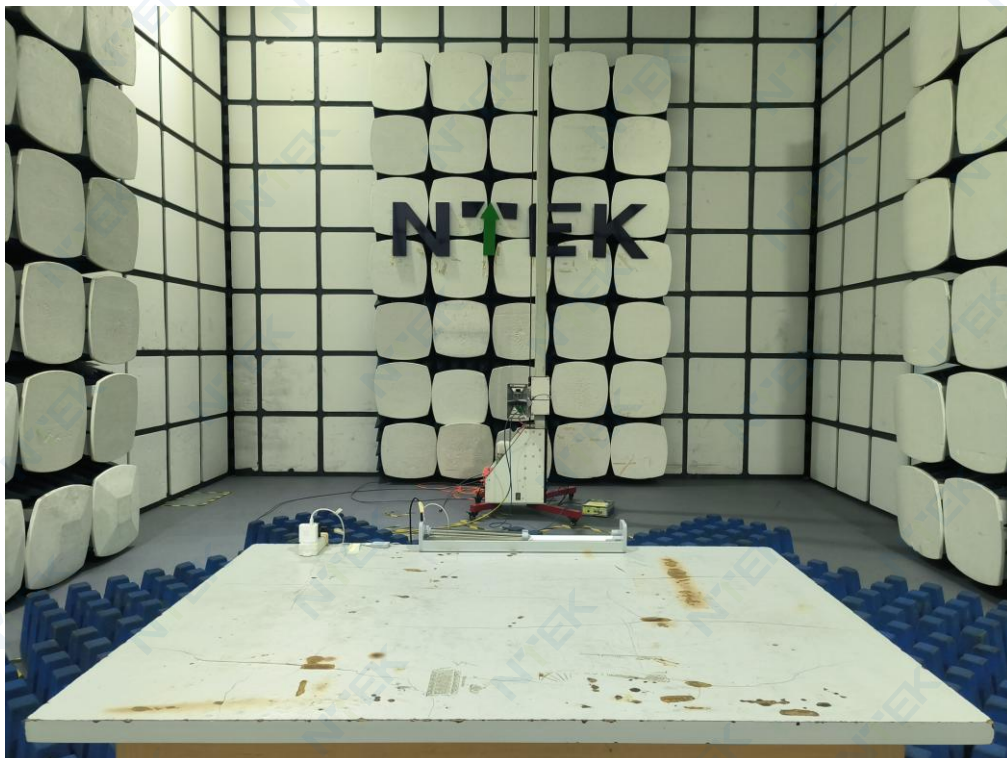
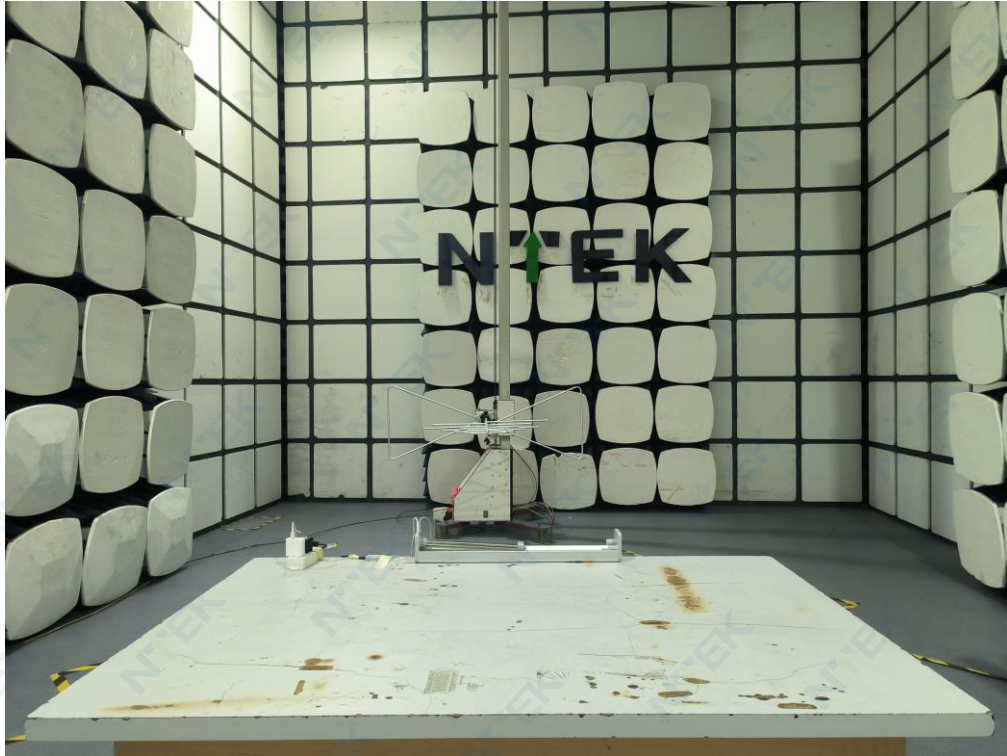
Voltage Reduction	Duration (ms)	Observation	Perform Criteria	Results
Voltage dip: 0%	10	TT, TR	B	P
Voltage dip: 0%	20	TT, TR	B	P
Voltage dip: 70%	500	TT, TR	C	P
Voltage interruptions: 0%	5000	TT, TR	C	P

Note:

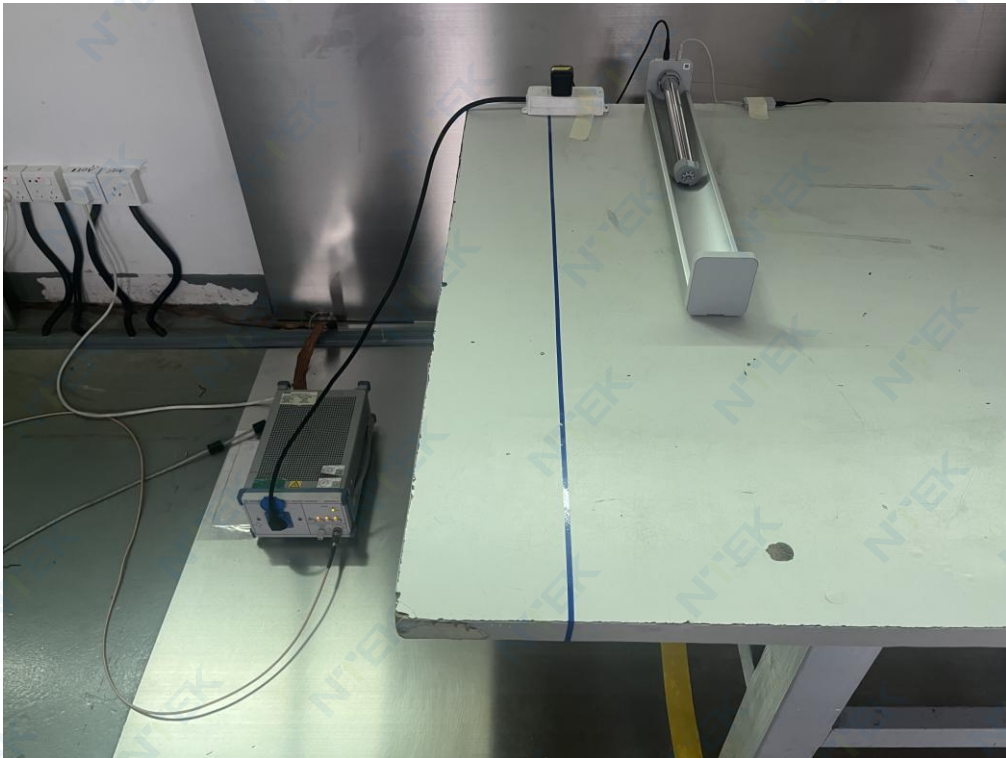
- 1) There was not any unintentional transmission in standby mode
- 2) In the table: 'P' represents 'PASS'; 'F' represents 'FAIL'.

5. EUT TEST PHOTO

Radiated Measurement Photo



Conducted Measurement Photo



END OF REPORT

CE EMC Test Report



(Declaration of Conformity)
For
Electromagnetic compatibility
Of

Product : SwitchBot Roller Shade

Trade Mark : SwitchBot

Model Number : W5000000, W5000001, W5000002, W5000003,
W5000004, W5000005, W5000006

Prepared for

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Prepared by

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TEST RESULT CERTIFICATION

Applicant's Name: Woan Technology (Shenzhen) Co., Ltd.
Room 1101, Qiancheng Commercial Center, No. 5 Haicheng Road,
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Manufacturer's Name.....: Woan Technology (Shenzhen) Co., Ltd.
Room 1101, Qiancheng Commercial Center, No. 5 Haicheng Road,
Address: Mabu Community, Xixiang Sub-district, Bao'an District, Shenzhen,
Guangdong, P.R.China, 518100

Product description

Product Name.....: SwitchBot Roller Shade
Model Number: W5000000, W5000001, W5000002, W5000003, W5000004,
W5000005, W5000006

Standards: EN IEC 55014-1:2021
EN IEC 55014-2:2021

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Test Sample Number: S240425025002

Date of Test:

Date (s) of performance of tests: 31 May 2024 ~ 18 Jun. 2024

Date of Issue: 18 Jun. 2024

Test Result: **Pass**

Testing Engineer

:

Estelle Chen

(Estelle Chen)

Technical Manager

:

Sky Zhang

(Sky Zhang)

Authorized Signatory

:

Alex

(Alex)

Table of Contents

Page

1 . TEST SUMMARY	4
1.1 TEST FACILITY	5
1.2 MEASUREMENT UNCERTAINTY	5
2 . GENERAL INFORMATION	7
2.1 GENERAL DESCRIPTION OF EUT	7
2.2 DESCRIPTION OF TEST MODES	8
2.3 DESCRIPTION OF TEST SETUP	8
2.4 DESCRIPTION TEST PERIPHERAL AND EUT PERIPHERAL	9
2.5 MEASUREMENT INSTRUMENTS LIST	10
2.6 MEASUREMENT SOFTWARE	11
3 . EMC EMISSION TEST	12
3.1 RADIATED EMISSION MEASUREMENT	12
3.1.1 LIMITS OF RADIATED EMISSION MEASUREMENT (Below 1000MHz)	12
3.1.2 LIMITS OF DISTURBANCE POWER MEASUREMENT (Below 1000MHz)	12
3.1.3 TEST PROCEDURE	13
3.1.4 TEST SETUP	13
3.1.5 EUT OPERATING CONDITIONS	13
3.1.6 TEST RESULTS (30-1000MHz)	14
4 . EMC IMMUNITY TEST	16
4.1 STANDARD COMPLIANCE/SEVERITY LEVEL/CRITERIA	16
4.2 GENERAL PERFORMANCE CRITERIA	16
4.3 GENERAL PERFORMANCE CRITERIA TEST SETUP	16
4.4 ESD TESTING	17
4.4.1 TEST SPECIFICATION	17
4.4.2 TEST PROCEDURE	17
4.4.3 TEST SETUP	18
4.4.4 TEST RESULTS	19
4.5 RS TESTING	20
4.5.1 TEST SPECIFICATION	20
4.5.2 TEST PROCEDURE	20
4.5.3 TEST SETUP	21
4.5.4 TEST RESULTS	22
5 . EUT TEST PHOTO	23
ATTACHMENT PHOTOGRAPHS OF EUT	24

1. TEST SUMMARY

Test procedures according to the technical standards:

EMC Emission				
Standard	Test Item	Limit	Judgment	Remark
EN IEC 55014-1:2021	Conducted Emission	-----	N/A	
	Radiated Emission	-----	PASS	
EMC Immunity				
Section EN IEC 55014-2:2021	Test Item	Performance Criteria	Judgment	Remark
EN 61000-4-2	Electrostatic Discharge	B	PASS	
EN 61000-4-3	RF electromagnetic field	A	PASS	Note (2) Note (3)
EN 61000-4-4	Fast transients	B	N/A	
EN 61000-4-5	Surges	B	N/A	
EN 61000-4-6	Injected Current	A	N/A	
EN 61000-4-11	Volt. Interruptions Volt. Dips	C / C / C	N/A	

NOTE:

- (1) "N/A" denotes test is not applicable in this Test Report
- (2) The test site is located in site B.
- (3) This test is not required when the EUT is judged to be category III according to EN IEC 55014-2:2021.
- (4) For client's request and manual description, the test will not be executed.

1.1 TEST FACILITY

Shenzhen NTEK Testing Technology Co., Ltd.

Add.(Site A) : 1/F, Building E, Fenda Science Park Sanwei, Hangcheng, Bao'an District
Shenzhen, Guangdong, People's Republic of China

Add.(Site B) : Building 30, Furong Third Road, Furong Industrial Zone, Xinqiao Street, Bao'an District

CNAS-Lab. : The Laboratory has been assessed and proved to be in compliance with CNAS-CL01:2018 (identical to ISO/IEC 17025:2017)
The Certificate Registration Number is L5516

ISED-Registration : The Company Number: 9270A.
CAB identifier: CN0074.

FCC- Accredited : Test Firm Registration Number: 463705
Designation Number: CN1184

A2LA-Lab. : The Certificate Registration Number is 4298.01
This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 General requirements for the competence of testing and calibration laboratories.
This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated April 2017).

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately **95** %.

Test Item	Measurement Frequency Range	K	U(dB)
Conducted Emission	0.009MHz ~ 0.15MHz	2	3.6
Conducted Emission	0.15MHz ~ 30MHz	2	3.1
Telecom Conducted Emission(Cat 3)	0.15MHz ~ 30MHz	2	3.1
Telecom Conducted Emission(Cat 5)	0.15MHz ~ 30MHz	2	3.6
Telecom Conducted Emission(Cat 6)	0.15MHz ~ 30MHz	2	4.2
Radiated Emission	30MHz ~ 1000MHz	2	5.2
Radiated Emission	1000MHz ~ 18000MHz	2	5.1
Power Clamp	30MHz ~ 300MHz	2	2.2

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	SwitchBot Roller Shade	
Model Number	W5000000	
Additional Model Number(s)	W5000001, W5000002, W5000003, W5000004, W5000005, W5000006	
Model Difference	All models are identical except model's name and appearance length.	
Product Description	The EUT is a SwitchBot Roller Shade.	
	Operating frequency:	40 MHz (Declaration by Manufacturer)
	Connecting I/O port:	N/A
	Based on the application, features, or specification exhibited in User's Manual, the EUT is considered as a Household Device. More details of EUT technical specification, please refer to the User's Manual.	
Power Source	DC Voltage	
Power Rating	DC 5V powered by Type-C port or DC 7.3V, 2600mAh, 18.98Wh powered by Battery	

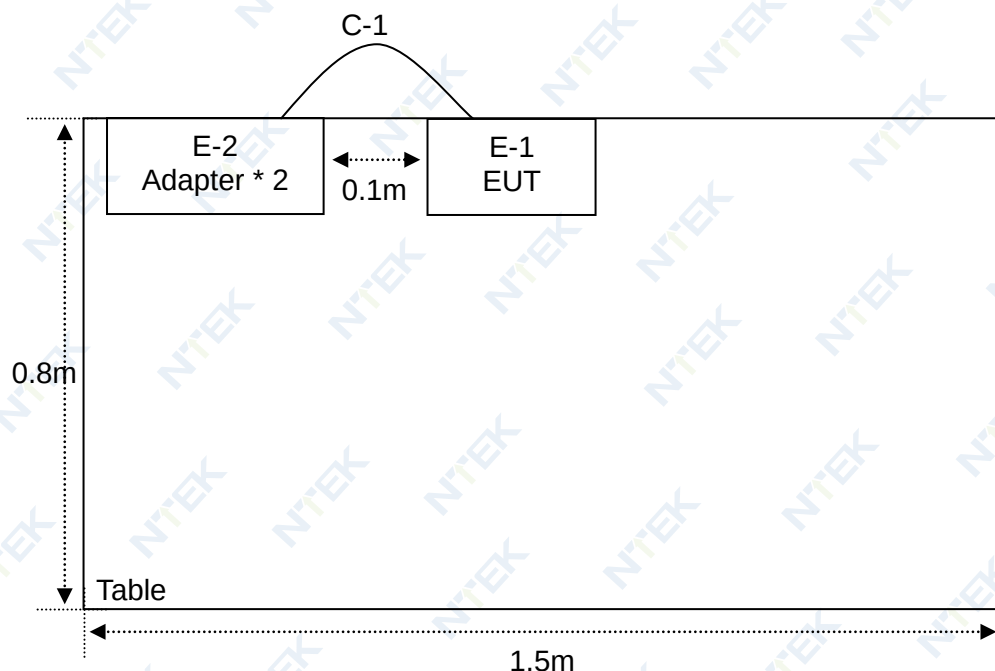
2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively. All test modes in the table below are tested, the worst case is listed on this report.

Pretest Mode	Description
Mode 1	Charging + Working(Rotate outward / Turning inward)
For Radiated Test	
Final Test Mode	Description
Mode 1	Charging + Working(Rotate outward / Turning inward)
For EMS Test	
Final Test Mode	Description
Mode 1	Charging + Working(Rotate outward / Turning inward)

2.3 DESCRIPTION OF TEST SETUP

Mode RE : Charging + Working



2.4 DESCRIPTION TEST PERIPHERAL AND EUT PERIPHERAL

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Brand	Model/Type No.	Series No.	Note
E-1	SwitchBot Roller Shade	SwitchBot	W5000000	N/A	EUT
E-2	Adapter	N/A	KSA29B0500200D5	N/A	
	Adapter	N/A	AD16ZM	N/A	

Item	Shielded Type	Ferrite Core	Length	Note
C-1	NO	NO	80cm	
C-2	NO	NO	80cm	

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.
- (3) "YES" means "shielded" "with core"; "NO" means "unshielded" "without core".

2.5 MEASUREMENT INSTRUMENTS LIST

2.5.1 RADIATED TEST

Item	Name of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	3m Anechoic Chamber	N/A	9*6*6	N/A	May 14, 2021	May 13, 2025	4 years
2	3m Anechoic Chamber	N/A	9*6*6	N/A	Jul. 28, 2022	Jul. 27, 2025	3 years
3	EMI Test Receiver	R&S	ESPI7	101318	Mar. 12, 2024	Mar. 11, 2025	1 year
4	Bilog Antenna	TESEQ	CBL6111D	31216	Mar. 11, 2024	Mar. 10, 2025	1 year
5	50Ω Coaxial Switch	Anritsu	MP59B	6200983705	May 06, 2023	May 05, 2026	3 years
6	Cable	Talent Microwave	A81-NWMS MAM-12M	21120897	Dec. 16, 2021	Dec. 15, 2024	3 years
7	Cable	Talent Microwave	A81-NMNM -10M	24012011	Jan. 23, 2024	Jan. 22, 2027	3 years
8	Cable	Talent Microwave	A81-NMNM -10M	22084896	Feb. 01, 2024	Jan. 31, 2027	3 years
9	Log-Periodic Antenna	SCHWARZB ECK	VULB 9162	675	Mar. 30, 2024	Mar. 29, 2025	1 year
10	Log-Periodic Antenna	SCHWARZB ECK	VULB 9162	584	Dec. 29, 2023	Dec. 28, 2024	1 year
11	Log-Periodic Antenna	SCHWARZB ECK	VULB 9162	586	Dec. 29, 2023	Dec. 28, 2024	1 year
12	Cable	Talent Microwave	A81-NMNM -2M	22084895	Sep. 09, 2022	Sep. 08, 2025	3 years
13	Attenuator	Eastsheep	5W-N-JK-6 G-6DB	N/A	Aug. 08, 2023	Aug. 07, 2024	1 year
14	Attenuator	Eastsheep	5W-N-JK-6 G-6DB	N/A	Jul. 31, 2023	Jul. 30, 2024	1 year
15	Broadband Horn Antenna	EM	EM-AH-101 80	2011071402	Mar. 31, 2022	Mar. 30, 2025	3 years
16	Broadband Horn Antenna	SCHWARZB ECK	BBHA 9120 D	2816	Jan. 12, 2023	Jan. 11, 2026	3 years
17	Broadband Horn Antenna	SCHWARZB ECK	BBHA 9120 D	2817	Jan. 12, 2023	Jan. 11, 2026	3 years
18	Spectrum Analyzer	Keysight	N9020A	MY532802 44	Nov. 03, 2023	Nov. 02, 2024	1 year
19	Spectrum Analyzer	Agilent	E4440A	MY410001 30	Mar. 12, 2024	Mar. 11, 2025	1 year
20	Pre-Amplifier	EMC	EMC05183 5SE	980246	Jan. 23, 2024	Jan. 22, 2025	1 year
21	Cable	Keysight	A40-2.92M 2.92M-2M	1808041	Nov. 01, 2022	Oct. 31, 2025	3 years
22	Absorbing Clamp	R&S	MDS-21	100423	May 16, 2024	May 15, 2025	1 year
23	50Ω Coaxial Switch	Anritsu	MP59B	6200983704	May 06, 2023	May 05, 2026	3 years
24	Low Frequency Cable	N/A	P-01	N/A	Jun. 17, 2022	Jun. 16, 2025	3 years

2.5.2 ESD

Item	Name of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	ESD Generator	EVERFINE	EMS61000-2A	P615727TA 1421113	Jul. 06, 2023	Jul. 05, 2024	1 year
2	Electrostatic Discharge Generator	Lioncel	ESD-203B	ESD203B0 150402	Aug. 11, 2023	Aug. 10, 2024	1 year

2.5.3 RS

Item	Name of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	RF Test System Controller	AR	SC1000	0350156	Feb. 01, 2024	Jan. 31, 2027	3 years
2	3m Anechoic Chamber	N/A	9*6*6	N/A	Mar. 24, 2023	Mar. 23, 2026	3 years
3	3m Anechoic Chamber	N/A	7*5*4	N/A	May 19, 2023	May 18, 2026	3 years
4	Broadband Amplifier	AR	60S1G6	0350414	Mar. 12, 2024	Mar. 11, 2025	1 year
5	Bilog Antenna	ETS	3142E	00214344	Nov. 07, 2023	Nov. 06, 2025	3 years
6	Power Amplifier	rflight	NTWPA-00810200	17063153	Apr. 26, 2024	Apr. 25, 2025	1 year
7	PSG Analog Signal Generator	Agilent	E8257D	MY51110112	Sep. 14, 2023	Sep. 13, 2024	1 year
8	ESG Vetctor Signal Generator	Agilent	E4438C	MY45093347	Apr. 13, 2024	Apr. 12, 2025	1 year

2.6 MEASUREMENT SOFTWARE

RADIATED TEST		
Software name	Manufacturer	Version number
EZ-EMC_RE	Farad	AIT-03A
RF ELECTROMAGNETIC FIELD TEST		
Software name	Manufacturer	Version number
Emcware	AR RF/Microwave Instrumentation	3.2.0.4

3. EMC EMISSION TEST

3.1 RADIATED EMISSION MEASUREMENT

3.1.1 LIMITS OF RADIATED EMISSION MEASUREMENT (Below 1000MHz)

FREQUENCY (MHz)	☐ At 10m (dB μ V/m)	☒ At 3m (dB μ V/m)
30 - 230	30	40
230 - 1000	37	47

3.1.2 LIMITS OF DISTURBANCE POWER MEASUREMENT (Below 1000MHz)

Frequency Range	General		Tools					
			P $\leq$ 700W		700W<P $\leq$ 1000W		P>1000W	
1	2	3	4	5	6	7	8	9
(MHz)	Quasi-peak dB(pW)	Average dB(pW)	Quasi-peak dB(pW)	Average dB(pW)	Quasi-peak dB(pW)	Average dB(pW)	Quasi-peak dB(pW)	Average dB(pW)
30-300	Increasing linearly with the frequency from:							
	44 - 55	35 - 45	44 - 55	35 - 45	49 - 59	39 - 49	55 - 65	45 - 55

P = rated power of the motor only.

* If the limit for the measurement with the average detector is met when using a receiver with a quasi-peak detector, the equipment under test shall be deemed to meet both limits and the measurement using the receiver with an average detector need not be carried out.

Frequency Range	General		Tools					
			P $\leq$ 700W		700W<P $\leq$ 1000W		P>1000W	
1	2	3	4	5	6	7	8	9
(MHz)	Quasi-peak dB(pW)	Average dB(pW)	Quasi-peak dB(pW)	Average dB(pW)	Quasi-peak dB(pW)	Average dB(pW)	Quasi-peak dB(pW)	Average dB(pW)
200-300	Increasing linearly with the frequency from:							
	0 - 10	0	0 - 10	0	0 - 10	0	0 - 10	0

Note: This table only applies if method a) specified in 4.3.4.2 is followed.

Note:

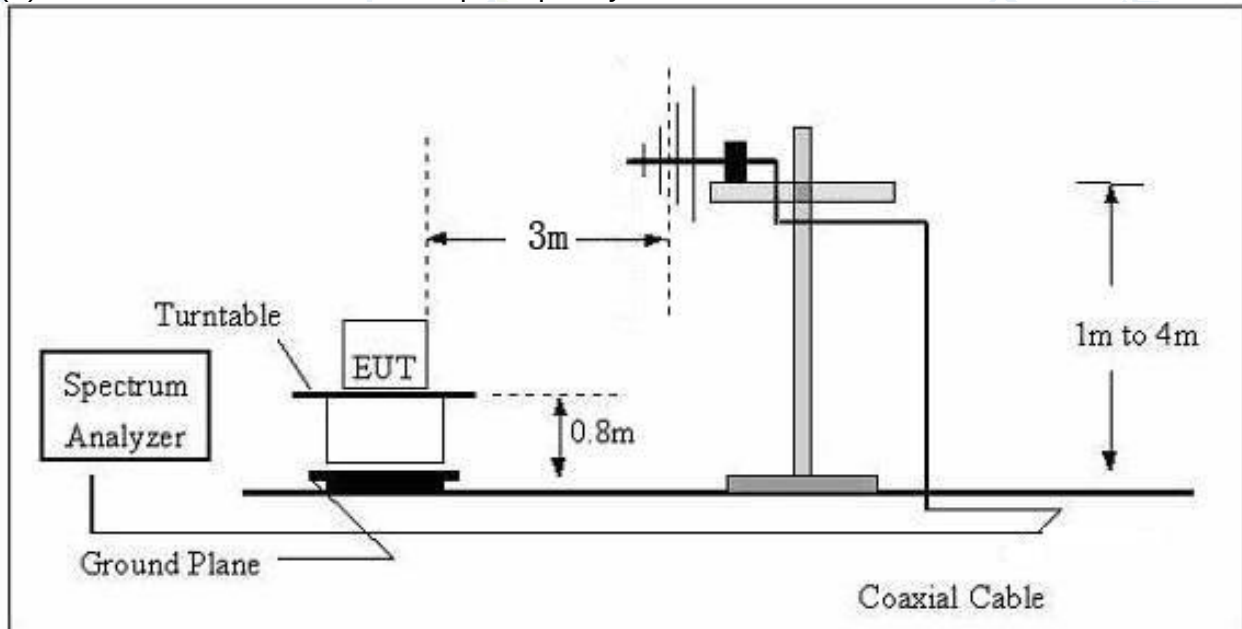
- (1) The limit for radiated test was performed according to as following: CISPR 14.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dB μ V/m)=20log Emission level (μ V/m).

3.1.3 TEST PROCEDURE

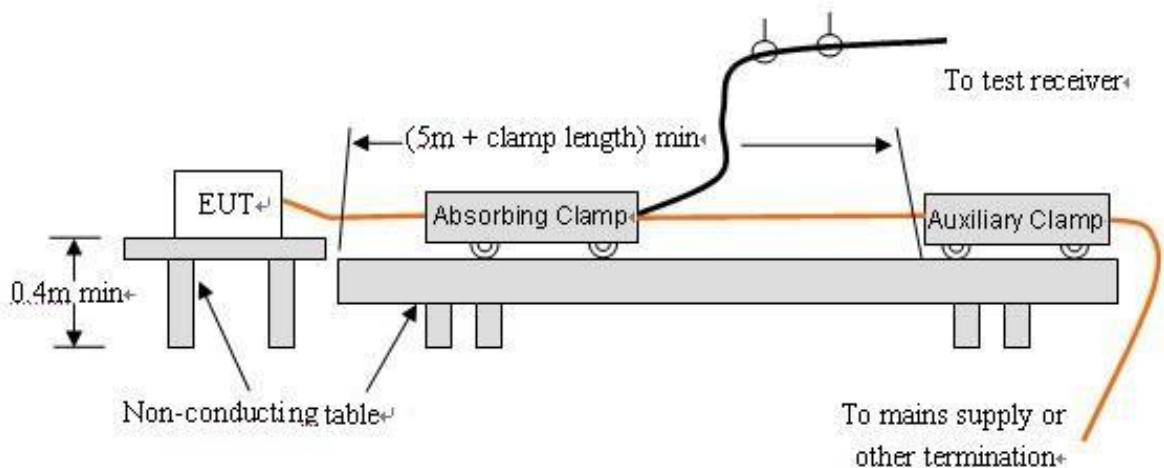
- The measuring distance of at 3m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured, above 1G Average detector mode will be instead.
- If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP(AV) Limits and then no additional QP Mode measurement performed.
- For the actual test configuration, please refer to the related Item -EUT Test Photos.

3.1.4 TEST SETUP

(A) Radiated Emission Test Set-Up Frequency Below 1 GHz



(B) Radiated Emission Test Set-Up Frequency Above 30 MHz

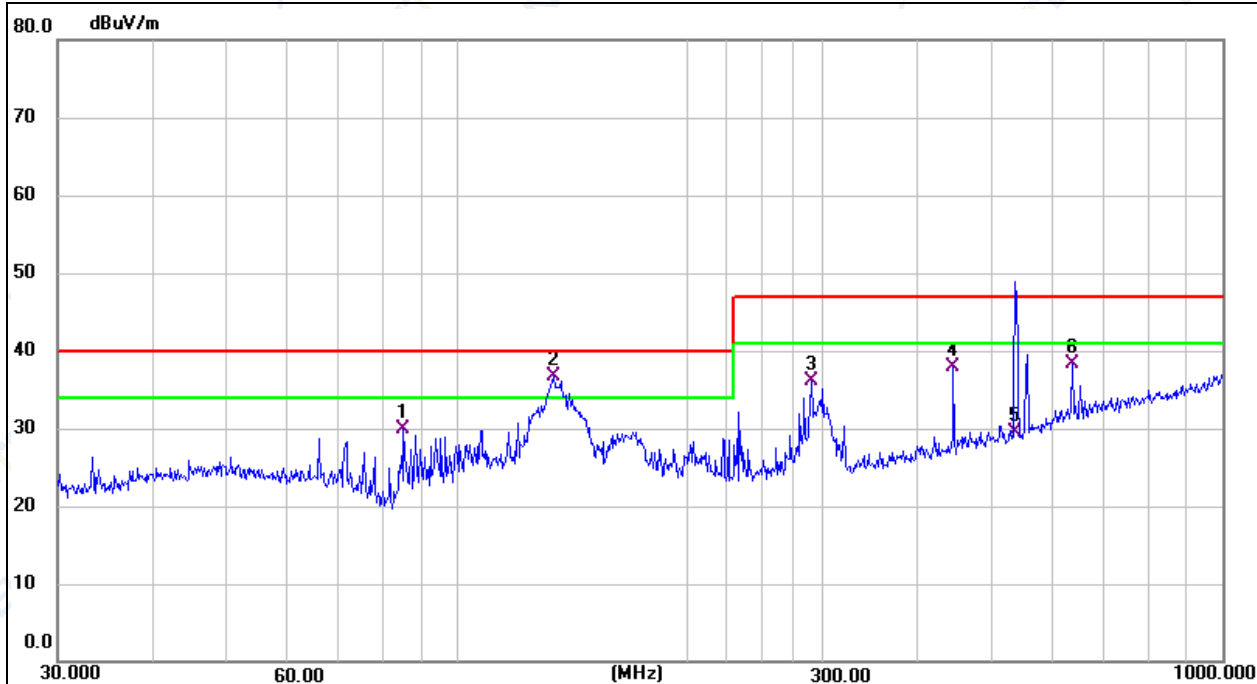


3.1.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

3.1.6 TEST RESULTS (30-1000MHz)

EUT:	SwitchBot Roller Shade	Model Name:	W5000000
Temperature:	25.5°C	Relative Humidity:	55%RH
Pressure:	1010hPa	Test Date:	2024-06-06
Test Mode:	Charging + Working(Rotate outward)	Polarization:	Horizontal
Test Power:	DC 5V powered by Adapter AC 230V/50Hz		

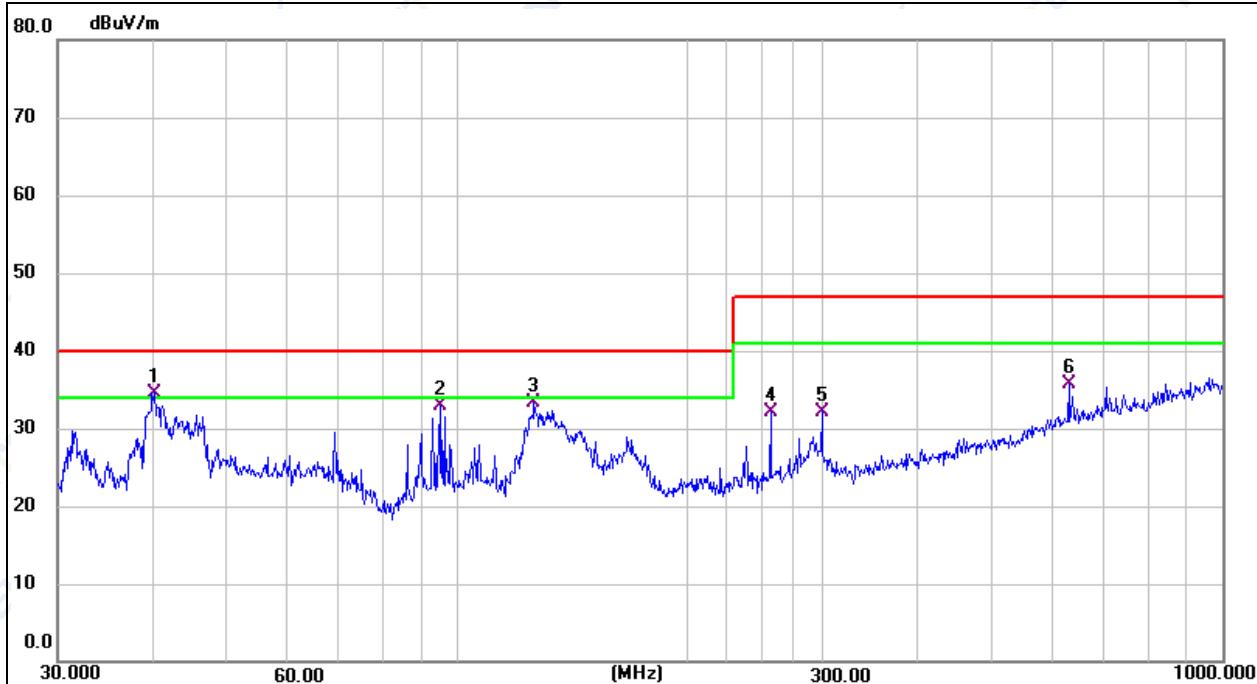


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	84.9995	14.08	15.88	29.96	40.00	-10.04	QP			P	
2 *	133.6188	21.26	15.44	36.70	40.00	-3.30	QP			P	
3	290.0172	16.08	20.02	36.10	47.00	-10.90	QP			P	
4	444.8514	14.98	22.87	37.85	47.00	-9.15	QP			P	
5	535.7073	5.20	24.32	29.52	47.00	-17.48	QP			P	
6	636.1340	12.09	26.16	38.25	47.00	-8.75	QP			P	

Remark:

Factor = Antenna Factor + Cable Loss.

EUT:	SwitchBot Roller Shade	Model Name:	W5000000
Temperature:	25.5°C	Relative Humidity:	55%RH
Pressure:	1010hPa	Test Date:	2024-06-06
Test Mode:	Charging + Working(Rotate outward)	Polarization:	Vertical
Test Power:	DC 5V powered by Adapter AC 230V/50Hz		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1 *	40.1347	15.01	19.59	34.60	40.00	-5.40	QP			P	
2	95.0930	15.03	17.85	32.88	40.00	-7.12	QP			P	
3	125.8863	17.22	16.13	33.35	40.00	-6.65	QP			P	
4	256.5210	12.59	19.47	32.06	47.00	-14.94	QP			P	
5	299.3158	12.09	20.04	32.13	47.00	-14.87	QP			P	
6	629.4772	9.70	26.04	35.74	47.00	-11.26	QP			P	

Remark:

Factor = Antenna Factor + Cable Loss.

4. EMC IMMUNITY TEST

4.1 STANDARD COMPLIANCE/SEVERITY LEVEL/CRITERIA

Tests Standard No.	TEST SPECIFICATION	Test Mode Test Ports	Perform Criteria
1. ESD IEC/EN 61000-4-2	8kV air discharge 4kV contact discharge	Direct Mode	B
	4kV HCP discharge 4kV VCP discharge	Indirect Mode	B
2. RS IEC/EN 61000-4-3	80 MHz to 1000 MHz; 1 kHz, 80%, AM modulated	Enclosure	A

4.2 GENERAL PERFORMANCE CRITERIA

According to **EN IEC 55014-2** standard, the general performance criteria as following:

Criterion A	The equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. 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 by what the user may reasonably expect from the equipment if used as intended.
Criterion B	After the test, the equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed, after the application of the phenomena below a performance level specified by the manufacturer, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is allowed. However, no change of operating state or stored data is allowed to persist after the test.
Criterion C	Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions. Functions, and/or information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

4.3 GENERAL PERFORMANCE CRITERIA TEST SETUP

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

4.4 ESD TESTING

4.4.1 TEST SPECIFICATION

Basic Standard:	IEC/EN 61000-4-2
Discharge Impedance:	330ohm / 150pF
Required Performance:	B
Discharge Voltage:	Air Discharge: 2kV/4kV/8kV (Direct) Contact Discharge: 2kV/4kV (Direct/Indirect)
Polarity:	Positive & Negative
Number of Discharge:	Air Discharge: min. 20 times at each test point Contact Discharge: min. 20 times at each test point
Discharge Mode:	Single Discharge
Discharge Period:	1 second minimum

4.4.2 TEST PROCEDURE

The test generator necessary to perform direct and indirect application of discharges to the EUT in the following manner:

a. Indirect application of the discharge:

Vertical Coupling Plane (VCP):

At least 10 single discharges (in the most sensitive polarity) shall be applied to the centre of one vertical edge of the coupling plane. The coupling plane, of dimensions 0,5 m × 0,5 m, is placed parallel to, and positioned at a distance of 0,1 m from, the EUT.

Discharges shall be applied to the coupling plane, with sufficient different positions such that the four faces of the EUT are completely illuminated. One VCP position is considered to illuminate 0,5 m × 0,5 m area of the EUT surface.

Horizontal Coupling Plane (HCP):

Discharge to the HCP shall be made horizontally to the edge of the HCP.

At least 10 single discharges (in the most sensitive polarity) shall be applied at the front edge of each HCP opposite the centre point of each unit (if applicable) of the EUT and 0.1m from the front of the EUT. The long axis of the discharge electrode shall be in the plane of the HCP and perpendicular to its front edge during the discharge.

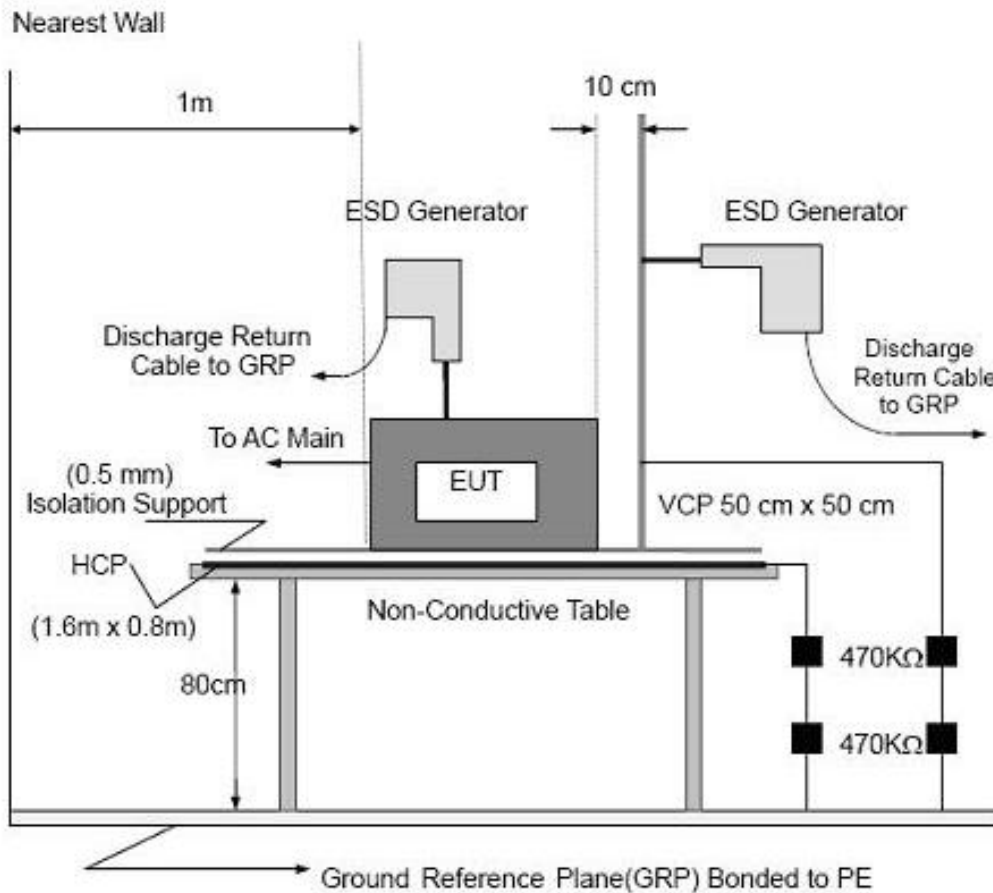
The discharge electrode shall be in contact with the edge of the HCP before the discharge switch is operated

b. Direct application of discharges to the EUT

The test shall be performed with single discharges. On each pre-selected point at least 10 single discharges (in the most sensitive polarity) shall be applied.

For the time interval between successive single discharges an initial value of 1 s is recommended. Longer intervals may be necessary to determine whether a system failure has occurred.

4.4.3 TEST SETUP



Note:

TABLE-TOP EQUIPMENT

The configuration consisted of a wooden table 0.8 meters high standing on the Ground Reference Plane. The GRP consisted of a sheet of aluminum at least 0.25mm thick, and 2.5 meters square connected to the protective grounding system. A Horizontal Coupling Plane (1.6m x 0.8m) was placed on the table and attached to the GRP by means of a cable with 940k total impedance. The equipment under test, was installed in a representative system as described in section 7 of IEC/EN 61000-4-2, and its cables were placed on the HCP and isolated by an insulating support of 0.5mm thickness. A distance of 1-meter minimum was provided between the EUT and the walls of the laboratory and any other metallic structure.

FLOOR-STANDING EQUIPMENT

The equipment under test was installed in a representative system as described in section 7 of IEC/EN 61000-4-2, and its cables were isolated from the Ground Reference Plane by an insulating support of 0.1-meter thickness. The GRP consisted of a sheet of aluminum that is at least 0.25mm thick, and 2.5meters square connected to the protective grounding system and extended at least 0.5 meters from the EUT on all sides.

4.4.4 TEST RESULTS

EUT:	SwitchBot Roller Shade	Model Name:	W5000000
Temperature:	25.5℃	Relative Humidity:	50%RH
Pressure:	1010hPa	Test Date:	2024-06-06
Test Mode:	Charging + Working(Rotate outward / Turning inward)		
Test Power:	DC 5V powered by Adapter AC 230V/50Hz		

Mode	Contact Discharge (Indirect)							Criterion	Result		
Test Level(kV)	Test Point	2		4		6					
Test Location		+	-	+	-	+	-				
HCP	Front	P	P	P	P			B	Complies		
	Rear	P	P	P	P						
	Left	P	P	P	P						
	Right	P	P	P	P						
VCP	Front	P	P	P	P						
	Rear	P	P	P	P						
	Left	P	P	P	P						
	Right	P	P	P	P						

Mode	Air Discharge								Contact Discharge								Criterion	Result
Test Level(kV)	2		4		8		15		2		4		6		8			
Test Location	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-		
Gap	P	P	P	P	P	P											B	Complies
Button	P	P	P	P	P	P												
Type-C port	P	P	P	P	P	P												
Screw									P	P	P	P						
Metal									P	P	P	P						

Note:

- (1) +/- denotes the Positive/Negative polarity of the output voltage.
- (2) In the table: 'P' represents 'PASS'; 'F' represents 'FAIL'.
- (3) Criteria A: Normal performance within limits specified by the manufacturer, requestor or purchaser.
- (4) Criteria B: Temporary loss of function or degradation of performance which ceases after the disturbance ceases, and from which the EUT recovers its normal performance, without operator intervention.
- (5) Criteria C: Temporary loss of function or degradation of performance, the correction of which requires operator intervention.
- (6) Criteria D: Loss of function or degradation of performance which is not recoverable, owing to damage to hardware or software, or loss of data.

4.5 RS TESTING

4.5.1 TEST SPECIFICATION

Basic Standard:	IEC/EN 61000-4-3
Required Performance:	A
Frequency Range:	80 MHz to 1000 MHz
Field Strength:	3 V/m
Modulation:	1kHz Sine Wave, 80%, AM Modulation
Frequency Step:	1 % of fundamental
Polarity of Antenna:	Horizontal and Vertical
Test Distance:	3 m
Antenna Height:	1.5 m
Dwell Time:	3 seconds

4.5.2 TEST PROCEDURE

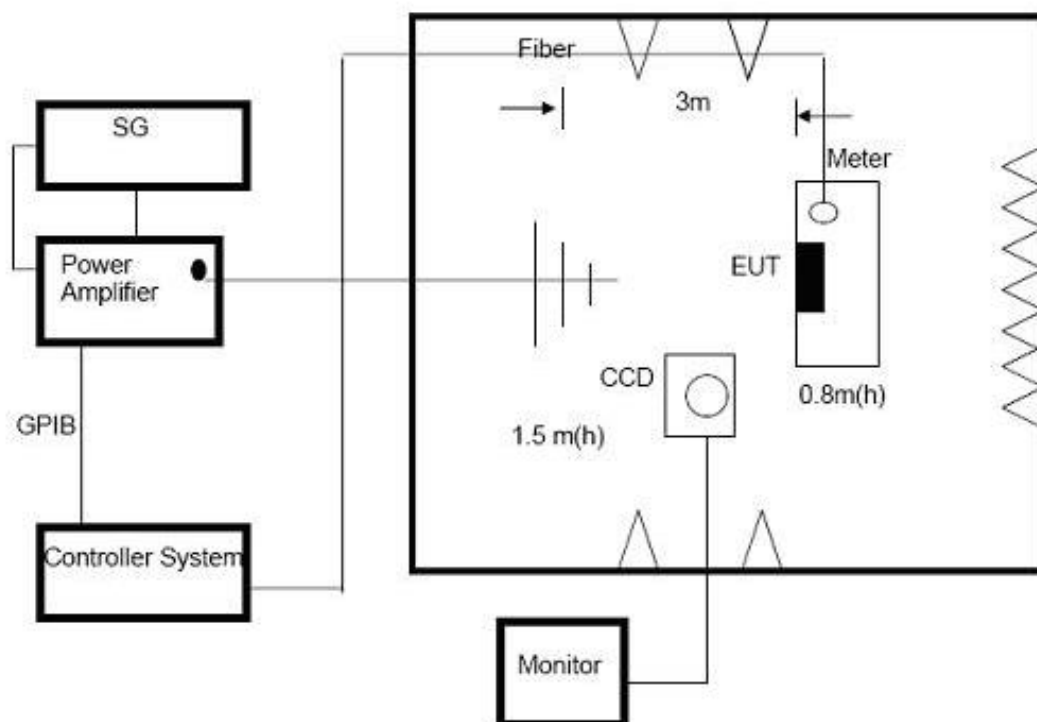
The EUT and support equipment, which are placed on a table that is 0.8 meter above ground and the testing was performed in a fully-anechoic chamber.

The testing distance from antenna to the EUT was 3 meters.

The other condition as following manner:

- The frequency range is swept from 80 MHz to 1000 MHz with the signal 80% amplitude modulated with a 1kHz sine wave. The rate of sweep did not exceed 1.5×10^{-3} decade/s. Where the frequency range is swept incrementally, the step size was 1% of fundamental.
- Sweep Frequency 900 MHz, with the Duty Cycle: 1/8 and Modulation: Pulse 217 Hz (if applicable)
- The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.
- The test was performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides.

4.5.3 TEST SETUP



Note:

TABLE-TOP EQUIPMENT

The EUT installed in a representative system as described in section 7 of IEC/EN 61000-4-3 was placed on a non-conductive table 0.8 meters in height. The system under test was connected to the power and signal wire according to relevant installation instructions.

FLOOR-STANDING EQUIPMENT

The EUT installed in a representative system as described in section 7 of IEC/EN 61000-4-3 was placed on a non-conductive wood support 0.1 meters in height. The system under test was connected to the power and signal wire according to relevant installation instructions.

4.5.4 TEST RESULTS

EUT:	SwitchBot Roller Shade	Model Name:	W5000000
Temperature:	21.5°C	Relative Humidity:	55%RH
Pressure:	1010hPa	Test Date:	2024-06-11
Test Mode:	Charging + Working(Rotate outward / Turning inward)		
Test Power:	DC 5V powered by Adapter AC 230V/50Hz		

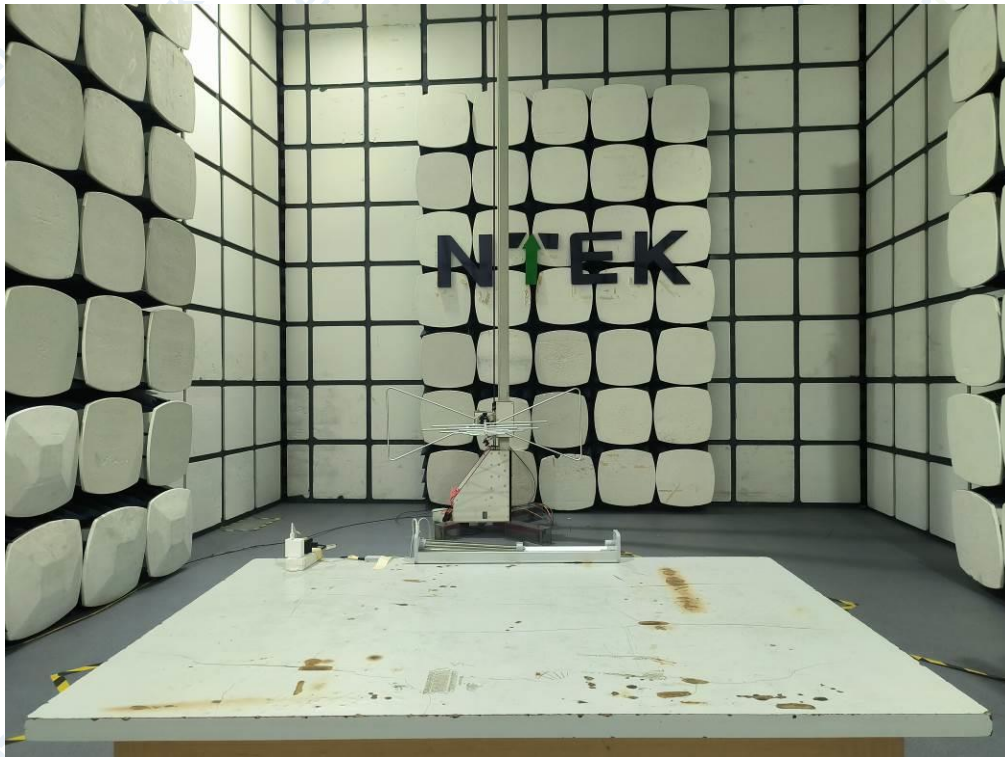
Frequency Range (MHz)	RF Field Position	R.F. Field Strength	Azimuth	Criterion	Result
80 - 1000	H / V	3 V/m (r.m.s) AM Modulated 1000Hz, 80%	Front	A	Complies
			Rear		
			Left		
			Right		

Note:

- (1) Criteria A: There was no change operated with initial operating during the test.
- (2) Criteria B: The EUT function loss during the test, but self-recoverable after the test.
- (3) Criteria C: The system shut down during the test.

5. EUT TEST PHOTO

Radiated Measurement Photo



ATTACHMENT PHOTOGRAPHS OF EUT

Photo 1



Photo 2

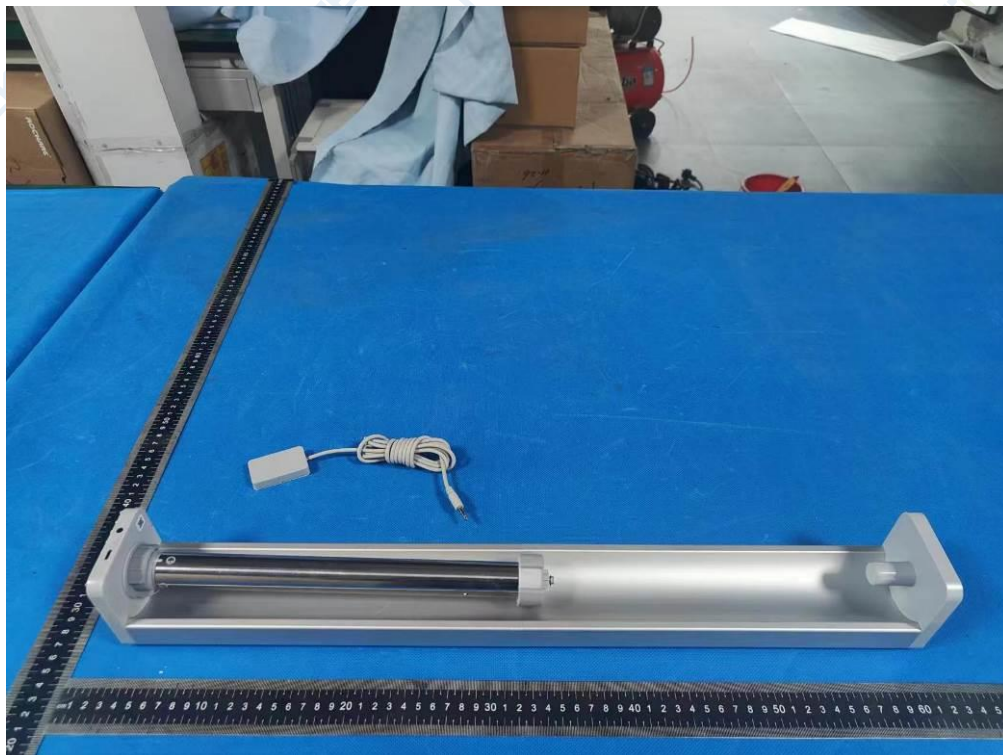


Photo 3

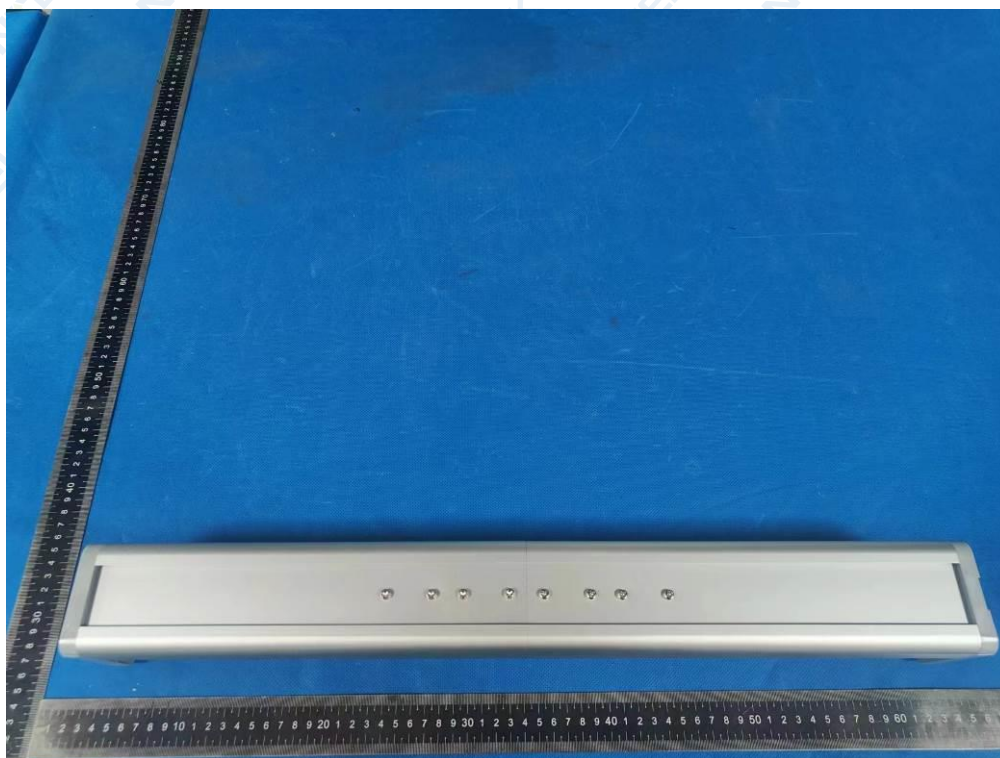


Photo 4

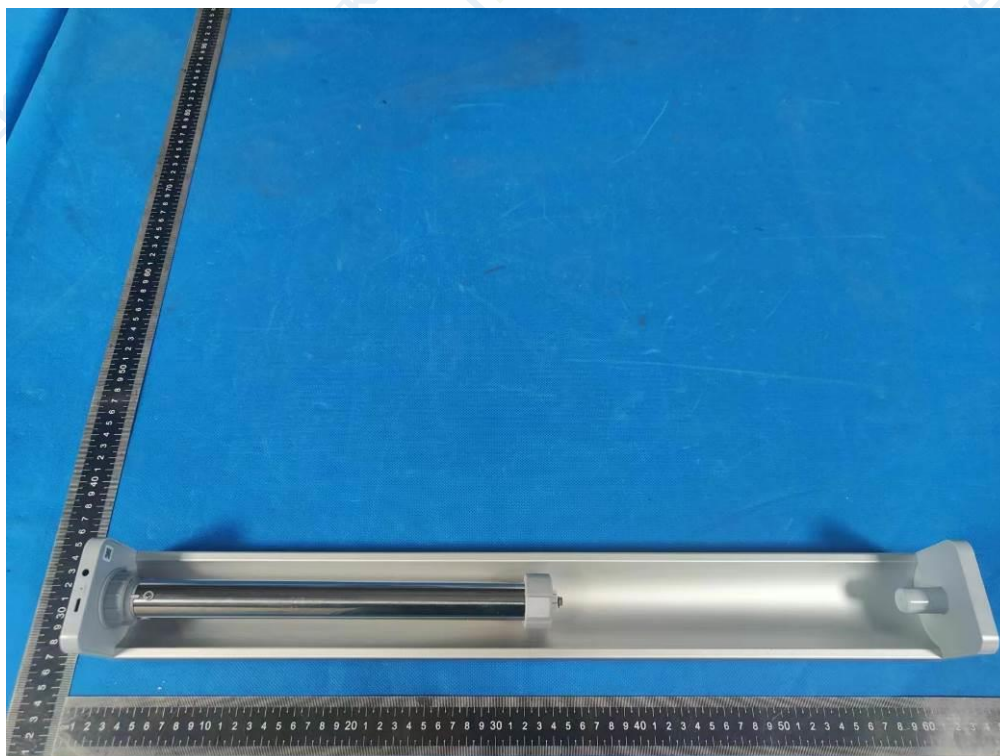


Photo 5

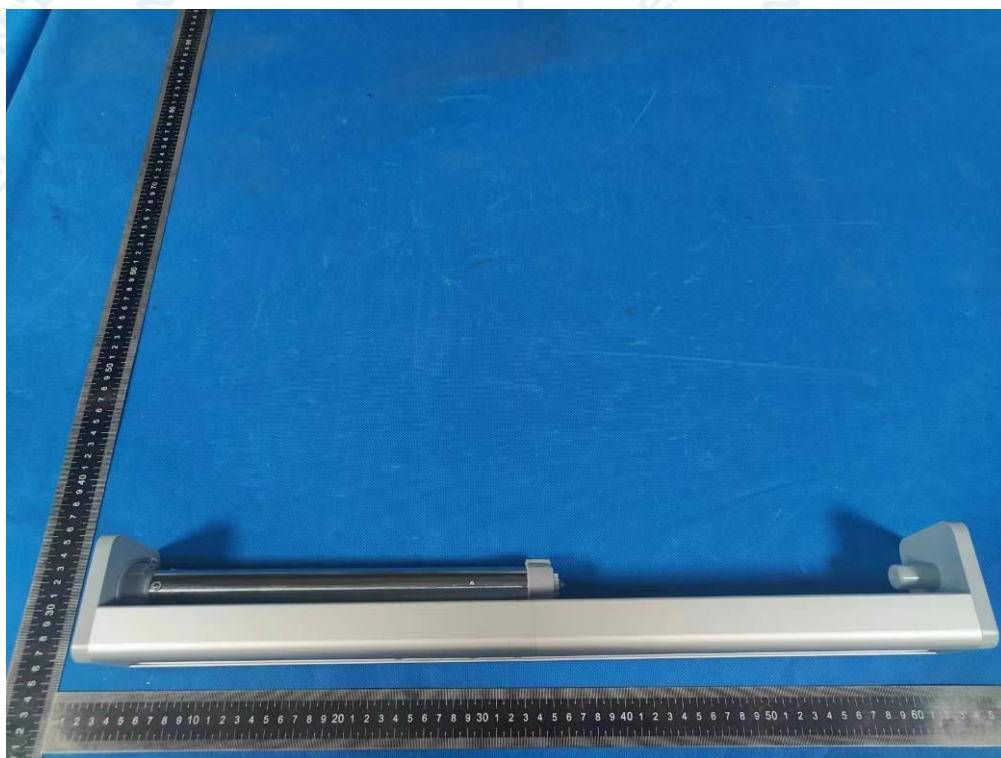


Photo 6

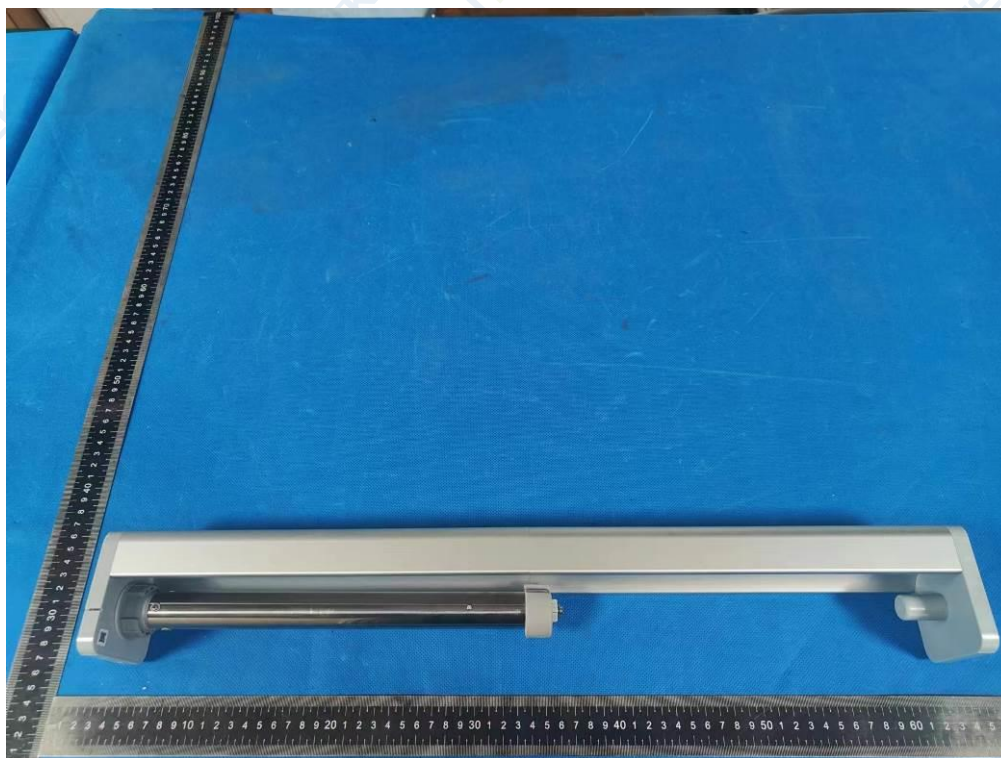


Photo 7

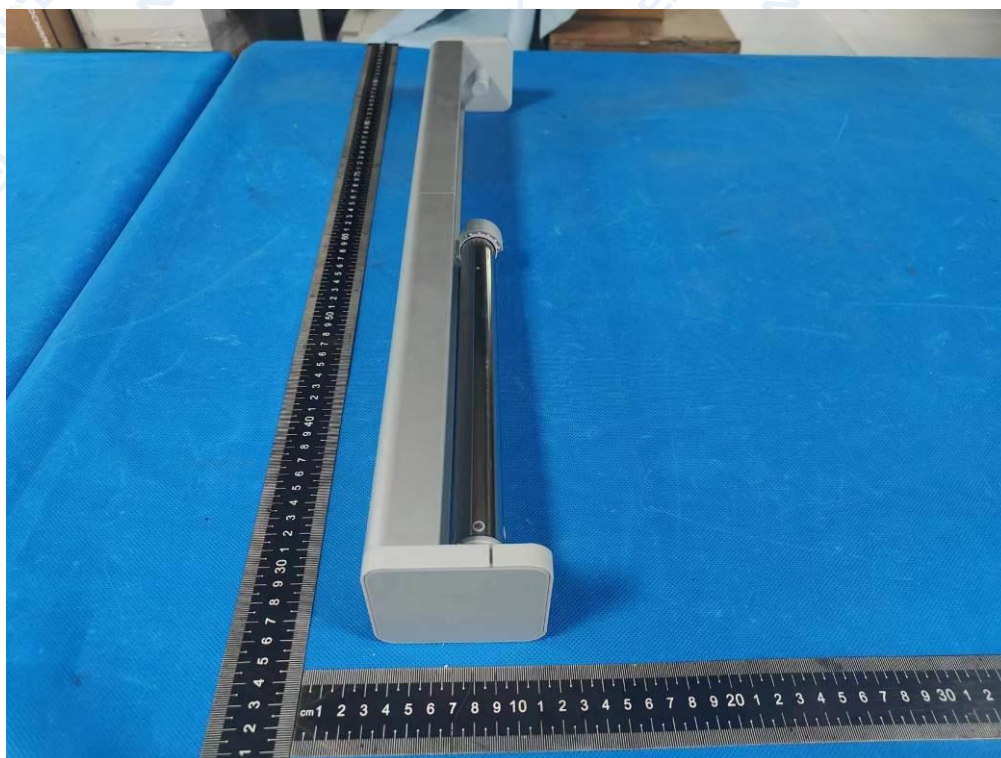


Photo 8

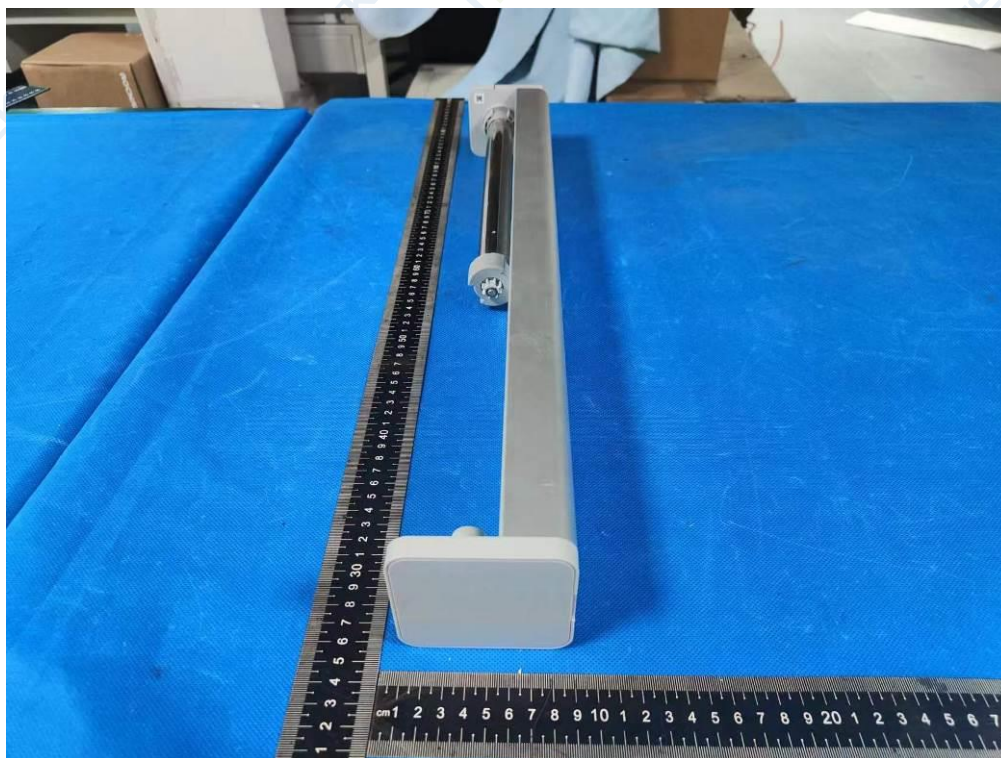


Photo 9

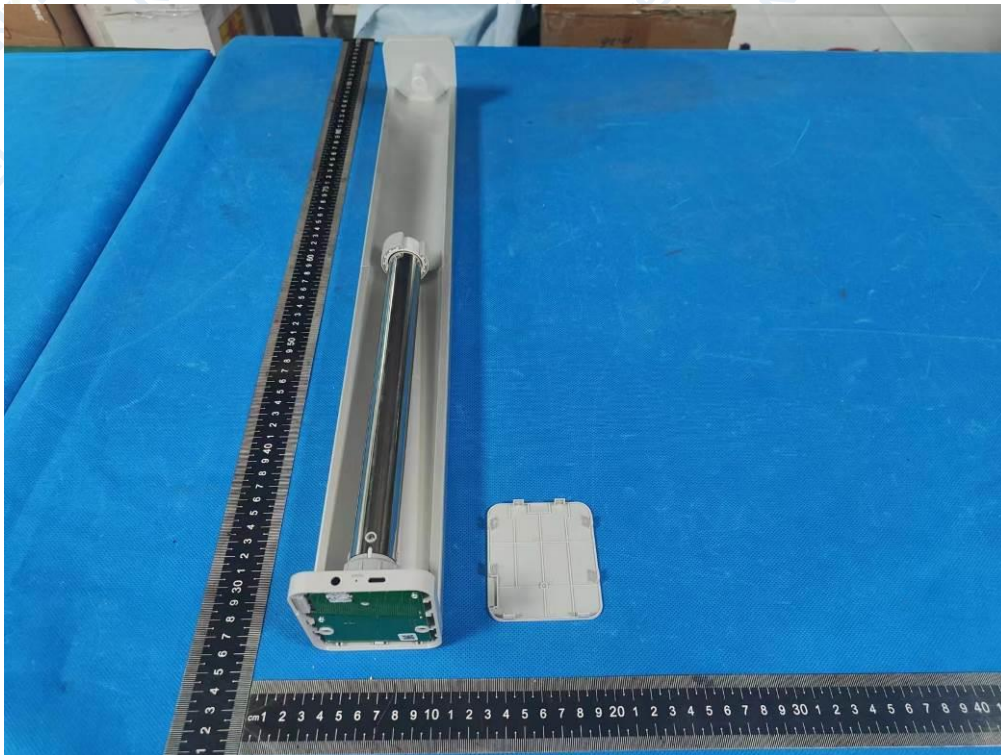


Photo 10



Photo 11



Photo 12

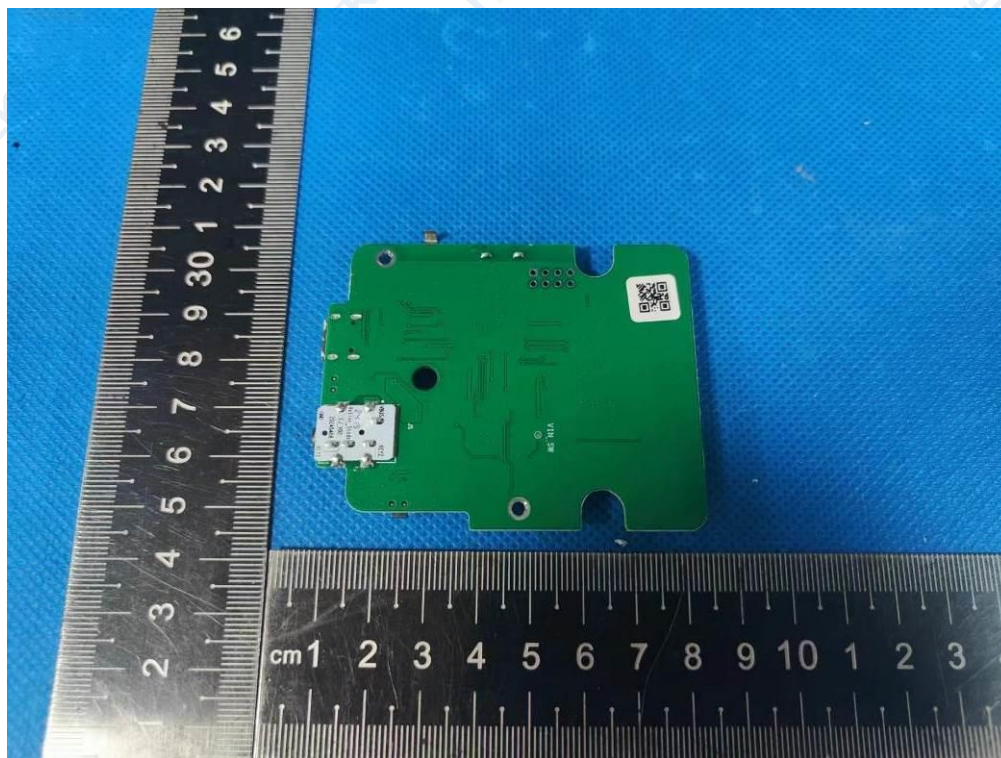


Photo 13



Photo 14

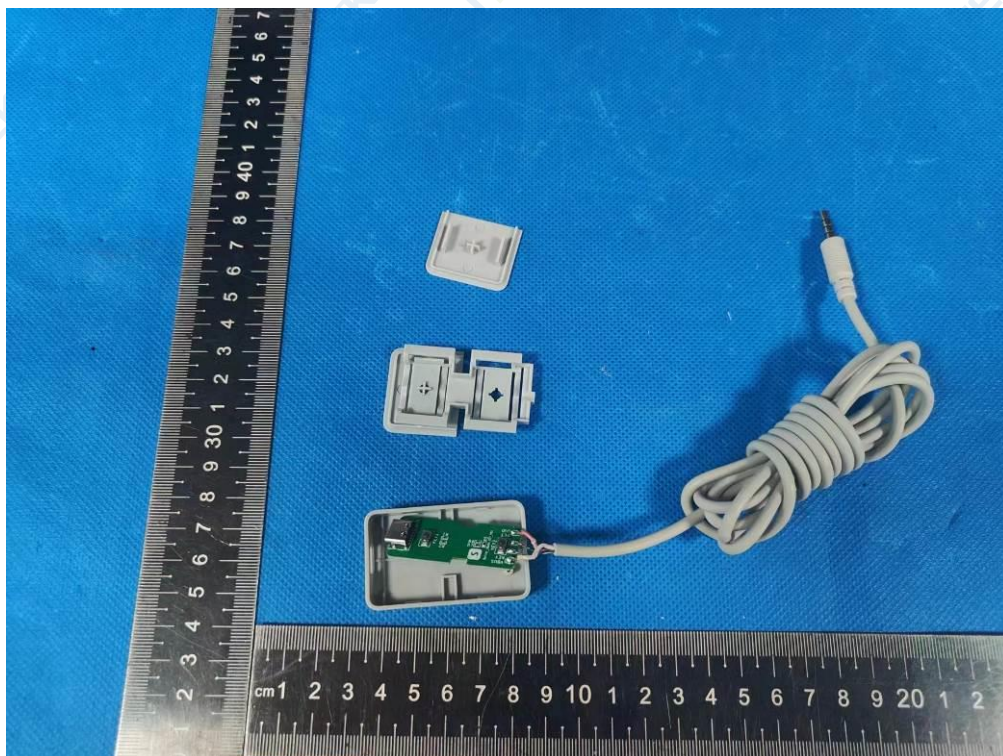


Photo 15

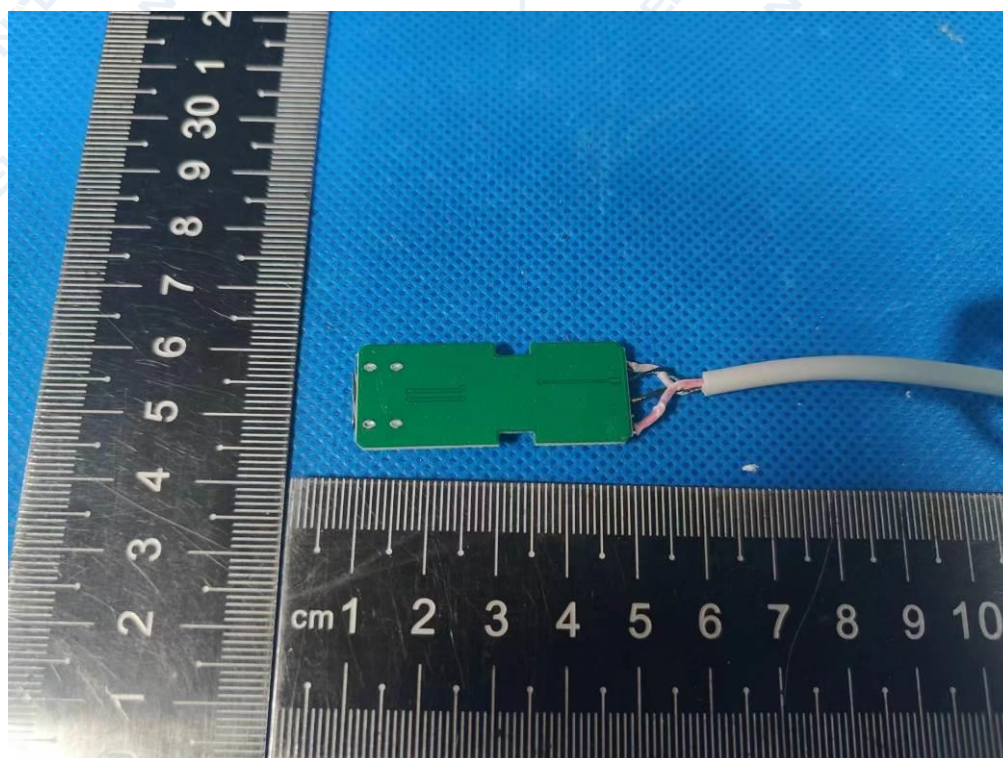
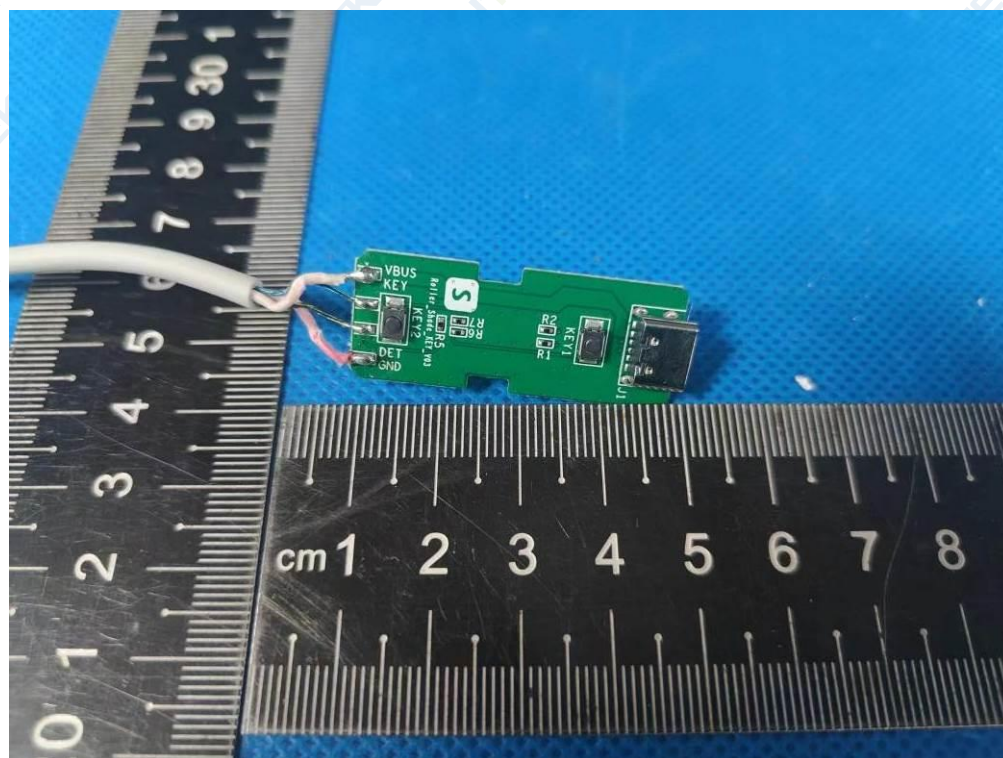


Photo 16



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

TEST REPORT

Report No.: S24042502503001

Product: SwitchBot Roller Shade

Model No.: W5000000, W5000001, W5000002, W5000003, W5000004,
W5000005, W5000006

Applicant: Woan Technology (Shenzhen) Co., Ltd.

Address: Room 1101, Qiancheng Commercial Center, No. 5 Haicheng
Road, Mabu Community, Xixiang Sub-district, Bao'an District,
Shenzhen, Guangdong, P.R.China, 518100

Issued by: Shenzhen NTEK Testing Technology Co., Ltd.

Lab Location: 1&5/F, Building C, 1&2/F, Building E, Fenda Science Park,
Sanwei Community, Hangcheng Street, Baoan District,
Shenzhen, Guangdong, China

Tel: 400-800-6106, 0755-2320 0050 / 2320 0090



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TEST REPORT**IEC 60335-2-97****Safety of household and similar electrical appliances****Part 2-97: Particular requirements for drives for rolling shutters, awnings, blinds and similar equipment****Report Number**.....: S24042502503001**Tested by**
(name + signature).....: Young Yin**Approved by**
(name + signature).....: Gary Li**Date of issue**.....: 2024-06-28**Testing Laboratory**.....: Shenzhen NTEK Testing Technology Co., Ltd.**Address**.....: 1&5/F, Building C, 1&2/F, Building E, Fenda Science Park, Sanwei Community, Hangcheng Street, Baoan District, Shenzhen, Guangdong, China**Testing location**.....: Same as above**Applicant's name**.....: Woan Technology (Shenzhen) Co., Ltd.**Address**.....: Room 1101, Qiancheng Commercial Center, No. 5 Haicheng Road, Mabu Community, Xixiang Sub-district, Bao'an District, Shenzhen, Guangdong, P.R.China, 518100**Test specification:****Standard**.....: ☐ IEC 60335-2-97:2002/AMD2:2008 in conjunction with IEC 60335-1:2010, COR1:2010, AMD1:2013, COR1:2014, AMD2:2016, COR1:2016☒ EN 60335-1:2012+A11:2014+A13:2017+A1:2019+A14:2019+A2:2019+A15:2021☒ EN 60335-2-97: 2006+ A2:2010+A11:2008+A12:2015☒ EN 62233:2008**Test procedure**.....: CE**Non-standard test method**.....: N/A**Test Report Form No.**.....: IEC60335_2_97G**Test Report Form(s) Originator**.....: VDE Testing and Certification Institute**Master TRF**.....: Dated 2022-05-06**Copyright © 2012 Worldwide System for Conformity Testing and Certification of Electrotechnical Equipment and Components (IECEE), Geneva, Switzerland. All rights reserved.**

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Test item description.....: SwitchBot Roller Shade**Trade Mark**.....: SwitchBot**Manufacturer**.....: Woan Technology (Shenzhen) Co., Ltd.**Address**.....: Room 1101, Qiancheng Commercial Center, No. 5 Haicheng Road, Mabu Community, Xixiang Sub-district, Bao'an District, Shenzhen, Guangdong, P.R.China, 518100**Model/Type reference**.....: W5000000, W5000001, W5000002, W5000003, W5000004, W5000005, W5000006

Ratings..... : DC5V, 1A

Test item particulars:

Classification of installation and use : Portable appliance
Supply connection : Appliance powered by rechargeable battery
Degree of protection : IPX0
Protection class : Class III appliance

Possible test case verdicts:

- test case does not apply to the test object : N(/A) (Not applicable)
- test object does meet the requirement : P (Pass)
- test object does not meet the requirement : F (Fail)

Testing:

Date of receipt of test item : 2024-05-31
Date (s) of performance of tests..... : 2024-05-31 to 2024-06-14

General remarks:

The test results presented in this report relate only to the object tested.
This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.
"(see Enclosure #)" refers to additional information appended to the report.
"(see appended table)" refers to a table appended to the report.
Throughout this report a comma is used as the decimal separator.

General production information:

-The product is a SwitchBot Roller Shade.
-Please refer to the instruction manual for more product information.
- All models are the same, only except different appearance and models name.

Copy of marking plate:

SwitchBot Roller Shade Model: W5000000 Input: 5V=1A Made in China
IC: 28651-W5000000 FCC ID: 2AKXB-W5000000 Designed By SwitchBot



XXXXXXXXXXXXXXXX R-R-Woa-W5000000 XXXXXX



® XXX-XXXXXX



IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
5	GENERAL CONDITIONS FOR THE TESTS		—
	Tests performed according to clause 5, e.g. nature of supply, sequence of testing, etc.		P
	A class III construction part of the appliance is tested connected to its detachable power supply part taking into account the instructions provided with the appliance.		P
5.101	Drives incorporating a tubular motor supplied without a driven part tested using apparatus described in figure 102 (IEC 60335-2-97)		N
6	CLASSIFICATION		—
6.1	Protection against electric shock: Class 0, 0I, I, II, III..... :	Class III appliance	P
	If an appliance consists of a part of class III construction and a detachable power supply part, the complete appliance is classified as a class I appliance or class II appliance in accordance with the classification applicable to its detachable power supply part.		N
6.2	Protection against harmful ingress of water	IPX0	N
	Parts of drive for installation outdoors be at least IPX4 (IEC/ 60335-2-97)		N
7	MARKING AND INSTRUCTIONS		—
7.1	Rated voltage or voltage range (V) :	5V	P
	Symbol for nature of supply, or :	---	P
	Rated frequency (Hz) :		N
	Rated power input (W), or :		N
	Rated current (A) :	1A	P
	Manufacturer's or responsible vendor's name, trademark or identification mark :	(see marking plate)	P
	Model or type reference :	(see marking plate)	P
	Symbol IEC 60417-5172, for class II appliances		N
	IP number, other than IPX0..... :	IPX0	N
	Symbol IEC 60417-5180, for class III appliances, unless		N
	the appliance is operated by batteries only		N
	Symbol IEC 60417-5018, for class II and class III appliances incorporating a functional earth (IEC 60335-1:2010/A1:2013)	class III	P
	Symbol IEC 60417-5180 (2003-02), for class III appliances. This marking is not necessary for appliances operated only by batteries (primary batteries or secondary batteries recharged outside of the appliance) or appliances powered by rechargeable batteries recharged in the appliance.		P

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
	Drives supplied without a driven part marked with (IEC 60335-2-97):		P
	- rated torque (Nm) (IEC 60335-2-97):		P
	-rated operating time (min), unless (IEC 60335-2-97):		P
	appliance intended for continuous operation (IEC 60335-2-97).		N
	Drives supplied with driven part marked with rated number of operating cycles (cycles), unless (IEC 60335-2-97):		N
	appliance is intended for continuous operation (IEC 60335-2-97).		N
7.2	Warning for stationary appliances for multiple supply		N
	Warning placed in vicinity of terminal cover		N
7.3	Range of rated values marked with the lower and upper limits separated by a hyphen		N
	Different rated values marked with the values separated by an oblique stroke		N
7.4	Appliances adjustable for different rated voltages, the voltage setting is clearly discernible		N
	Requirement met if frequent changes are not required and the rated voltage to which the appliance is to be adjusted is determined from a wiring diagram		N
7.5	Appliances with more than one rated voltage or one or more rated voltage ranges, marked with rated input or rated current for each rated voltage or range, unless		N
	the power input is related to the arithmetic mean value of the rated voltage range		N
	Relation between marking for upper and lower limits of rated power input or rated current and voltage is clear		N
7.6	Correct symbols used		P
	Symbol for nature of supply placed next to rated voltage	---	P
	Symbol for class II appliances placed unlikely to be confused with other marking		N
	Units of physical quantities and their symbols according to international standardized system		P
7.7	Connection diagram fixed to appliances to be connected to more than two supply conductors and appliances for multiple supply, unless		N
	correct mode of connection is obvious		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
7.8	Except for type Z attachment, terminals for connection to the supply mains indicated as follows:		N
	- marking of terminals exclusively for the neutral conductor (letter N)		N
	- marking of protective earthing terminals (symbol IEC 60417-5019)		N
	- marking not placed on removable parts		N
7.9	Marking or placing of switches which may cause a hazard	Not affect safety	N
7.10	Indications of switches on stationary appliances and controls on all appliances by use of figures, letters or other visual means :		N
	This applies also to switches which are part of a control		N
	If figures are used, the off position indicated by the figure 0		N
	The figure 0 indicates only OFF position, unless no confusion with the OFF position		N
7.11	Indication for direction of adjustment of controls		N
7.12	Instructions for safe use provided		P
	Details concerning precautions during user maintenance		P
	The instructions state that:		P
	- the appliance is not to be used by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction		P
	- children being supervised not to play with the appliance		P
	For a part of class III construction supplied from a detachable power supply unit, the instructions state that the appliance is only to be used with the unit provided.		N
	Instructions for class III appliances state that it must only be supplied at SELV, unless		P
	it is a battery-operated appliance, the battery being charged outside the appliance		N
	For appliances for altitudes exceeding 2000 m, the maximum altitude is stated: (IEC 60335 1:2010/A1:2013)		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
	The instructions for appliances incorporating a functional earth states that the appliance incorporates an earth connection for functional purposes only (IEC 60335 1:2010/A1:2013)		N
	Instructions for drives supplied with a driven part state that rated number of operating cycles is not to be exceeded (IEC 60335-2-97)		N
	Instructions state substance of following (IEC 60335-2-97):		P
	WARNING: Important safety instructions. It is important for the safety of persons to follow these instructions. Save these instructions. (IEC 60335-2-97)		P
	Instructions include substance of following (IEC 60335-2-97):		P
	-do not allow children to play with fixed controls. Keep remote controls away from children (IEC 60335-2-97);		P
	-frequently examine the installation for imbalance and signs of wear or damage to cables and springs. Do not use if repair or adjustment is necessary (IEC 60335-2-97);		N
	-details on how to use the manual release (IEC 60335-2-97).		P
	Instructions for shutters also include substance of following (IEC 60335-2-97):		N
	-watch the moving shutter and keep people away until the shutter is completely closed (IEC 60335-2-97);		N
	-care should be taken when operating the manual release since an open shutter may fall rapidly due to weak or broken springs (IEC 60335-2-97).		N
	Instructions for awnings state substance of following (IEC 60335-2-97):		N
	Do not operate the awning when maintenance, such as window cleaning, is being carried out in the vicinity (IEC 60335-2-97).		N
	Instructions for automatically controlled awnings state substance of following (IEC 60335-2-97):		N
	Disconnect the awning from the supply when maintenance, such as window cleaning, is being carried out in the vicinity (IEC 60335-2-97).		N
	Instruction concerning persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge not applicable (IEC 60335-2-97/A2)		N
7.12.1	Sufficient details for installation supplied		P

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
	For an appliance intended to be permanently connected to the water mains and not connected by a hose-set, this is stated		N
	If different rated voltages or different rated frequencies are marked, the instructions state what action to be taken to adjust the appliance (IEC 60335-1:2010/A1:2013)		N
	Installation instructions state substance of following (IEC 60335-2-97):		P
	WARNING: Important safety instructions. Follow all instructions, since incorrect installation can lead to severe injury (IEC 60335-2-97).		P
	Installation instructions indicate type of driven part for which drive is intended to be used (IEC 60335-2-97)		N
	They specify mechanical parts necessary to couple drive to driven part (IEC 60335-2-97/A1)		N
	Installation instructions state substance of following (IEC 60335-2-97):		N
	-before installing the drive, remove any unnecessary cords and disable any equipment not needed for powered operation (IEC 60335-2-97);		N
	-install the actuating member of a manual release at a height less than 1,8 m (IEC 60335-2-97);		N
	-that actuating member of a biased off switch is to be located within direct sight of driven part but away from moving parts. It is to be installed at a minimum height of 1,5 m (IEC 60335-2-97);		N
	-information if drive intended to be installed at height of at least 2,5 m above floor level or other access level (IEC 60335-2-97/A2).		N
	Drives supplied without a driven part, installation instructions state substance of following (IEC 60335-2-97):		P
	-that the characteristics of the driven part must be compatible with the rated torque and rated operating time (IEC 60335-2-97);		P
	-the minimum tube diameter, for tubular drives (IEC 60335-2-97);		N
	-how to assemble the driven part and how to adjust the controls (IEC 60335-2-97).		N
	Installation instructions for awnings state that a horizontal distance of at least 0,4 m is to be maintained between fully unrolled driven part and any permanent object (IEC 60335-2-97)		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
7.12.2	Stationary appliances not fitted with means for disconnection from the supply mains having a contact separation in all poles that provide full disconnection under overvoltage category III, the instructions state that means for disconnection must be incorporated in the fixed wiring in accordance with the wiring rules		N
7.12.3	Insulation of the fixed wiring in contact with parts exceeding 50 K during clause 11; instructions state that the fixed wiring must be protected		N
7.12.4	Instructions for built-in appliances:		N
	- dimensions of space		N
	- dimensions and position of supporting and fixing		N
	- minimum distances between parts and surrounding structure		N
	- minimum dimensions of ventilating openings and arrangement		N
	- connection to supply mains and interconnection of separate components		N
	- allow disconnection of the appliance after installation, by accessible plug or a switch in the fixed wiring, unless		N
	a switch complying with 24.3		N
7.12.5	Replacement cord instructions, type X attachment with a specially prepared cord		N
	Replacement cord instructions, type Y attachment		N
	Replacement cord instructions, type Z attachment		N
7.12.6	Caution in the instructions for appliances incorporating a non-self-resetting thermal cut-out that is reset by disconnection of the supply mains, if this cut-out is required to comply with the standard		N
7.12.7	Instructions for fixed appliances stating how the appliance is to be fixed		N
7.12.8	Instructions for appliances connected to the water mains:		N
	- max. inlet water pressure (Pa) :		N
	- min. inlet water pressure, if necessary (Pa)..... :		N
	Instructions concerning new and old hose-sets for appliances connected to the water mains by detachable hose-sets		N
7.12.9	Instructions specified in 7.12 and from 7.12.1 to 7.12.8 appear together before any other instructions supplied with the appliance		P

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
	Alternatively, these instructions may be supplied with the appliance separately from any functional use booklet.		P
	They may follow the description of the appliance that identifies parts, or follow the drawings/sketches common to the languages of the instructions.		N
7.13	Instructions and other texts in an official language	English or local language	P
7.14	Marking clearly legible and durable, rubbing test as specified		P
	The signal words WARNING, CAUTION, DANGER if in the Latin alphabet shall be in uppercase having a height not less than		N
	- 3,5 mm for appliances normally used on the floor;		N
	- 2,0 mm for portable appliances with a printable surface of less than 10 cm ² ; and		N
	- 3,0 mm for other appliances.		N
	Uppercase letter of the text explaining the signal word shall be no smaller than 1,6 mm, with other letters according to the font size of the uppercase letter.		N
	Countries that do not use the Latin alphabet need to specify the minimum size of the script to be used taking into account what is specified for the Latin alphabet.		N
	Unless contrasting colours are used, moulded in, engraved, or stamped markings shall be either raised above or have a depth below the surface of at least 0,25 mm.		N
7.15	Markings on a main part		P
	Marking clearly discernible from the outside, if necessary after removal of a cover		P
	For portable appliances, cover can be removed or opened without a tool		P
	For stationary appliances, name, trademark or identification mark and model or type reference visible after installation		N
	For fixed appliances, name, trademark or identification mark and model or type reference visible after installation according to the instructions		N
	Indications for switches and controls placed on or near the components. Marking not on parts which can be positioned or repositioned in such a way that the marking is misleading		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
	Symbol IEC 60417 5018 is placed next to the symbol IEC 60417 5172 or IEC 60417 5180 (IEC 60335-1:2010/A1:2013)		N
	Marking of tubular drives concealed after installation (IEC 60335-2-97)		N
7.16	Marking of a possible replaceable thermal link or fuse link clearly visible with regard to replacing the link		N
8	PROTECTION AGAINST ACCESS TO LIVE PARTS		—
8.1	Adequate protection against accidental contact with live parts	No live parts	N
8.1.1	Requirement applies for all positions, detachable parts removed		P
	Lamps behind a detachable cover not removed, if conditions met		N
	Insertion or removal of lamps, protection against contact with live parts of the lamp cap		N
	Use of test probe B of IEC 61032, with a force not exceeding 1 N: no contact with live parts		P
	Use of test probe B of IEC 61032 through openings, with a force of 20 N: no contact with live parts		P
8.1.2	Use of test probe 13 of IEC 61032, with a force not exceeding 1 N, through openings in class 0 appliances and class II appliances/constructions: no contact with live parts		N
	Test probe 13 also applied through openings in earthed metal enclosures having a non-conductive coating: no contact with live parts		N
8.1.3	For appliances other than class II, use of test probe 41 of IEC 61032, with a force not exceeding 1 N: no contact with live parts of visible glowing heating elements		P
8.1.4	Accessible part not considered live if:		P
	- safety extra-low a.c. voltage: peak value not exceeding 42.4 V		N
	- safety extra-low d.c. voltage: not exceeding 42.4 V	Max. DC 5V, no live parts existed	P
	- or separated from live parts by protective impedance		N
	If protective impedance: d.c. current not exceeding 2 mA, and		N
	a.c. peak value not exceeding 0.7 mA		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
	- for peak values over 42.4 V up to and including 450 V, capacitance not exceeding 0,1 μ F		N
	- for peak values over 450 V up to and including 15 kV, discharge not exceeding 45 μ C		N
	- for peak values over 15kV, the energy in the discharge not exceeding 350 mJ		N
8.1.5	Live parts protected at least by basic insulation before installation or assembly:		N
	- built-in appliances		N
	- fixed appliances		N
	- appliances delivered in separate units		N
8.2	Class II appliances and constructions constructed so that there is adequate protection against accidental contact with basic insulation and metal parts separated from live parts by basic insulation only		N
	Only possible to touch parts separated from live parts by double or reinforced insulation		N
	Basic insulation and parts separated from live parts by basic insulation touched during adjustment, if a tool is needed to gain access to adjustment means (IEC 60335-2-97)		N
9	STARTING OF MOTOR-OPERATED APPLIANCES		--
	Requirements and tests are specified in part 2 when necessary		N
10	POWER INPUT AND CURRENT		—
10.1	Power input at normal operating temperature, rated voltage and normal operation not deviating from rated power input by more than shown in table 1 :	(See appended table)	N
	If the power input varies throughout the operating cycle and the maximum value of the power input exceeds, by a factor greater than two, the arithmetic mean value of the power input occurring during a representative period, the power input is the maximum value that is exceeded for more than 10 % of the representative period.		N
	Otherwise the power input is the arithmetic mean value		N
	Test carried out at upper and lower limits of the ranges for appliances with one or more rated voltage ranges, unless		N
	the rated power input is related to the arithmetic mean value		N
	Instead of determining mean value, maximum value of power input is determined, effect of inrush currents being ignored (IEC 60335-2-97)		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
10.2	Current at normal operating temperature, rated voltage and normal operation not deviating from rated current by more than shown in table 2..... :	(see appended table)	P
	If the current varies throughout the operating cycle and the maximum value of the current exceeds, by a factor greater than two, the arithmetic mean value of the current occurring during a representative period, the current is the maximum value that is exceeded for more than 10 % of the representative period.		N
	Otherwise the current is the arithmetic mean value.		N
	Test carried out at upper and lower limits of the ranges for appliances with one or more rated voltage ranges, unless		N
	the rated current is related to the arithmetic mean value of the range		N
	Instead of determining mean value, maximum value of current is determined, inrush currents being ignored (IEC 60335-2-97)		N
11	HEATING		—
11.1	No excessive temperatures in normal use		P
11.2	The appliance is held, placed or fixed in position as described		P
11.3	Temperature rises, other than of windings, determined by thermocouples		P
	Temperature rises of windings determined by resistance method, unless		N
	the windings are non-uniform or it is difficult to make the necessary connections		P
11.4	Heating appliances operated under normal operation at 1,15 times rated power input (W)		N
11.5	Motor-operated appliances operated under normal operation at most unfavourable voltage between 0.94 and 1.06 times rated voltage (V)	(see appended table)	P
11.6	Combined appliances operated under normal operation at most unfavourable voltage between 0,94 and 1,06 times rated voltage (V)..... :		N
11.7	Drives for continuous operation operated for consecutive cycles until steady conditions established (IEC 60335-2-97)		N
	Other drives operated as follows (IEC 60335-2-97):		P
	-drives supplied without a driven part operated without rest periods for rated operating time but for not less than 4 min (IEC 60335-2-97);		P

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
	-drives supplied with a driven part operated without rest periods for rated number of operating cycles but for not less than two cycles of operation (IEC 60335-2-97).		P
11.8	Temperature rises monitored continuously and not exceeding the values in table 3	(see appended table)	P
	If the temperature rise of a motor winding exceeds the value of table 3, or		N
	if there is doubt with regard to classification of insulation,		N
	tests of Annex C are carried out		N
	Sealing compound does not flow out		N
	Protective devices do not operate, except		P
	components in protective electronic circuits tested for the number of cycles specified in 24.1.4		N
13	LEAKAGE CURRENT AND ELECTRIC STRENGTH AT OPERATING TEMPERATURE		—
13.1	Leakage current not excessive and electric strength adequate		N
	Heating appliances operated at 1.15 times the rated power input (W)		N
	Motor-operated appliances and combined appliances supplied at 1.06 times the rated voltage (V)		N
	Protective impedance and radio interference filters disconnected before carrying out the tests		N
13.2	For class 0, class II and class III appliances, leakage current measured by means of the circuit described in figure 4 of IEC 60990		N
	For other appliances, a low impedance ammeter may be used		N
	Leakage current measurements	(see appended table)	N
13.3	The appliance is disconnected from the supply		N
	Electric strength tests according to table 4	(see appended table)	N
	No breakdown during the tests		N
14	TRANSIENT OVERVOLTAGES		—
	Appliances withstand the transient over-voltages to which they may be subjected		N
	Clearances having a value less than specified in table 16 subjected to an impulse voltage test, the test voltage specified in table 6		N
	No flashover during the test, unless		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
	of functional insulation if the appliance complies with clause 19 with the clearance short-circuited		N
15	MOISTURE RESISTANCE		—
15.1	Enclosure provides the degree of moisture protection according to classification of the appliance		N
	Compliance checked as specified in 15.1.1, taking into account 15.1.2, followed by the electric strength test of 16.3		N
	No trace of water on insulation which can result in a reduction of clearances or creepage distances below values specified in clause 29		N
15.1.1	Appliances, other than IPX0, subjected to tests as specified in IEC 60529 :	IPX0	N
	Water valves containing live parts in external hoses for connection of an appliance to the water mains tested as specified for IPX7 appliances		N
15.1.2	Hand-held appliance turned continuously through the most unfavourable positions during the test		N
	Built-in appliances installed according to the instructions		N
	Appliances placed or used on the floor or table placed on a horizontal unperforated support		N
	Appliances normally fixed to a wall and appliances with pins for insertion into socket-outlets are mounted on a wooden board		N
	For IPX3 appliances, the base of wall mounted appliances is placed at the same level as the pivot axis of the oscillating tube		N
	For IPX4 appliances, the horizontal centre line of the appliance is aligned with the pivot axis of the oscillating tube, and		N
	for appliances normally used on the floor or table, the movement is limited to two times 90° for a period of 5 min, the support being placed at the level of the pivot axis of the oscillating tube		N
	Wall-mounted appliances, take into account the distance to the floor stated in the instructions		N
	Appliances normally fixed to a ceiling are mounted underneath a horizontal unperforated support, the pivot axis of the oscillating tube located at the level of the underside of the support, and		N
	for IPX4 appliances, the movement of the tube is limited to two times 90° from the vertical for a period of 5 min		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
	Appliances with type X attachment fitted with a flexible cord as described		N
	Detachable parts subjected to the relevant treatment with the main part		N
	However, if a part has to be removed for user maintenance and a tool is needed, this part is not removed		N
	IPX4 tubular drives installed in a tube that is open at both ends and has the largest diameter specified in instructions. Tube has a length twice that of motor and is mounted on a support as in normal use. Support is rotated at a speed of 1 rev/min (IEC 60335-2-97)		N
	Drives with driven part tested with driven part fully unrolled but at end of test driven part is fully retracted (IEC 60335-2-97)		N
15.2	Spillage of liquid does not affect the electrical insulation		N
	Spillage solution comprising water containing approximately 1 % NaCl and 0,6 % rinsing agent		N
	Appliances with type X attachment fitted with a flexible cord as described		N
	Appliances incorporating an appliance inlet tested with or without an connector, whichever is most unfavourable		N
	Detachable parts are removed		N
	Overfilling test with additional amount of water, over a period of 1 min (I)..... :		N
	The appliance withstands the electric strength test of 16.3		N
	No trace of water on insulation that can result in a reduction of clearances or creepage distances below values specified in clause 29		N
15.3	Appliances proof against humid conditions		N
	Checked by test Cab: Damp heat steady state in IEC 60068-2-78		N
	Detachable parts removed and subjected, if necessary, to the humidity test with the main part		N
	Humidity test for 48 h in a humidity cabinet		N
	Reassembly of those parts that may have been removed		N
	The appliance withstands the tests of clause 16		N
16	LEAKAGE CURRENT AND ELECTRIC STRENGTH		—

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
16.1	Leakage current not excessive and electric strength adequate		N
	Protective impedance disconnected from live parts before carrying out the tests		N
	Tests carried out at room temperature and not connected to the supply		N
16.2	Single-phase appliances: test voltage 1.06 times rated voltage (V)..... :	(see appended table)	N
	Three-phase appliances: test voltage 1.06 times rated voltage divided by $\sqrt{3}$ (V)..... :		N
	Leakage current measurements..... :	(see appended table)	N
	Limit values doubled if:		N
	- all controls have an off position in all poles, or		N
	- the appliance has no control other than a thermal cut-out, or		N
	- all thermostats, temperature limiters and energy regulators do not have an off position, or		N
	- the appliance has radio interference filters		N
	With the radio interference filters disconnected, the leakage current do not exceed limits specified :		N
16.3	Electric strength tests according to table 7 :	(see appended table)	N
	Test voltage applied between the supply cord and inlet bushing and cord guard and cord anchorage as specified..... :		N
	No breakdown during the tests		N
17	OVERLOAD PROTECTION OF TRANSFORMERS AND ASSOCIATED CIRCUITS		—
	No excessive temperatures in transformer or associated circuits in event of short-circuits likely to occur in normal use :		N
	Appliance supplied with 1.06 or 0.94 times rated voltage under the most unfavourable short-circuit or overload likely to occur in normal use (V) :		N
	Basic insulation is not short-circuited		N
	Temperature rise of insulation of the conductors of safety extra-low voltage circuits not exceeding the relevant value specified in table 3 by more than 15 K		N
	Temperature of the winding not exceeding the value specified in table 8		N
	However, limits do not apply to fail-safe transformers complying with sub-clause 15.5 of IEC 61558-1		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
18	ENDURANCE		--
	Requirements and tests are specified in part 2 when necessary		N
19	ABNORMAL OPERATION		—
19.1	The risk of fire, mechanical damage or electric shock under abnormal or careless operation obviated		P
	Electronic circuits so designed and applied that a fault will not render the appliance unsafe	(see appended table)	P
	Appliances incorporating heating elements subjected to the tests of 19.2 and 19.3, and		N
	if the appliance also has a control that limit the temperature during clause 11 it is subjected to the test of 19.4, and		N
	if applicable, to the test of 19.5		N
	Appliances incorporating PTC heating elements are also subjected to the test of 19.6		N
	Appliances incorporating motors subjected to the tests of 19.7 to 19.10, as applicable		P
	Appliances incorporating electronic circuits subjected to the tests of 19.11 and 19.12, as applicable		P
	Appliances incorporating contactors or relays subjected to the test of 19.14, being carried out before the tests of 19.11		N
	Appliances incorporating voltage selector switches subjected to the test of 19.15		N
	Unless otherwise specified, the tests are continued until a non-self-resetting thermal cut-out operates, or		N
	until steady conditions are established		P
	If a heating element or intentionally weak part becomes open-circuited, the relevant test is repeated on a second sample		N
19.2	Test of appliances with heating elements with restricted heat dissipation; test voltage (V), power input of 0,85 times rated power input (W)		N
19.3	Test of 19.2 repeated; test voltage (V), power input of 1,24 times rated power input (W)		N
19.4	Test conditions as in clause 11, any control limiting the temperature during tests of clause 11 short-circuited		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
19.5	Test of 19.4 repeated on Class 0I and I appliances with tubular sheathed or embedded heating elements. No short-circuiting, but one end of the element connected to the sheath		N
	The test repeated with reversed polarity and the other end of the heating element connected to the sheath		N
	The test is not carried out on appliances intended to be permanently connected to fixed wiring and on appliances where an all-pole disconnection occurs during the test of 19.4		N
19.6	Appliances with PTC heating elements tested at rated voltage, establishing steady conditions		N
	The working voltage of the PTC heating element is increased by 5% and the appliance is operated until steady conditions are re-established. The voltage is then increased in similar steps until 1.5 times working voltage or until the PTC heating element ruptures (V)..... :		N
19.7	Stalling test by locking the rotor if the locked rotor torque is smaller than the full load torque, or		P
	locking moving parts of other appliances		P
	Locked rotor, capacitors open-circuited one at a time		N
	Test repeated with capacitors short-circuited one at a time, unless		N
	Capacitor is of class class S2 or S3 of IEC 60252-1		N
	Appliances with timer or programmer supplied with rated voltage for each of the tests, for a period equal to the maximum period allowed..... :		N
	An electronic timer or programmer that operates to ensure compliance with the test before the maximum period under the conditions of Clause 11 is reached, is a protective electronic circuit (IEC 60335-1:2010/A1:2013)		N
	Other appliances supplied with rated voltage for a period as specified		P
	Winding temperatures not exceeding values specified in table 8	(See appended table)	P
19.8	Multi-phase motors operated at rated voltage with one phase disconnected		N
19.10	Series motor operated at 1.3 times rated voltage for 1 min (V) :		N
	Instead of being tested with lowest possible load for 1 min, drives incorporating series motors are operated for one downward run (IEC 60335-2-97)		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
	During the test, parts not being ejected from the appliance		N
19.11	Electronic circuits, compliance checked by evaluation of the fault conditions specified in 19.11.2 for all circuits or parts of circuits, unless		P
	they comply with the conditions specified in 19.11.1		P
	Appliances incorporating an electronic circuit that relies upon a programmable component to function correctly, subjected to the test of 19.11.4.8, unless		N
	restarting does not result in a hazard		N
	Appliances having a device with an off position obtained by electronic disconnection, or a device placing the appliance in a stand-by mode, subjected to the tests of 19.11.4		N
	If the safety of the appliance under any of the fault conditions depends on the operation of a miniature fuse-link complying with IEC 60127, the test of 19.12 is carried out		N
	During and after each test the following is checked:		N
	- the temperature of the windings do not exceed the values specified in table 8		N
	- the appliance complies with the conditions specified in 19.13		P
	- any current flowing through protective impedance not exceeding the limits specified in 8.1.4		N
	If a conductor of a printed board becomes open-circuited, the appliance is considered to have withstood the particular test, provided both of the following conditions are met:		N
	- the base material of the printed circuit board withstands the test of Annex E		N
	- any loosened conductor does not reduce clearance or creepage distances between live parts and accessible metal parts below the values specified in clause 29		N
19.11.1	Fault conditions a) to g) in 19.11.2 are not applied to circuits or parts of circuits meeting both of the following conditions:		N
	- the electronic circuit is a low-power circuit, that is, the maximum power at low-power points does not exceed 15 W according to the tests specified		N
	- the protection against electric shock, fire hazard, mechanical hazard or dangerous malfunction of other parts of the appliance does not rely on the correct functioning of the electronic circuit		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
19.11.2	Fault conditions applied one at a time, the appliance operating under conditions specified in clause 11, but supplied at rated voltage, duration of the tests as specified:		P
	a) short circuit of functional insulation if clearances or creepage distances are less than the values specified in clause 29		N
	b) open circuit at the terminals of any component		N
	c) short circuit of capacitors, unless they comply with IEC 60384-14	SC C9, no hazard.	P
	d) short circuit of any two terminals of an electronic component, other than integrated circuits	SC D4, no hazard.	P
	This fault condition is not applied between the two circuits of an optocoupler		N
	e) failure of triacs in the diode mode	SC R37, no hazard.	P
	f) failure of microprocessors and integrated circuits	U3 failure, no hazard.	P
	g) failure of an electronic power switching device		N
	Each low power circuit is short-circuited by connecting the low-power point to the pole of the supply source from which the measurements were made		N
19.11.3	If the appliance incorporates a protective electronic circuit that operates to ensure compliance with Clause 19, the appliance is tested as follows:		N
	A fault as indicated in a) to g) of 19.11.2 shall be incorporated in the protective electronic circuit either before the appliance is started or at any point in time after the appliance is started so that the most unfavourable conditions of the test are applied.		N
	If the appliance is able to operate after the fault in the protective electronic circuit is incorporated, then the appliance is further tested as follows.		N
	For appliances for continuous operation the appliance is operated until steady conditions are reached. Then the relevant test of Clause 19 is repeated.		N
	Other appliances are operated for one cycle of operation. Then the relevant test of Clause 19 is repeated.		N
19.11.4	Appliances having a device with an off position obtained by electronic disconnection, or		N
	a device that can be placed in the stand-by mode,		N
	subjected to the tests of 19.11.4.1 to 19.11.4.7, the device being set in the off position or in the stand-by mode		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
	Appliances incorporating a protective electronic circuit subjected to the tests of 19.11.4.1 to 19.11.4.7, the tests being carried out after the protective electronic circuit has operated, except that		N
	appliances operated for 30 s or 5 min during the test of 19.7 are not subjected to the tests for electromagnetic phenomena.		N
	Surge protective devices disconnected, unless		N
	They incorporate spark gaps		N
19.11.4.1	The appliance is subjected to electrostatic discharges in accordance with IEC 61000-4-2, test level 4		N
19.11.4.2	The appliance is subjected to radiated fields in accordance with IEC 61000-4-3.		N
	The frequency ranges tested shall be:		N
	– 80 MHz to 1 000 MHz, test level 3;		N
	– 1,4 GHz to 2,0 GHz, test level 3;		N
	– 2,0 GHz to 2,7 GHz, test level 2.		N
19.11.4.3	The appliance is subjected to fast transient bursts in accordance with IEC 61000-4-4, test level 3 or 4 as specified		N
19.11.4.4	The power supply terminals of the appliance subjected to voltage surges in accordance with IEC 61000-4-5, test level 3 or 4 as specified		N
	An open circuit test voltage of 2 kV is applicable for the line-to-line coupling mode		N
	An open circuit test voltage of 4 kV is applicable for the line-to-earth coupling		N
	Earthed heating elements in class I appliances disconnected		N
19.11.4.5	The appliance is subjected to injected currents in accordance with IEC 61000-4-6, test level 3		N
19.11.4.6	Appliances having a rated current not exceeding 16 A are subjected to the class 3 voltage dips and interruptions in accordance with IEC 61000-4-11		N
	Appliances having a rated current exceeding 16 A are subjected to the class 3 voltage dips and interruptions in accordance with IEC 61000-4-34		N
19.11.4.7	The appliance is subjected to mains signals in accordance with IEC 61000-4-13, test level class 2		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
19.11.4.8	The appliance is supplied at rated voltage and operated under normal operation. After 60s the power supply is reduced to a level such that the appliance ceases to respond or parts controlled by the programmable component cease to operate		N
	The appliance continues to operate normally, or		N
	requires a manual operation to restart		N
19.12	If the safety of the appliance for any of the fault conditions specified in 19.11.2 depends on the operation of a miniature fuse-link complying with IEC 60127, the test is repeated, measuring the current flowing through the fuse-link; measured current (A); rated current of the fuse-link (A)..... :		N
19.13	During the tests the appliance does not emit flames, molten metal, poisonous or ignitable gas in hazardous amounts		P
	Temperature rises not exceeding the values shown in table 9 :	(see appended table)	P
	Compliance with clause 8 not impaired		P
	If the appliance can still be operated it complies with 20.2		P
	Insulation, other than of class III appliances or class III constructions that do not contain live parts, withstands the electric strength test of 16.3, the test voltage as specified in table 4:		N
	- basic insulation (V) :		N
	- supplementary insulation (V) :		N
	- reinforced insulation (V) :		N
	After operation or interruption of a control, clearances and creepage distances across the functional insulation withstand the electric strength test of 16.3, the test voltage being twice the working voltage		N
	The appliance does not undergo a dangerous malfunction, and		P
	no failure of protective electronic circuits, if the appliance is still operable		N
	Appliances tested with an electronic switch in the off position, or in the stand-by mode:		N
	- do not become operational, or		N
	- if they become operational, do not result in a dangerous malfunction during or after the tests of 19.11.4		N
	If the appliance contains lids or doors that are controlled by one or more interlocks, one of the interlocks may be released provided that:		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
	- the lid or door does not move automatically to an open position when the interlock is released, and		N
	- the appliance does not start after the cycle in which the interlock was released		N
	After each test, appliance comply with clause 20.101 to 20.104 (IEC 60335-2-97)		N
19.14	Appliances operated under the conditions of clause 11, any contactor or relay contact operating under the conditions of clause 11 being short-circuited		N
	For a relay or contactor with more than one contact, all contacts are short-circuited at the same time		N
	A relay or contactor operating only to ensure the appliance is energized for normal use is not short-circuited		N
	If more than one relay or contactor operates in clause 11, they are short-circuited in turn		N
19.15	For appliances with a mains voltage selector switch, the switch is set to the lowest rated voltage position and the highest value of rated voltage is applied	No such switch	N
20	STABILITY AND MECHANICAL HAZARDS		—
20.1	Appliances having adequate stability	Fixed appliances	N
	Tilting test through an angle of 10°, appliance placed on an inclined plane/horizontal support, not connected to the supply mains; appliance does not overturn		N
	Tilting test repeated on appliances with heating elements, angle of inclination increased to 15°		N
	Possible heating test in overturned position; temperature rise does not exceed values shown in table 9		N
20.2	Moving parts adequately arranged or enclosed as to provide protection against personal injury		P
	Protective enclosures, guards and similar parts are non-detachable, and		P
	have adequate mechanical strength		P
	Enclosures that can be opened by overriding an interlock are considered to be detachable parts		N
	Self-resetting thermal cut-outs and overcurrent protective devices not causing a hazard by unexpected closure		N
	Not possible to touch dangerous moving parts with the test probe described		P

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
20.101	Driven parts prevented from unrolling in a hazardous manner (IEC 60335-2-97)		N
	Drive is disconnected from supply mains and loaded with twice rated torque for 30 min. If drive is supplied with a driven part, load is applied to driven part and is equal to highest force exerted by it (IEC 60335-2-97)		N
	Spring-controlled driven parts fully retracted and a force equal to mass of driven part is applied in unrolling direction for 30 min (IEC 60335-2-97)		N
	Driven part not move faster than 150 mm/s (IEC 60335-2-97)		N
	Test repeated with drive supplied at 0,85 times rated voltage (IEC 60335-2-97)		N
20.102	Drives prevent driven part from unrolling in hazardous manner due to reduction of supply voltage (IEC 60335-2-97/A2)		N
	Drives start, from an unrolled position of driven part, under low supply voltage conditions (IEC 60335-2-97/A2)		N
	Drive supplied at rated voltage and operated under normal operation for at least rated operating time or cycles specified in 11.7, finishing with driven part in fully unrolled position. It is then allowed to cool down drive to approximately ambient temperature (IEC 60335-2-97/A2)		P
	Drive, with driven part approximately half unrolled, supplied at 0,85 times rated voltage and operated until driven part fully unrolled. Driven part not unroll in an uncontrolled manner (IEC 60335-2-97/A2)		N
	After 15 s, driven part retracted (IEC 60335-2-97/A2)		N
	Drive shall retract driven part to fully rolled position each time and protective devices not operate (IEC 60335-2-97/A2)		N
20.103	Actuation of a control to stop unrolling movement be effective (IEC 60335-2-97)		P
	Drive is supplied at rated voltage and operated under normal operation in unrolling direction and control is actuated. Driven part does not move more than 100 mm before stopping (IEC 60335-2-97)		P
20.104	Drives supplied with a driven part operate so that injury is prevented during unrolling movement (IEC 60335-2-97)		N
	This requirement considered to be met if appliance is controlled by a fixed biased-off switch only or (IEC 60335-2-97)		P

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
	if driven part, when fully unrolled, is at a height of at least 1,8 m (IEC 60335-2-97)		P
	Roller shutters fitted to roof or ceiling window, compliance checked by inspection, by measurement or by tests of clause 20.104.1, or 20.104.2 or 20.104.3 (IEC 60335-2-97/A2)		P
	Other appliances, compliance checked by inspection, by measurement or by tests of clause 20.104.1 or 20.104.2 (IEC 60335-2-97/A2)		P
20.104.1	Appliance supplied at rated voltage and operated under normal operation in unrolling direction. An obstacle is placed 400 mm above fully unrolled position. Force exerted by bottom edge of driven part is measured (IEC 60335-2-97)		N
	Test repeated with obstacle placed 100 mm above fully unrolled position (IEC 60335-2-97)		N
	Force not exceed (IEC 60335-2-97):		N
	- 25 N, more than 5 s (IEC 60335-2-97);		N
	- 150 N, more than 0,5 s (IEC 60335-2-97).		N
20.104.2	Appliance installed with driven part assembled in a rigid frame and positioned vertically. Bottom edge of driven part is positioned approximately 160 mm from fully unrolled position. A force of 150 N is applied upwards to bottom edge (IEC 60335-2-97)		N
	Displacement be at least 40 mm (IEC 60335-2-97)		N
20.104.3	Appliance supplied at rated voltage and operated under normal operation in unrolling direction. An obstacle placed 0,16 m above fully unrolled position. When driven part reaches obstacle, drive stop movement of driven part, and within 5 s start to reverse automatically. During this period, force not exceed (IEC 60335-2-97/A2):		N
	- 250 N during first 2 s (IEC 60335-2-97/A2);		N
	- 150 N during further period of 3 s (IEC 60335-2-97/A2);		N
	- 25 N thereafter (IEC 60335-2-97/A2).		N
	Distance between bottom edge of driven part and obstacle measured after automatic reversing stopped (IEC 60335-2-97/A2)		N
	Distance (mm) be at least 40 mm (IEC 60335-2-97/A2)		N
20.105	During movement of drive in either direction, actuation of manual control stop movement if (IEC 60335-2-97)		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
	there is no separate button for stop function (IEC 60335-2-97/A2)		P
	Drive with single button for controlling movement, further actuation reverse direction of movement (IEC 60335-2-97/A2)		N
	Drive with three buttons for controlling movement, one button be stop button (IEC 60335-2-97/A2)		P
	Requirements not apply to controls affecting automatic modes of operation (IEC 60335-2-97/A2)		N
	Any button with stop function not require key to stop drive (IEC 60335-2-97/A2)		N
21	MECHANICAL STRENGTH		—
21.1	Appliance has adequate mechanical strength and is constructed as to withstand rough handling		P
	Checked by applying 3 blows to every point of the enclosure like to be weak, in accordance with test Ehb of IEC 60068-2-75, spring hammer test, with an impact energy of 0,5 J		P
	The appliance shows no damage impairing compliance with this standard, and		P
	compliance with 8.1, 15.1 and clause 29 not impaired		P
	If doubt, supplementary or reinforced insulation subjected to the electric strength test of 16.3		N
	If necessary, repetition of groups of three blows on a new sample		N
21.2	Accessible parts of solid insulation having strength to prevent penetration by sharp implements		P
	Test not applicable if the thickness of supplementary insulation is at least 1 mm and reinforced insulation at least 2 mm		P
	The insulation is tested as specified, and does withstand the electric strength test of 16.3		N
22	CONSTRUCTION		—
22.1	Appliance marked with the first numeral of the IP system, relevant requirements of IEC 60529 are fulfilled	IPX0	N
22.2	Stationary appliance: means to ensure all-pole disconnection from the supply being provided:		N
	- a supply cord fitted with a plug, or		N
	- a switch complying with 24.3, or		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
	- a statement in the instruction sheet that a disconnection incorporated in the fixed wiring is to be provided, or		N
	- an appliance inlet		N
	Single-pole switches and single-pole protective devices for the disconnection of heating elements in single-phase, permanently connected class 01 and class I appliances, connected to the phase conductor		N
22.3	Appliance provided with pins: no undue strain on socket-outlets		N
	Applied torque not exceeding 0.25 Nm		N
	Pull force of 50N to each pin after the appliance has being placed in the heating cabinet; when cooled to room temperature the pins are not displaced by more than 1mm		N
	Each pin subjected to a torque of 0.4Nm; the pins are not rotating, unless		N
	rotating does not impair compliance with this standard		N
22.4	Appliance for heating liquids and appliance causing undue vibration not provided with pins for insertion into socket-outlets		N
22.5	No risk of electric shock when touching pins, for appliances having a capacitor with rated capacitance equal to or greater than 0,1 μ F, the appliance being disconnected from the supply at the instant of voltage peak		N
	If compliance relies on the operation of an electronic circuit, the electromagnetic phenomena tests of 19.11.4.3 and 19.11.4.4 are applied (IEC 60335 1:2010/A1:2013)		N
	The discharge test is then repeated three times, voltage not exceeding 34 V (V) : (IEC 60335 1:2010/A1:2013):		N
22.6	Electrical insulation not affected by condensing water or leaking liquid		N
	Electrical insulation of Class II appliances not affected if a hose ruptures or seal leaks		N
	In case of doubt, test as described		N
22.7	Adequate safeguards against the risk of excessive pressure in appliances containing liquid or gases or having steam-producing devices		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
22.8	Electrical connections not subject to pulling during cleaning of compartments to which access can be gained without the aid of a tool, and that are likely to be cleaned in normal use		P
22.9	Insulation, internal wiring, windings, commutators and slip rings not exposed to oil, grease or similar substances, unless		P
	the substance has adequate insulating properties		N
22.10	Not possible to reset voltage-maintained non-self-resetting thermal cut-outs by the operation of an automatic switching device incorporated within the appliance, if:		N
	- a non-self-resetting thermal cut-out is required by the standard, and		N
	- a voltage maintained non-self-resetting thermal cut-out is used to meet it		N
	Non-self-resetting thermal motor protectors have a trip-free action, unless		N
	they are voltage maintained		N
	Reset buttons of non-self-resetting controls so located or protected that accidental resetting is unlikely		N
22.11	Reliable fixing of non-detachable parts that provide the necessary degree of protection against electric shock, moisture or contact with moving parts		P
	Obvious locked position of snap-in devices used for fixing such parts		N
	No deterioration of the fixing properties of snap-in devices used in parts that are likely to be removed during installation or servicing		N
	Tests as described		P
22.12	Handles, knobs etc. fixed in a reliable manner, if loosening result in a hazard		N
	Removing or fixing in wrong position of handles, knobs etc. indicating position of switches or similar components not possible, if resulting in a hazard		N
	A choking hazard does not apply to appliances for commercial use		N
	Axial force 15 N applied to parts, the shape being so that an axial pull is unlikely to be applied		N
	Axial force 30 N applied to parts, the shape being so that an axial pull is likely to be applied		N
	If the part is removed and can be contained within the small parts cylinder, it is considered to be a choking hazard		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
22.13	Unlikely that handles, when gripped as in normal use, make the operator's hand touch parts having a temperature rise exceeding the value specified for handles which are held for short periods only		N
22.14	No ragged or sharp edges creating a hazard for the user in normal use, or during user maintenance		P
	No exposed pointed ends of self-tapping screws or other fasteners, likely to be touched by the user in normal use or during user maintenance		P
22.15	Storage hooks and the like for flexible cords smooth and well rounded		N
22.16	Automatic cord reels cause no undue abrasion or damage to the sheath of the flexible cord, no breakage of conductors strands and no undue wear of contacts		N
	Cord reel tested with 6000 operations, as specified		N
	Electric strength test of 16.3, voltage of 1000 V applied		N
22.17	Spacers not removable from the outside by hand or by means of a screwdriver or a spanner		N
22.18	Current-carrying parts and other metal parts resistant to corrosion		P
22.19	Driving belts not relied upon to provide the required level of insulation, unless		N
	constructed to prevent inappropriate replacement		N
22.20	Direct contact between live parts and thermal insulation effectively prevented, unless		N
	material used is non-corrosive, non-hygroscopic and non-combustible		N
22.21	Wood, cotton, silk, ordinary paper and fibrous or hygroscopic material not used as insulation, unless		P
	impregnated		N
	This requirement does not apply to magnesium oxide and mineral ceramic fibres used for the electrical insulation of heating elements		N
22.22	Appliances not containing asbestos		P
22.23	Oils containing polychlorinated biphenyl (PCB) not used		P
22.24	Bare heating elements, except in class III appliances or class III constructions that do not contain live parts, adequately supported		N
	In case of rupture, the heating conductor is unlikely to come in contact with accessible metal parts		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
22.25	Sagging heating conductors, except in class III appliances or class III constructions that do not contain live parts, cannot come into contact with accessible metal parts		N
22.26	For class III constructions the insulation between parts operating at safety extra-low voltage and other live parts complies with the requirements for double or reinforced insulation		N
22.27	Parts connected by protective impedance separated by double or reinforced insulation		N
22.28	Metal parts of Class II appliances conductively connected to gas pipes or in contact with water, separated from live parts by double or reinforced insulation		N
22.29	Class II appliances permanently connected to fixed wiring so constructed that the required degree of access to live parts is maintained after installation		N
22.30	Parts serving as supplementary or reinforced insulation fixed so that they cannot be removed without being seriously damaged, or		N
	so constructed that they cannot be replaced in an incorrect position, and so that if they are omitted, the appliance is rendered inoperable or manifestly incomplete		N
22.31	Neither clearances nor creepage distances over supplementary and reinforced insulation reduced below values specified in clause 29 as a result of wear		N
	Neither clearances nor creepage distances between live parts and accessible parts reduced below values for supplementary insulation if wires, screws etc. become loose		N
22.32	Supplementary and reinforced insulation constructed or protected against pollution so that clearances or creepage distances are not reduced below the values in clause 29		N
	Supplementary insulation of natural or synthetic rubber resistant to ageing, or arranged and dimensioned so that creepage distances are not reduced below values specified in 29.2		N
	Ceramic material not tightly sintered, similar materials or beads alone not used as supplementary or reinforced insulation		N
	Insulating material in which heating conductors are embedded is considered to be basic insulation, not reinforced insulation		N
	Oxygen bomb test at 70 °C for 96 h and 16 h at room temperature		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
22.33	Conductive liquids that are or may become accessible in normal use and conductive liquids that are in contact with unearthed accessible metal parts are not in direct contact with live parts		N
	unearthed metal parts separated from live parts by basic insulation only (IEC 60335-1:2010/A1:2013)		N
	Electrodes not used for heating liquids		N
	For class II constructions, conductive liquids that are or may become accessible in normal use and conductive liquids that are in contact with unearthed accessible metal parts, not in direct contact with basic or reinforced insulation, unless		N
	the reinforced insulation consists of at least 3 layers		N
	For class II constructions, conductive liquids which are in contact with live parts, not in direct contact with reinforced insulation, unless		N
	the reinforced insulation consists of at least 3 layers		N
	An air layer not used as basic or supplementary insulation in a double insulation system if likely to be bridged by leaking liquid		N
22.34	Shafts of operating knobs, handles, levers etc. not live, unless		N
	the shaft is not accessible when the part is removed		N
22.35	For other than class III constructions, handles, levers and knobs, held or actuated in normal use, not becoming live in the event of a failure of basic insulation		N
	Such parts being of metal, and their shafts or fixings are likely to become live in the event of a failure of basic insulation, are either adequately covered by insulation material or their accessible parts are separated from their shafts or fixings by supplementary insulation		N
	This requirement does not apply to handles, levers and knobs on stationary appliances, other than those of electrical components, provided they are reliably connected to an earthing terminal or earthing contact, or separated from live parts by earthed metal		N
	Insulating material covering metal handles, levers and knobs withstand the electric strength test of 16.3 for supplementary insulation		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
22.36	For appliances other than class III, handles continuously held in the hand in normal use so constructed that when gripped as in normal use, the operators hand is not likely to touch metal parts, unless		N
	they are separated from live parts by double or reinforced insulation		N
22.37	Capacitors in Class II appliances not connected to accessible metal parts and their casings, if of metal, separated from accessible metal parts by supplementary insulation, unless		N
	the capacitors comply with 22.42		N
22.38	Capacitors not connected between the contacts of a thermal cut-out		N
22.39	Lamp holders used only for the connection of lamps		N
22.41	No components, other than lamps, containing mercury		P
22.42	Protective impedance consisting of at least two separate components		N
	Values specified in 8.1.4 not exceeded if any one of the components are short-circuited or open-circuited		N
	Resistors checked by the test of 14.1 a) in IEC 60065		N
	Capacitors checked by the tests for class Y capacitors in IEC 60384-14		N
22.43	Appliances adjustable for different voltages, accidental changing of the setting of the voltage unlikely to occur		N
22.44	Appliances not having an enclosure that is shaped or decorated like a toy		P
22.45	When air is used as reinforced insulation, clearances not reduced below the values specified in 29.1.3 due to deformation as a result of an external force applied to the enclosure		N
22.46	For programmable protective electronic circuits used to ensure compliance with the standard, the software contains measures to control the fault/error conditions in table R.1		N
	Software that contains measures to control the fault/error conditions specified in table R.2 is to be specified in parts 2 for particular constructions or to address specific hazards		N
	These requirements are not applicable to software used for functional purpose or compliance with clause 11		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
22.47	Appliances connected to the water mains withstand the water pressure expected in normal use		N
	No leakage from any part, including any inlet water hose		N
22.48	Appliances connected to the water mains constructed to prevent backsiphonage of non-potable water		N
22.49	For remote operation, the duration of operation is to be set before the appliance can be started, unless		N
	the appliance switches off automatically or can operate continuously without hazard		N
22.50	Controls incorporated in the appliance take priority over controls actuated by remote operation		N
22.51	There is a control on the appliance manually adjusted to the setting for remote operation before the appliance can be operated in this mode		N
	There is a visual indication showing that the appliance is adjusted for remote operation		N
	These requirements not necessary on appliances that can operate as follows, without giving rise to a hazard:		N
	- continuously, or		N
	- automatically, or		N
	- remotely		N
22.52	Socket-outlets on appliances accessible to the user in accordance with the socket-outlet system used in the country in which the appliance is sold		N
22.53	Class II appliances and class III appliances that incorporate functionally earthed parts have at least double insulation or reinforced insulation between live parts and the functionally earthed parts		N
22.54	Button cells and batteries designated R1 not accessible without the aid of a tool, unless		N
	the cover of their compartment can only be opened after at least two independent movements have been applied simultaneously		N
22.55	Devices operated to stop the intended function of the appliance, if any, are to be distinguished from other manual devices by means of shape, size, surface texture or position	position	P
	An indication when the device has been operated is given by:		—
	– tactile feedback from the actuator or tactile feedback from the appliance such as stopping of the vibration on the body of the appliance or of a part of it; or		P

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
	- reduction in heat output; or		N
	- audible and visible feedback		N
	The sound of the motor or sound of an actuator switching from on to off is considered as an audible feedback. A switch with a stable off-position different from the on-position is considered visual and tactile feedback. The force feedback from the actuator when operating it is considered to be tactile feedback.		N
22.56	Detachable power supply part shall be provided with the part of class III construction of the appliance.		P
22.57	The properties of non-metallic materials shall not degrade from exposure to UV-C radiation generated from UV sources provided for microbiological control within the appliance such that they no longer comply with this standard. This requirement does not apply to glass, ceramics or similar materials.		N
23	INTERNAL WIRING		—
23.1	Wireways smooth and free from sharp edges		P
	Wires protected against contact with burrs, cooling fins etc.		P
	Wire holes in metal well-rounded or provided with bushings		N
	Wiring effectively prevented from coming into contact with moving parts		P
23.2	Beads etc. on live wires cannot change their position, and are not resting on sharp edges		N
	Beads inside flexible metal conduits contained within an insulating sleeve		N
23.3	Electrical connections and internal conductors movable relatively to each other not exposed to undue stress		N
	Flexible metallic tubes not causing damage to insulation of conductors		N
	Open-coil springs not used		N
	Adequate insulating lining provided inside a coiled spring, the turns of which touch one another		N
	No damage after 10 000 flexings for conductors flexed during normal use, or		N
	100 flexings for conductors flexed during user maintenance		N
	Electric strength test of 16.3, 1000 V between live parts and accessible metal parts		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
	Not more than 10% of the strands of any conductor broken, and		N
	not more than 30% for wiring supplying circuits that consume no more than 15W		N
23.4	Bare internal wiring sufficiently rigid and fixed		N
23.5	The insulation of internal wiring subjected to the supply mains voltage withstanding the electrical stress likely to occur in normal use		N
	Basic insulation electrically equivalent to the basic insulation of cords complying with IEC 60227 or IEC 60245, or		N
	no breakdown when a voltage of 2000 V is applied for 15 min between the conductor and metal foil wrapped around the insulation		N
	For class II construction, the requirements for supplementary insulation and reinforced insulation apply,		N
	except that the sheath of a cord complying with IEC 60227 or IEC 60245 may provide supplementary insulation.		N
	A single layer of internal wiring insulation does not provide reinforced insulation		N
23.6	Sleeving used as supplementary insulation on internal wiring retained in position by clamping at both ends, or		N
	be such that it can only be removed by breaking or cutting		N
23.7	The colour combination green/yellow only used for earthing conductors		N
23.8	Aluminium wires not used for internal wiring		P
23.9	Stranded conductors not consolidated by soldering where they are subjected to contact pressure, unless		N
	the contact pressure is provided by spring terminals		N
23.10	The insulation and sheath of internal wiring, incorporated in external hoses for the connection of an appliance to the water mains, at least equivalent to that of light polyvinyl chloride sheathed flexible cord (60227 IEC 52)		N
24	COMPONENTS		—
24.1	Components comply with safety requirements in relevant IEC standards		P
	List of components :	(see appended table)	P

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
	Motors not required to comply with IEC 60034-1, they are tested as part of the appliance		P
	Relays tested as part of the appliance, or		N
	alternatively acc. to IEC 60730-1, and meeting the additional requirements in IEC 60335-1		N
	The requirements of Clause 29 apply between live parts of components and accessible parts of the appliance		N
	Components can comply with the requirements for clearances and creepage distances for functional insulation in the relevant component standard		N
	30.2 of this standard apply to parts of non-metallic material in components including parts of non-metallic material supporting current-carrying connections		P
	Components that have not been previously tested to comply with the IEC standard for the relevant component are tested according to the requirements of 30.2		P
	Components that have been previously tested to comply with the resistance to fire requirements in the IEC standard for the relevant component need not be retested provided the specified conditions are met		P
	If these conditions are not satisfied, the component is tested as part of the appliance.		P
	Power electronic converter circuits not required to comply with IEC 62477-1, they are tested as part of the appliance		N
	If components have not been tested and found to comply with relevant IEC standard for the number of cycles specified, they are tested in accordance with 24.1.1 to 24.1.9		N
	For components mentioned in 24.1.1 to 24.1.9 no additional tests specified in the relevant component standard are necessary other than those specified in 24.1.1 to 24.1.9		P
	Components not tested and found to comply with relevant IEC standard and components not marked or not used in accordance with its marking, tested under the conditions occurring in the appliance		P
	Lampholders and starterholders that have not being tested and found to comply with the relevant IEC standard, tested as a part of the appliance and additionally according to the gauging and interchangeability requirements of the relevant IEC standard		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
	No additional tests specified for nationally standardized plugs such as those detailed in IEC/TR 60083 or connectors complying with the standard sheets of IEC 60320-1 and IEC 60309		N
24.1.1	Capacitors likely to be permanently subjected to the supply voltage and used for radio interference suppression or for voltage dividing, complying with IEC 60384-14		N
	If the capacitors have to be tested, they are tested according to Annex F		N
24.1.2	Transformers in associated switch mode power supplies comply with Annex BB of IEC 61558-2-16		N
	Safety isolating transformers complying with IEC 61558-2-6		N
	If they have to be tested, they are tested according to annex G		N
24.1.3	Switches complying with IEC 61058-1, the number of cycles of operation being at least 10 000		N
	If they have to be tested, they are tested according to Annex H		N
	If the switch operates a relay or contactor, the complete switching system is subjected to the test		N
	If the switch only operates a motor starting relay complying with IEC 60730-2-10 with the number of cycles of a least 10 000 as specified, the complete switching system need not be tested		N
24.1.4	Automatic controls complying with IEC 60730-1 with the relevant part 2. The number of cycles of operation being at least:		N
	- thermostats: 10 000		N
	- temperature limiters: 1 000		N
	- self-resetting thermal cut-outs: 300		N
	- voltage maintained non-self-resetting thermal cut-outs: 1 000		N
	- other non-self-resetting thermal cut-outs: 30		N
	- timers: 3 000		N
	- energy regulators: 10 000		N
	The number of cycles for controls operating during clause 11 need not be declared, if the appliance meets the requirements of this standard when they are short-circuited		N
	Thermal motor protectors are tested in combination with their motor under the conditions specified in Annex D		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
	For water valves containing live parts and that are incorporated in external hoses for connection of an appliance to the water mains, the degree of protection declared for subclause 6.5.2 of IEC 60730-2-8 is IPX7		N
	Thermal cut-outs of the capillary type comply with the requirements for type 2.K controls in IEC 60730-2-9		N
24.1.5	Appliance couplers complying with IEC 60320-1		N
	However, for appliances classified higher than IPX0, the appliance couplers complying with IEC 60320-2-3		N
	Interconnection couplers complying with IEC 60320-2-2		N
24.1.6	Small lamp holders similar to E10 lampholders complying with IEC 60238, the requirements for E10 lampholders being applicable		N
24.1.7	For remote operation of the appliance via a telecommunication network, the relevant standard for the telecommunication interface circuitry in the appliance is IEC 62151		N
24.1.8	The relevant standard for thermal links is IEC 60691		N
	Thermal links not complying with IEC 60691 are considered to be an intentionally weak part for the purposes of Clause 19		N
24.1.9	Contactors and relays, other than motor starting relays, tested as part of the appliance		N
	They are also tested in accordance with Clause 17 of IEC 60730-1, the number of cycles of operations in 24.1.4 selected according to the contactor or relay function in the appliance..... :		N
24.2	Appliances not fitted with:		—
	- switches or automatic controls in flexible cords		N
	- devices causing the protective device in the fixed wiring to operate in the event of a fault in the appliance		N
	- thermal cut-outs that can be reset by soldering, unless		N
	the solder has a melting point of at least 230 °C		N
24.3	Switches intended for all-pole disconnection of stationary appliances are directly connected to the supply terminals and have a contact separation in all poles, providing full disconnection under overvoltage category III conditions		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
24.4	Plugs and socket-outlets for extra-low voltage circuits and heating elements, not interchangeable with plugs and socket-outlets listed in IEC/TR 60083 or IEC 60906-1 or with connectors and appliance inlets complying with the standard sheets of IEC 60320-1		N
24.5	Capacitors in auxiliary windings of motors marked with their rated voltage and capacitance, and used accordingly		N
	Voltage across capacitors in series with a motor winding does not exceed 1,1 times rated voltage, when the appliance is supplied at 1,1 times rated voltage under minimum load		N
24.6	Working voltage of motors connected to the supply mains and having basic insulation that is inadequate for the rated voltage of the appliance, not exceeding 42 V		N
	In addition, the motors comply with the requirements of Annex I		N
24.7	Detachable hose-sets for connection of appliances to the water mains comply with IEC 61770		N
	They are supplied with the appliance		N
	Appliances intended to be permanently connected to the water mains not connected by a detachable hose-set		N
24.8	Motor running capacitors in appliances for which 30.2.3 is applicable and that are permanently connected in series with a motor winding, not causing a hazard in event of a failure		N
	One or more of the following conditions are to be met:		N
	- the capacitors are of class P2 according to IEC 60252-1		N
	- the capacitors are housed within a metallic or ceramic enclosure		N
	- the distance of separation of the outer surface to adjacent non-metallic parts exceeds 50 mm		N
	- adjacent non-metallic parts within 50 mm withstand the needle-flame test of Annex E		N
	- adjacent non-metallic parts within 50 mm classified as at least V-1 according to IEC 60695-11-10		N
25	SUPPLY CONNECTION AND EXTERNAL FLEXIBLE CORDS		—
25.1	Appliance not intended for permanent connection to fixed wiring, means for connection to the supply:		N
	- supply cord fitted with a plug,		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
	- an appliance inlet having at least the same degree of protection against moisture as required for the appliance, or		N
	- pins for insertion into socket-outlets		N
25.2	Appliance not provided with more than one means of connection to the supply mains		N
	Stationary appliance for multiple supply may be provided with more than one means of connection, provided electric strength test of 1250 V for 1 min between each means of connection causes no breakdown		N
25.3	Appliance intended to be permanently connected to fixed wiring provided with one of the following means for connection to the supply mains:		N
	- a set of terminals allowing the connection of a flexible cord		N
	- a fitted supply cord		N
	- a set of supply leads accommodated in a suitable compartment		N
	- a set of terminals for the connection of cables of fixed wiring, cross-sectional areas specified in 26.6, and the appliance allows the connection of the supply conductors after the appliance has been fixed to its support		N
	- a set of terminals and cable entries, conduit entries, knock-outs or glands, allowing connection of appropriate types of cable or conduit, and the appliance allows the connection of the supply conductors after the appliance has been fixed to its support		N
	For a fixed appliance constructed so that parts can be removed to facilitate easy installation, this requirement is met if it is possible to connect the fixed wiring without difficulty after a part of the appliance has been fixed to its support		N
25.4	Cable and conduit entries, rated current of appliance not exceeding 16 A, dimension according to table 10 (mm)		N
	Introduction of conduit or cable does not reduce clearances or creepage distances below values specified in clause 29		N
25.5	Method for assembling the supply cord to the appliance:		N
	- type X attachment		N
	- type Y attachment		N
	- type Z attachment, if allowed in relevant part 2		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
	Type X attachment, other than those with a specially prepared cord, not used for flat twin tinsel cords		N
	For multi-phase appliances supplied with a supply cord and that are intended to be permanently connected to fixed wiring, the supply cord is assembled to the appliance by type Y attachment		N
25.6	Plugs fitted with only one flexible cord		N
25.7	Supply cords, other than for class III appliances, being one of the following types:		N
	- rubber sheathed (at least 60245 IEC 53)		N
	- polychloroprene sheathed (at least 60245 IEC 57)		N
	- polyvinyl chloride sheathed. Not used if they are likely to touch metal parts having a temperature rise exceeding 75 K during the test of clause 11		N
	light polyvinyl chloride sheathed cord (60227 IEC 52), for appliances not exceeding 3 kg		N
	ordinary polyvinyl chloride sheathed cord (60227 IEC 53), for other appliances		N
	- heat resistant polyvinyl chloride sheathed. Not used for type X attachment other than specially prepared cords		N
	heat-resistant light polyvinyl chloride sheathed cord (60227 IEC 56), for appliances not exceeding 3 kg		N
	heat-resistant polyvinyl chloride sheathed cord (60227 IEC 57), for other appliances		N
	-Halogen-free, low smoke, thermoplastic insulated and sheathed		N
	Their properties should at least be those of:		N
	-Light duty halogen-free low smoke flexible cable (code designation 62821 IEC 101 for circular cable and code designation 62821 IEC 101f for flat cable);		N
	-Ordinary duty halogen-free, low smoke flexible cable (code designation 62821 IEC 102 for circular cable and code designation 62821 IEC 102f for flat cable).		N
	Supply cords for class III appliances adequately insulated		N
	Test with 500 V for 2 min for supply cords of class III appliances that contain live parts		N
	Supply cord of drives for outdoor use be polychloroprene sheathed and not be lighter than ordinary polychloroprene sheathed flexible cord (code designation 60245 IEC 57) (IEC 60335-2-97)		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
25.8	Nominal cross-sectional area of supply cords not less than table 11; rated current (A); cross-sectional area (mm ²)..... :		N
25.9	Supply cords not in contact with sharp points or edges		P
25.10	Supply cord of class I appliances have a green/yellow core for earthing		N
	In multi-phase appliances, the colour of the neutral conductor of the supply cord is blue.		N
	Where additional neutral conductors are provided in the supply cord:		N
	- other colours may be used for these additional neutral conductors;		N
	- all of the neutral conductors and line conductors are identified by marking using the alpha numeric notation specified in IEC 60445		N
	- the supply cord is fitted to the appliance		N
25.11	Conductors of supply cords not consolidated by soldering where they are subject to contact pressure, unless		N
	the contact pressure is provided by spring terminals		N
25.12	Insulation of the supply cord not damaged when moulding the cord to part of the enclosure		N
25.13	Inlet openings so constructed as to prevent damage to the supply cord		N
	If the enclosure at the inlet opening is not of insulating material, a non-detachable lining or bushing complying with 29.3 for supplementary insulation provided		N
	If the enclosure at the inlet opening is not of insulating material, a non-detachable lining or bushing complying with 29.3 for supplementary insulation provided		N
	If unsheathed supply cord, a similar additional bushing or lining is required, unless the appliance is		N
	class 0, or		N
	a class III appliance not containing live parts		N
25.14	Supply cords moved while in operation adequately protected against excessive flexing		N
	Flexing test, as described:		N
	- applied force (N)..... :		N
	- number of flexings..... :		N
	The test does not result in:		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
	- short-circuit between the conductors, such that the current exceeds a value of twice the rated current		N
	- breakage of more than 10% of the strands of any conductor		N
	- separation of the conductor from its terminal		N
	- loosening of any cord guard		N
	- damage to the cord or the cord guard		N
	- broken strands piercing the insulation and becoming accessible		N
25.15	For appliances with supply cord and appliances to be permanently connected to fixed wiring by a flexible cord, conductors of the supply cord relieved from strain, twisting and abrasion by use of cord anchorage		N
	The cord cannot be pushed into the appliance to such an extent that the cord or internal parts of the appliance can be damaged		N
	Pull and torque test of supply cord:		N
	- fixed appliances: pull 100 N; torque (not on automatic cord reel) (Nm)..... :		N
	Pull and torque test of supply cord, values shown in table 12: mass (kg); pull (N); torque (not on automatic cord reel) (Nm)..... :		N
	Cord not damaged and max. 2 mm displacement of the cord		N
25.16	Cord anchorages for type X attachments constructed and located so that:		N
	- replacement of the cord is easily possible		N
	- it is clear how the relief from strain and the prevention of twisting are obtained		N
	- they are suitable for different types of supply cord		N
	- cord cannot touch the clamping screws of cord anchorage if these screws are accessible, unless		N
	they are separated from accessible metal parts by supplementary insulation		N
	- the cord is not clamped by a metal screw which bears directly on the cord		N
	- at least one part of the cord anchorage securely fixed to the appliance, unless		N
	it is part of a specially prepared cord		N
	- screws which have to be operated when replacing the cord do not fix any other component, unless		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
	the appliance becomes inoperative or incomplete or the parts cannot be removed without a tool		N
	- if labyrinths can be bypassed the test of 25.15 is nevertheless withstood		N
	- for class 0, 0I and I appliances they are of insulating material or are provided with an insulating lining, unless		N
	failure of the insulation of the cord does not make accessible metal parts live		N
	- for class II appliances they are of insulating material, or		N
	if of metal, they are insulated from accessible metal parts by supplementary insulation		N
	After the test of 25.15, under the conditions specified, the conductors have not moved by more than 1 mm in the terminals		N
25.17	Adequate cord anchorages for type Y and Z attachment, test with the cord supplied with the appliance		N
25.18	Cord anchorages only accessible with the aid of a tool, or		N
	Constructed so that the cord can only be fitted with the aid of a tool		N
25.19	Type X attachment, glands not used as cord anchorage in portable appliances		N
	Tying the cord into a knot or tying the cord with string not used		N
25.20	The insulated conductors of the supply cord for type Y and Z attachment additionally insulated from accessible metal parts		N
25.21	Space for supply cord for type X attachment or for connection of fixed wiring constructed:		N
	- to permit checking of conductors with respect to correct positioning and connection before fitting any cover		N
	- so there is no risk of damage to the conductors or their insulation when fitting the cover		N
	- for portable appliances, so that the uninsulated end of a conductor, if it becomes free from the terminal, prevented from contact with accessible metal parts		N
	2 N test to the conductor for portable appliances; no contact with accessible metal parts		N
25.22	Appliance inlets:		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
	- live parts not accessible during insertion or removal		N
	Requirement not applicable to appliance inlets complying with IEC 60320-1		N
	- connector can be inserted without difficulty		N
	- the appliance is not supported by the connector		N
	- not for cold conditions if temp. rise of external metal parts exceeds 75 K during clause 11, unless		N
	the supply cord is unlikely to touch such metal parts		N
25.23	Interconnection cords comply with the requirements for the supply cord, except that:		N
	- the cross-sectional area of the conductors is determined on the basis of the maximum current during clause 11		N
	- the thickness of the insulation may be reduced		N
	- for class III construction, interconnection cords of a class I appliance or class II appliance, the cross sectional areas of the conductors need not comply with 25.8 if the temperature of the cord insulation specified in Table 3 and Table 9 are not exceeded during the tests of Clause 11 and Clause 19, respectively.		N
	If necessary, electric strength test of 16.3		N
25.24	Interconnection cords not detachable without the aid of a tool if compliance with this standard is impaired when they are disconnected		N
25.25	Dimensions of pins that are inserted into socket-outlets compatible with the dimensions of the relevant socket-outlet.		N
	Dimensions of pins and engagement face in accordance with the dimensions of the relevant plug in IEC/TR 60083		N
26	TERMINALS FOR EXTERNAL CONDUCTORS		—
26.1	Appliances provided with terminals or equally effective devices for connection of external conductors		N
	Terminals only accessible after removal of a non-detachable cover, except		N
	for class III appliances that do not contain live parts		N
	Earthing terminals may be accessible if a tool is required to make the connections and means are provided to clamp the wire independently from its connection		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
26.2	Appliances with type X attachment and appliances for the connection of cables to fixed wiring provided with terminals in which connections are made by means of screws, nuts or similar devices, unless		N
	the connections are soldered		N
	Screws and nuts not used to fix any other component, except		N
	internal conductors, if so arranged that they are unlikely to be displaced when fitting the supply conductors		N
	If soldered connections used, the conductor so positioned or fixed that reliance is not placed on soldering alone, unless		N
	barriers provided so that neither clearances nor creepage distances between live parts and other metal parts reduced below the values for supplementary insulation if the conductor becomes free at the soldered joint		N
26.3	Terminals for type X attachment and for connection of cables of fixed wiring so constructed that the conductor is clamped between metal surfaces with sufficient contact pressure but without damaging the conductor		N
	Terminals fixed so that when the clamping means is tightened or loosened:		N
	- the terminal does not become loose		N
	- internal wiring is not subjected to stress		N
	- neither clearances nor creepage distances are reduced below the values in clause 29		N
	Compliance checked by inspection and by the test of subclause 9.6 of IEC 60999-1, the torque applied being equal to two-thirds of the torque specified (Nm)..... :		N
	No deep or sharp indentations of the conductors		N
26.4	Terminals for type X attachment, except those having a specially prepared cord and those for the connection of cables of fixed wiring, no special preparation of conductors such as by soldering, use of cable lugs, eyelets or similar, and		N
	so constructed or placed that conductors prevented from slipping out when clamping screws or nuts are tightened		N
26.5	Terminals for type X attachment so located or shielded that if a wire of a stranded conductor escapes, no risk of accidental connection to other parts that result in a hazard		N
	Stranded conductor test, 8 mm insulation removed		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
	No contact between live parts and accessible metal parts and,		N
	for class II constructions, between live parts and metal parts separated from accessible metal parts by supplementary insulation only		N
26.6	Terminals for type X attachment and for connection of cables of fixed wiring suitable for connection of conductors with cross-sectional area according to table 13; rated current (A); nominal cross-sectional area (mm ²)..... :		N
	If a specially prepared cord is used, terminals need only be suitable for that cord		N
26.7	Terminals for type X attachment, except in class III appliances not containing live parts, accessible after removal of a cover or part of the enclosure		N
26.8	Terminals for the connection of fixed wiring, including the earthing terminal, located close to each other		N
26.9	Terminals of the pillar type constructed and located as specified		N
26.10	Terminals with screw clamping and screwless terminals not used for flat twin tinsel cords, unless		N
	conductors ends fitted with means suitable for screw terminals		N
	Pull test of 5 N to the connection		N
26.11	For type Y and Z attachment, soldered, welded, crimped or similar connections may be used		N
	For Class II appliances, the conductor so positioned or fixed that reliance is not placed on soldering, welding or crimping alone		N
	If soldering, welding or crimping alone used, barriers provided so that clearances and creepage distances between live parts and other metal parts are not reduced below the values for supplementary insulation if the conductor becomes free		N
27	PROVISION FOR EARTHING		—
27.1	Accessible metal parts of class 0I and I appliances permanently and reliably connected to an earthing terminal or earthing contact of the appliance inlet		N
	Earthing terminals and earthing contacts not connected to the neutral terminal		N
	Class 0, II and III appliances have no provision for protective earthing	Class III appliance	P
	Class II appliances and class III appliances can incorporate an earth for functional purposes		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
	Safety extra-low voltage circuits not earthed, unless		N
	protective extra-low voltage circuits		N
27.2	Clamping means of earthing terminals adequately secured against accidental loosening		N
	Terminals for the connection of external equipotential bonding conductors allow connection of conductors of 2,5 to 6 mm ² , and		N
	do not provide earthing continuity between different parts of the appliance, and		N
	conductors cannot be loosened without the aid of a tool		N
	Requirements not applicable to class II appliances and class III appliances that incorporate an earth for functional purposes		N
27.3	For a detachable part having an earth connection and being plugged into another part of the appliance, the earth connection is made before and separated after current-carrying connections when removing the part		N
	For appliances with supply cords, current-carrying conductors become taut before earthing conductor, if the cord slips out of the cord anchorage		N
	Requirements not applicable to class II appliances and class III appliances that incorporate an earth for functional purposes		N
27.4	No risk of corrosion resulting from contact between parts of the earthing terminal and the copper of the earthing conductor or other metal		N
	Parts providing earthing continuity, other than parts of a metal frame or enclosure, have adequate resistance to corrosion		N
	If of steel, these parts provided with an electroplated coating with a thickness at least 5 µm		N
	Adequate protection against rusting of parts of coated or uncoated steel, only intended to provide or transmit contact pressure		N
	In the body of the earthing terminal is a part of a frame or enclosure of aluminium or aluminium alloys, precautions taken to avoid risk of corrosion		N
27.5	Low resistance of connection between earthing terminal and earthed metal parts		N
	This requirement does not apply to connections providing earthing continuity in the protective extra-low voltage circuit, provided the clearances of basic insulation are based on the rated voltage of the appliance		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
	Requirements not applicable to class II appliances and class III appliances that incorporate an earth for functional purposes		N
	Resistance not exceeding 0,1 Ω at the specified low-resistance test (Ω)..... :		N
27.6	The printed conductors of printed circuit boards not used to provide earthing continuity in hand-held appliances.		N
	They may be used to provide earthing continuity in other appliances if at least two tracks are used with independent soldering points and the appliance complies with 27.5 for each circuit		N
	Requirements not applicable to class II appliances and class III appliances that incorporate an earth for functional purposes		N
28	SCREWS AND CONNECTIONS		—
28.1	Fixings, electrical connections and connections providing earthing continuity withstand mechanical stresses		P
	Screws not of soft metal liable to creep, such as zinc or aluminium		P
	Diameter of screws of insulating material min. 3 mm	No insulating screw used	N
	Screws of insulating material not used for any electrical connections or connections providing earthing continuity		N
	Screws used for electrical connections or connections providing earthing continuity screwed into metal		N
	Screws not of insulating material if their replacement by a metal screw can impair supplementary or reinforced insulation		N
	For type X attachment, screws to be removed for replacement of supply cord or for user maintenance, not of insulating material if their replacement by a metal screw impairs basic insulation		N
	For screws and nuts; torque-test as specified in table 14..... :	(See appended table)	P
28.2	Electrical connections and connections providing earthing continuity constructed so that contact pressure is not transmitted through non-ceramic insulating material liable to shrink or distort, unless		N
	there is resiliency in the metallic parts to compensate for shrinkage or distortion of the insulating material		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
	This requirement does not apply to electrical connections in circuits of appliances for which:		N
	30.2.2 is applicable and that carry a current not exceeding 0,5 A		N
	30.2.3 is applicable and that carry a current not exceeding 0,2 A		N
28.3	Space-threaded (sheet metal) screws only used for electrical connections if they clamp the parts together		N
	Thread-cutting (self-tapping) screws and thread rolling screws only used for electrical connections if they generate a full form standard machine screw thread		N
	Thread-cutting (self-tapping) screws not used if they are likely to be operated by the user or installer		N
	Thread-cutting, thread rolling and space threaded screws may be used in connections providing earthing continuity provided it is not necessary to disturb the connection:		N
	- in normal use,		N
	- during user maintenance,		N
	- when replacing a supply cord having a type X attachment, or		N
	- during installation		N
	At least two screws being used for each connection providing earthing continuity, unless		N
	the screw forms a thread having a length of at least half the diameter of the screw		N
28.4	Screws and nuts that make mechanical connection secured against loosening if they also make electrical connections or connections providing earthing continuity		N
	This requirement does not apply to screws in the earthing circuit if at least two screws are used, or		N
	if an alternative earthing circuit is provided		N
	Rivets for electrical connections or connections providing earthing continuity secured against loosening if the connections are subjected to torsion		N
29	CLEARANCES, CREEPAGE DISTANCES AND SOLID INSULATION		—
	Clearances, creepage distances and solid insulation withstand electrical stress		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
	For coatings used on printed circuits boards to protect the microenvironment (Type 1) or to provide basic insulation (Type 2), Annex J applies		N
	The microenvironment is pollution degree 1 under type 1 protection		N
	For type 2 protection, the spacing between the conductors before the protection is applied is not less than the values specified in Table 1 of IEC 60664-3		N
	These values apply to functional, basic, supplementary and reinforced insulation		N
29.1	Clearances not less than the values specified in table 16, taking into account the rated impulse voltage for the overvoltage categories of table 15, unless		N
	for basic insulation and functional insulation they comply with the impulse voltage test of clause 14		N
	However, if the distances are affected by wear, distortion, movement of the parts or during assembly, the clearances for rated impulse voltages of 1500 V and above are increased by 0,5 mm and the impulse voltage test is not applicable		N
	For appliances intended for use at altitudes exceeding 2 000 m, the clearances in Table 16 is increased according to the relevant multiplier values in Table A.2 of IEC 60664-1		N
	Impulse voltage test is not applicable:		N
	- when the microenvironment is pollution degree 3, or		N
	- for basic insulation of class 0 and class 01 appliances		N
	-to appliances intended for use at altitudes exceeding 2 000 m		N
	Appliances are in overvoltage category II		N
	A force of 2 N is applied to bare conductors, other than heating elements		N
	A force of 30 N is applied to accessible surfaces		N
29.1.1	Clearances of basic insulation withstand the overvoltages, taking into account the rated impulse voltage		N
	The values of table 16 or the impulse voltage test of clause 14 are applicable.....		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
	Clearance at the terminals of tubular sheathed heating elements may be reduced to 1,0 mm if the microenvironment is pollution degree 1		N
	Lacquered conductors of windings considered to be bare conductors		N
29.1.2	Clearances of supplementary insulation not less than those specified for basic insulation in table 16:		N
29.1.3	Clearances of reinforced insulation not less than those specified for basic insulation in table 16, using the next higher step for rated impulse voltage		N
	For double insulation, with no intermediate conductive part between basic and supplementary insulation, clearances are measured between live parts and the accessible surface, and the insulation system is treated as reinforced insulation		N
29.1.4	Clearances for functional insulation are the largest values determined from:		N
	- table 16 based on the rated impulse voltage		N
	- table F.7a in IEC 60664-1, frequency not exceeding 30 kHz		N
	- clause 4 of IEC 60664-4, frequency exceeding 30 kHz		N
	If values of table 16 are largest, the impulse voltage test of clause 14 may be applied instead, unless		N
	the microenvironment is pollution degree 3, or		N
	the distances can be affected by wear, distortion, movement of the parts or during assembly		N
	However, clearances are not specified if the appliance complies with clause 19 with the functional insulation short-circuited		N
	Lacquered conductors of windings considered to be bare conductors		N
	However, clearances at crossover points are not measured		N
	Clearance between surfaces of PTC heating elements may be reduced to 1mm		N
29.1.5	Appliances having higher working voltages than rated voltage, clearances for basic insulation are the largest values determined from:		N
	- table 16 based on the rated impulse voltage		N
	- table F.7a in IEC 60664-1, frequency not exceeding 30 kHz		N
	- clause 4 of IEC 60664-4, frequency exceeding 30 kHz		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
	If clearances for basic insulation are selected from Table F.7a of IEC 60664-1 or Clause 4 of IEC 60664-4, the clearances of supplementary insulation are not less than those specified for basic insulation		N
	If clearances for basic insulation are selected from Table F.7a of IEC 60664-1, the clearances of reinforced insulation dimensioned as specified in Table F.7a are to withstand 160% of the withstand voltage required for basic insulation		N
	If clearances for basic insulation are selected from Clause 4 of IEC 60664-4, the clearances of reinforced insulation are twice the value required for basic insulation		N
	If the secondary winding of a step-down transformer is earthed, or if there is an earthed screen between the primary and secondary windings, clearances of basic insulation on the secondary side not less than those specified in table 16, but using the next lower step for rated impulse voltage		N
	Circuits supplied with a voltage lower than rated voltage, clearances of functional insulation are based on the working voltage used as the rated voltage in table 15		N
29.2	Creepage distances not less than those appropriate for the working voltage, taking into account the material group and the pollution degree..... :		N
	Pollution degree 2 applies, unless		N
	- precautions taken to protect the insulation; pollution degree 1		N
	- insulation subjected to conductive pollution; pollution degree 3		N
	A force of 2 N is applied to bare conductors, other than heating elements		N
	A force of 30 N is applied to accessible surfaces		N
	In a double insulation system, the working voltage for both the basic and supplementary insulation is taken as the working voltage across the complete double insulation system		N
29.2.1	Creepage distances of basic insulation not less than specified in table 17..... :		N
	However, if the working voltage is periodic and has a frequency exceeding 30 kHz, the creepage distances are also determined from table 2 of IEC 60664-4, these values being used if exceeding the values in table 17..... :		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
	Except for pollution degree 1, corresponding creepage distance not less than the minimum specified for the clearance in table 16, if the clearance has been checked according to the test of clause 14		N
29.2.2	Creepage distances of supplementary insulation at least those specified for basic insulation in table 17, or.....		N
	Table 2 of IEC 60664-4, as applicable		N
29.2.3	Creepage distances of reinforced insulation at least double those specified for basic insulation in table 17, or		N
	Table 2 of IEC 60664-4, as applicable		N
29.2.4	Creepage distances of functional insulation not less than specified in table 18.....		N
	However, if the working voltage is periodic and has a frequency exceeding 30 kHz, the creepage distances are also determined from table 2 of IEC 60664-4, these values being used if exceeding the values in table 18.....		N
	Creepage distances may be reduced if the appliance complies with clause 19 with the functional insulation short-circuited		N
29.3	Supplementary and reinforced insulation have adequate thickness, or a sufficient number of layers, to withstand the electrical stresses		N
	Compliance checked:		N
	- by measurement, in accordance with 29.3.1, or		N
	- by an electric strength test in accordance with 29.3.2, or		N
	- by an assessment of the thermal quality of the material combined with an electric strength test, in accordance with 29.3.3, and		N
	for accessible parts of reinforced insulation consisting of a single layer, by measurement in accordance with 29.3.4, or		N
	- by an assessment of the thermal quality of the material according to 29.3.3 combined with an electric strength test in accordance with 23.5, for each single layer internal wiring insulation touching each other, or		N
	- as specified in subclause 6.3 of IEC 60664-4 for insulation that is subjected to any periodic voltage having a frequency exceeding 30 kHz		N
29.3.1	Supplementary insulation have a thickness of at least 1 mm		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
	Reinforced insulation have a thickness of at least 2 mm		N
29.3.2	Each layer of material withstand the electric strength test of 16.3 for supplementary insulation		N
	Supplementary insulation consist of at least 2 layers		N
	Reinforced insulation consist of at least 3 layers		N
29.3.3	The insulation is subjected to the dry heat test Bb of IEC 60068-2-2, followed by		N
	the electric strength test of 16.3		N
	If the temperature rise during the tests of clause 19 does not exceed the value specified in table 3, the test of IEC 60068-2-2 is not carried out		N
29.3.4	Thickness of accessible parts of reinforced insulation consisting of a single layer not less than specified in table 19..... :		N
30	RESISTANCE TO HEAT AND FIRE		—
30.1	External parts of non-metallic material,		P
	parts supporting live parts, and		N
	parts of thermoplastic material providing supplementary or reinforced insulation		N
	sufficiently resistant to heat		P
	Ball-pressure test according to IEC 60695-10-2		P
	External parts tested at 40 °C plus the maximum temperature rise determined during the test of clause 11, or at 75 °C, whichever is the higher; temperature (°C)..... :	(see appended table)	P
	Parts supporting live parts tested at 40°C plus the maximum temperature rise determined during the test of clause 11, or at 125 °C, whichever is the higher; temperature (°C)..... :	(see appended table)	N
	Parts of thermoplastic material providing supplementary or reinforced insulation tested at 25 °C plus the maximum temperature rise determined during clause 19, if higher; temperature (°C) :		N
30.2	Parts of non-metallic material resistant to ignition and spread of fire		P
	This requirement does not apply to:		—
	parts having a mass not exceeding 0,5 g, provided the cumulative effect is unlikely to propagate flames that originate inside the appliance by propagating flames from one part to another, or		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
	decorative trims, knobs and other parts unlikely to be ignited or to propagate flames that originate inside the appliance		P
	Compliance checked by the test of 30.2.1, and in addition:		P
	- for attended appliances, 30.2.2 applies		N
	- for unattended appliances, 30.2.3 applies		P
	For appliances for remote operation, 30.2.3 applies		N
	For base material of printed circuit boards, 30.2.4 applies		N
	Drives operated by biased off switch, clause 30.2.2 applies (IEC 60335 2 97/A2)		N
	Other drives, clause 30.2.3 applies (IEC 60335 2 97/A2)		N
30.2.1	Parts of non-metallic material subjected to the glow-wire test of IEC 60695-2-11 at 550 °C		P
	However, test not carried out if the material is classified as having a glow-wire flammability index according to IEC 60695-2-12 of at least 550 °C, or		N
	the material is classified at least HB40 according to IEC 60695-11-10		N
	Parts for which the glow-wire test cannot be carried out need to meet the requirements in ISO 9772 for material classified HBF		N
30.2.2	Appliances operated while attended, parts of non-metallic material supporting current-carrying connections, and		N
	parts of non-metallic material within a distance of 3mm of such connections,		N
	subjected to the glow-wire test of IEC 60695-2-11		N
	The test severity is:		N
	- 750 °C, for connections carrying a current exceeding 0,5 A during normal operation		N
	- 650 °C, for other connections		N
	Glow-wire applied to an interposed shielding material, if relevant		N
	The glow-wire test is not carried out on parts of material classified as having a glow-wire flammability index according to IEC 60695-2-12 of at least:		N
	- 750 °C, for connections carrying a current exceeding 0,5 A during normal operation		N
	- 650 °C, for other connections		N
	The glow-wire test is also not carried out on small parts. These parts are to:		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
	- comprise material having a glow-wire flammability index of at least 750 °C, or 650 °C as appropriate, or		N
	- comply with the needle-flame test of Annex E, or		N
	- comprise material classified as V-0 or V-1 according to IEC 60695-11-10		N
	Glow-wire test not applicable to conditions as specified		N
30.2.3	Appliances operated while unattended, tested as specified in 30.2.3.1 and 30.2.3.2		P
	The tests are not applicable to conditions as specified		N
30.2.3.1	Parts of non-metallic material supporting connections carrying a current exceeding 0,2 A during normal operation, and		P
	parts of non-metallic material, other than small parts, within a distance of 3 mm,		P
	subjected to the glow-wire test of IEC 60695-2-11 with a test severity of 850 °C		P
	Glow-wire applied to an interposed shielding material, if relevant		N
	The glow-wire test is not carried out on parts of material classified as having a glow-wire flammability index according to IEC 60695-2-12 of at least 850 °C		N
30.2.3.2	Parts of non-metallic material supporting connections, and		P
	parts of non-metallic material within a distance of 3mm,		P
	subjected to glow-wire test of IEC 60695-2-11	(see appended table)	P
	The test severity is:		P
	- 750 °C, for connections carrying a current exceeding 0,2 A during normal operation		P
	- 650 °C, for other connections		P
	Glow-wire applied to an interposed shielding material, if relevant		N
	However, the glow-wire test of 750 °C or 650 °C as appropriate, is not carried out on parts of material fulfilling both or either of the following classifications:		N
	- a glow-wire ignition temperature according to IEC 60695-2-13 of at least:		N
	775 °C, for connections carrying a current exceeding 0,2 A during normal operation		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
	675 °C, for other connections		N
	- a glow-wire flammability index according to IEC 60695-2-12 of at least:		N
	- 750 °C, for connections carrying a current exceeding 0,2 A during normal operation		N
	- 650 °C, for other connections		N
	The glow-wire test is also not carried out on small parts. These parts are to:		N
	- comprise material having a glow-wire ignition temperature of at least 775 °C or 675 °C as appropriate, or		N
	- comprise material having a glow-wire flammability index of at least 750 °C or 650 °C as appropriate, or		N
	- comply with the needle-flame test of Annex E, or		N
	- comprise material classified as V-0 or V-1 according to IEC 60695-11-10		N
	The consequential needle-flame test of Annex E applied to non-metallic parts that encroach within the vertical cylinder placed above the centre of the connection zone and on top of the non-metallic parts supporting current-carrying connections, and parts of non-metallic material within a distance of 3 mm of such connections if these parts are those:		N
	- parts that withstood the glow-wire test of IEC 60695-2-11 of 750 °C or 650 °C as appropriate, but produce a flame that persist longer than 2 s, or		N
	- parts that comprised material having a glow-wire flammability index of at least 750 °C or 650 °C as appropriate, or		N
	- small parts, that comprised material having a glow-wire flammability index of at least 750 °C or 650 °C as appropriate, or		N
	- small parts for which the needle-flame test of Annex E was applied, or		N
	- small parts for which a material classification of V-0 or V-1 was applied		N
	However, the consequential needle-flame test is not carried out on non-metallic parts, including small parts, within the cylinder that are:		N
	- parts having a glow-wire ignition temperature of at least 775 °C or 675 °C as appropriate, or		N
	- parts comprising material classified as V-0 or V-1 according to IEC 60695-11-10, or		P
	- parts shielded by a flame barrier that meets the needle-flame test of Annex E or that comprises material classified as V-0 or V-1 according to IEC 60695-11-10		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
30.2.4	Base material of printed circuit boards subjected to the needle-flame test of Annex E		N
	Test not applicable to conditions as specified :		N
31	RESISTANCE TO RUSTING		—
	Relevant ferrous parts adequately protected against rusting		P
	Tests specified in part 2 when necessary		N
	Parts intended to be installed outdoors, compliance checked by salt mist test of IEC 60068 2 52, severity 2 being applicable. Before test, coatings scratched as specified (IEC 60335 2 97)		N
	After test, appliance not have deteriorated to such an extent that compliance with this standard, in particular with clauses 8 and 27, is impaired (IEC 60335 2 97)		N
	Coating not be broken and not have loosened from metal surface (IEC 60335 2 97)		N
32	RADIATION, TOXICITY AND SIMILAR HAZARDS		—
	Appliance does not emit harmful radiation or present a toxic or similar hazard due to their operation in normal use		P
	Compliance is checked by the limits or tests specified in part 2, if relevant		N
A	ANNEX A (INFORMATIVE) ROUTINE TESTS		N
	Description of routine tests to be carried out by the manufacturer		N
B	ANNEX B (NORMATIVE) APPLIANCES POWERED BY RECHARGEABLE BATTERIES		P
	The following modifications to this standard are applicable for appliances powered by batteries that are recharged in the appliance		P
	This annex does not apply to battery chargers		P
	Three forms of construction covered:		N
	a) Appliance supplied directly from the supply mains or a renewable energy source, the battery charging circuitry and other supply unit circuitry incorporated within the appliance		N
	b) The part of the appliance incorporating the battery is supplied from the supply mains or a renewable energy source, via a detachable supply unit. The battery charging circuitry is incorporated within the part of the appliance containing the battery		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
	c) The part of the appliance incorporating the battery is supplied from the supply mains or a renewable energy source, via a detachable supply unit. The battery charging circuitry is incorporated within the detachable supply unit		N
3.1.9	Appliance operated under the following conditions:		P
	- the appliance, supplied by its fully charged battery, operated as specified in relevant part 2		P
	- the battery is charged, the battery being initially discharged to such an extent that the appliance cannot operate		P
	-if possible, the appliance is supplied from the supply mains through its battery charger, the battery being initially discharged to such an extent that the appliance cannot operate. The appliance is operated as specified in relevant part 2		P
	- if the appliance incorporates inductive coupling between two parts that are detachable from each other, the appliance is supplied from the supply mains with the detachable part removed		P
3.6.2	Part to be removed in order to discard the battery is not considered to be detachable		P
5.B.101	Appliances supplied from the supply mains tested as specified for motor-operated appliances		P
7.1	Battery compartment for batteries intended to be replaced by the user, marked with battery voltage and polarity of the terminals		N
	The positive terminal indicated by symbol IEC 60417-5005 and the negative terminal by symbol IEC 60417-5006		N
	Appliances intending to be supplied from a detachable supply unit marked with symbol IEC 60417-6181 and its type reference along with symbol ISO 7000-0790 (2004-01), or		N
	use only with <model designation> supply unit :		N
7.6	Symbols 60417-5005 and IEC 60417-5006		P
7.12	The instructions give information regarding charging		P
	The instructions for appliances incorporating batteries intended to be replaced by the user includes required information		N
	Details about how to remove batteries containing materials hazardous to the environment given		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
	For appliances intending to be supplied from a detachable supply unit for the purposes of recharging the battery, the type reference of the detachable supply unit is stated along with the following: (IEC 60335-1:2010/A1:2013)		N
	WARNING: For the purposes of recharging the battery, only use the detachable supply unit provided with this appliance (IEC 60335-1:2010/A1:2013)		N
	If the symbol for detachable supply unit is used, its meaning is explained (IEC 60335-1:2010/A1:2013)		N
	Instructions for appliances containing non user-replaceable batteries state the substance of the following:		P
	This appliance contains batteries that are only replaceable by skilled persons		P
	Instructions for appliances containing non-replaceable batteries shall state the substance of the following:		N
	This appliance contains batteries that are non-replaceable		N
7.15	Markings placed on the part of the appliance connected to the supply mains		P
	The type reference of the detachable supply unit is placed in close proximity to the symbol		N
8.2	Appliances having batteries that according to the instruction may be replaced by the user need only have basic insulation between live parts and the inner surface of the battery compartment		P
	If the appliance can be operated without batteries, double or reinforced insulation required		N
11.7	The battery is charged for the period stated in the instructions or 24 h		P
11.8	Temperature rise of the battery surface does not exceed the limit in the battery manufacturer's specification; measured (K); limit (K).....		P
	If no limit specified, the temperature rise does not exceed 20 K; measured (K)		P
19.1	Appliances subjected to tests of 19.B.101, 19.B.102 and 19.B.103		P
19.10	Not applicable		P
19.B.101	Appliances supplied at rated voltage for 168 h, the battery being continually charged		P
19.B.102	For appliances having batteries that can be removed without the aid of a tool, short-circuit of the terminals of the battery, the battery being fully charged,		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
19.B.103	Appliances having batteries replaceable by the user supplied at rated voltage under normal operation with the battery removed or in any position allowed by the construction		N
19.13	The battery does not rupture or ignite		P
21.B.101	Appliances having pins for insertion into socket-outlets have adequate mechanical strength		N
	Part of the appliance incorporating the pins subjected to the free fall test, procedure 2, of IEC 60068-2-31, the number of falls being:		N
	- 100, if the mass of the part does not exceed 250 g (g)		N
	- 50, if the mass of the part exceeds 250 g		N
	After the test, the requirements of 8.1, 15.1.1, 16.3 and clause 29 are met		N
22.3	Appliances having pins for insertion into socket-outlets tested as fully assembled as possible		N
25.13	An additional lining or bushing not required for interconnection cords in class III appliances or class III constructions operating at safety extra-low voltage not containing live parts		N
30.2	For parts of the appliance connected to the supply mains during the charging period, 30.2.3 applies		P
	For other parts, 30.2.2 applies		P
C	ANNEX C (NORMATIVE) AGEING TEST ON MOTORS		N
	Tests, as described, carried out when doubt with regard to the temperature classification of the insulation of a motor winding		N
	Value of p in table C.1 is 2 000 (IEC 60335 2 97)		N
D	ANNEX D (NORMATIVE) THERMAL MOTOR PROTECTORS		N
	Applicable to appliances having motors that incorporate thermal motor protectors necessary for compliance with the standard		N
	Test conditions as specified		N
E	ANNEX E (NORMATIVE) NEEDLE-FLAME TEST		N
	Needle-flame test carried out in accordance with IEC 60695-11-5, with the following modifications:		N
7	Severities		N
	The duration of application of the test flame is 30 s $\pm$ 1 s		N
9	Test procedure		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
9.1	The specimen so arranged that the flame can be applied to a vertical or horizontal edge as shown in the examples of Figure 1		N
9.2	The first paragraph does not apply		N
	If possible, the flame is applied at least 10 mm from a corner		N
9.3	The test is carried out on one specimen		N
	If the specimen does not withstand the test, the test may be repeated on two additional specimens, both withstanding the test		N
11	Evaluation of test results		N
	The duration of burning not exceeding 30 s		N
	However, for printed circuit boards, the duration of burning not exceeding 15 s		N
F	ANNEX F (NORMATIVE) CAPACITORS		N
	Capacitors likely to be permanently subjected to the supply voltage, and used for radio interference suppression or voltage dividing, comply with the following clauses of IEC 60384-14, with the following modifications:		N
1.5	Terms and definitions		N
1.5.3	Class X capacitors tested according to subclass X2		N
1.5.4	This subclause is applicable		N
1.6	Marking		N
	Items a) and b) are applicable		N
3.4	Approval testing		N
3.4.3.2	Table 3 is applicable as described		N
4.1	Visual examination and check of dimensions		N
	This subclause is applicable		N
4.2	Electrical tests		N
4.2.1	This subclause is applicable		N
4.2.5	This subclause is applicable		N
4.2.5.2	Only table 11 is applicable		N
	Values for test A apply		N
	However, for capacitors in heating appliances the values for test B or C apply		N
4.12	Damp heat, steady state		N
	This subclause is applicable		N
	Only insulation resistance and voltage proof are checked		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
4.13	Impulse voltage		N
	This subclause is applicable		N
4.14	Endurance		N
	Subclauses 4.14.1, 4.14.3, 4.14.4 and 4.14.7 are applicable		N
4.14.7	Only insulation resistance and voltage proof are checked		N
	No visible damage		N
4.17	Passive flammability test		N
	This subclause is applicable		N
4.18	Active flammability test		N
	This subclause is applicable		N
G	ANNEX G (NORMATIVE) SAFETY ISOLATING TRANSFORMERS		N
	The following modifications to this standard are applicable for safety isolating transformers:		N
7	Marking and instructions		N
7.1	Transformers for specific use marked with:		N
	-name, trademark or identification mark of the manufacturer or responsible vendor..... :		N
	-model or type reference :		N
17	Overload protection of transformers and associated circuits		N
	Fail-safe transformers comply with subclause 15.5 of IEC 61558-1		N
22	Construction		N
	Subclauses 19.1 and 19.1.2 of IEC 61558-2-6 are applicable		N
29	Clearances, creepage distances and solid insulation		N
29.1, 29.2, 29.3	The distances specified in items 2a, 2c and 3 in table 13 of IEC 61558-1 apply		N
	For insulated winding wires complying with subclause 19.12.3 of IEC 61558-1 there are no requirements for clearances or creepage distances		N
	For windings providing reinforced insulation, the distance specified in item 2c of table 13 of IEC 61558-1 is not assessed		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
	For safety isolating transformers subjected to periodic voltages with a frequency exceeding 30 kHz, the clearances, creepage distances and solid insulation values specified in IEC 60664-4 are applicable, if greater than the values specified in items 2a, 2c and 3 in table 13 of IEC 61558-1		N
H	ANNEX H (NORMATIVE) SWITCHES		N
	Switches comply with the following clauses of IEC 61058-1, as modified below:		N
	The tests of IEC 61058-1 carried out under the conditions occurring in the appliance		N
	Before being tested, switches are operated 20 times without load		N
8	Marking and documentation		N
	Switches are not required to be marked		N
	However, a switch that can be tested separately from the appliance marked with the manufacturer's name or trade mark and the type reference		N
13	Mechanism		N
	The tests may be carried out on a separate sample		N
15	Insulation resistance and dielectric strength		N
15.1	Not applicable		N
15.2	Not applicable		N
15.3	Applicable for full disconnection and micro-disconnection		N
17	Endurance		N
	Compliance is checked on three separate appliances or switches		N
	For 17.2.4.4, the number of cycles declared according to 7.1.4 is 10 000, unless		N
	otherwise specified in 24.1.3 of the relevant part 2 of IEC 60335..... :		N
	Switches for operation under no load and which can be operated only by a tool, and		N
	switches operated by hand that are interlocked so that they cannot be operated under load,		N
	are not subjected to the tests		N
	However, switches without this interlock are subjected to the test of 17.2.4.4 for 100 cycles of operation		N
	Subclauses 17.2.2 and 17.2.5.2 not applicable		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
	The ambient temperature during the test is that occurring in the appliance during the test of Clause 11 in IEC 60335-1		N
	The temperature rise of the terminals not more than 30 K above the temperature rise measured in clause 11 of IEC 60335-1 (K) :		N
20	Clearances, creepage distances, solid insulation and coatings of rigid printed board assemblies		N
	Clause 20 is applicable to clearances across full disconnection and micro-disconnection (IEC 60335-1:2010/A1:2013)		N
	It is also applicable to creepage distances for functional insulation, across full disconnection and micro-disconnection, as stated in Table 24 (IEC 60335-1:2010/A1:2013)		N
I	ANNEX I (NORMATIVE) MOTORS HAVING BASIC INSULATION THAT IS INADEQUATE FOR THE RATED VOLTAGE OF THE APPLIANCE		N
	The following modifications to this standard are applicable for motors having basic insulation that is inadequate for the rated voltage of the appliance:		N
8	Protection against access to live parts		N
8.1	Metal parts of the motor are considered to be bare live parts		N
11	Heating		N
11.3	The temperature rise of the body of the motor is determined instead of the temperature rise of the windings		N
11.8	The temperature rise of the body of the motor, where in contact with insulating material, not exceeding values in table 3 for the relevant insulating material		N
16	Leakage current and electric strength		N
16.3	Insulation between live parts of the motor and its other metal parts is not subjected to the test		N
19	Abnormal operation		N
19.1	The tests of 19.7 to 19.9 are not carried out		N
19.1.101	Appliance operated at rated voltage with each of the following fault conditions:		N
	- short circuit of the terminals of the motor, including any capacitor incorporated in the motor circuit		N
	- short circuit of each diode of the rectifier		N
	- open circuit of the supply to the motor		N
	- open circuit of any parallel resistor, the motor being in operation		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
	Only one fault simulated at a time, the tests carried out consecutively		N
22	Construction		N
22.1.101	For class I appliances incorporating a motor supplied by a rectifier circuit, the d.c. circuit being insulated from accessible parts of the appliance by double or reinforced insulation		N
	Compliance checked by the tests specified for double and reinforced insulation		N
J	ANNEX J (NORMATIVE) COATED PRINTED CIRCUIT BOARDS		N
	Testing of protective coatings of printed circuit boards carried out in accordance with IEC 60664-3 with the following modifications:		N
5.7	Conditioning of the test specimens		N
	When production samples are used, three samples of the printed circuit board are tested		N
5.7.1	Cold		N
	The test is carried out at -25 °C		N
5.7.3	Rapid change of temperature		N
	Severity 1 is specified		N
5.9	Additional tests		N
	This subclause is not applicable		N
K	ANNEX K (NORMATIVE) OVERVOLTAGE CATEGORIES		N
	The information on overvoltage categories is extracted from IEC 60664-1		N
	Overvoltage category is a numeral defining a transient overvoltage condition		N
	Equipment of overvoltage category IV is for use at the origin of the installation		N
	Equipment of overvoltage category III is equipment in fixed installations and for cases where the reliability and the availability of the equipment is subject to special requirements		N
	Equipment of overvoltage category II is energy consuming equipment to be supplied from the fixed installation		N
	If such equipment is subjected to special requirements with regard to reliability and availability, overvoltage category III applies		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
	Equipment of overvoltage category I is equipment for connection to circuits in which measures are taken to limit transient overvoltages to an appropriate low level		N
L	ANNEX L (INFORMATIVE) GUIDANCE FOR THE MEASUREMENT OF CLEARANCES AND CREEPAGE DISTANCES		N
	Information for the determination of clearances and creepage distances		N
M	ANNEX M (NORMATIVE) POLLUTION DEGREE		N
	The information on pollution degrees is extracted from IEC 60664-1		N
	Pollution		N
	The microenvironment determines the effect of pollution on the insulation, taking into account the macroenvironment		N
	Means may be provided to reduce pollution at the insulation by effective enclosures or similar		N
	Minimum clearances specified where pollution may be present in the microenvironment		N
	Degrees of pollution in the microenvironment		N
	For evaluating creepage distances, the following degrees of pollution in the microenvironment are established:		N
	- pollution degree 1: no pollution or only dry, non-conductive pollution occurs. The pollution has no influence		N
	- pollution degree 2: only non-conductive pollution occurs, except that occasionally a temporary conductivity caused by condensation is to be expected		N
	- pollution degree 3: conductive pollution occurs or dry non-conductive pollution occurs that becomes conductive due to condensation that is to be expected		N
	- pollution degree 4: the pollution generates persistent conductivity caused by conductive dust or by rain or snow		N
N	ANNEX N (NORMATIVE) PROOF TRACKING TEST		N
	The proof tracking test is carried out in accordance with IEC 60112 with the following modifications:		N
7	Test apparatus		N
7.3	Test solutions		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
	Test solution A is used		N
10	Determination of proof tracking index (PTI)		N
10.1	Procedure		N
	The proof voltage is 100V, 175V, 400V or 600V.. :		N
	The test is carried out on five specimens		N
	In case of doubt, additional test with proof voltage reduced by 25V, the number of drops increased to 100		N
10.2	Report		N
	The report states if the PTI value was based on a test using 100 drops with a test voltage of (PTI-25) V		N
O	ANNEX O (INFORMATIVE) SELECTION AND SEQUENCE OF THE TESTS OF CLAUSE 30		P
	Description of tests for determination of resistance to heat and fire		P
P	ANNEX P (INFORMATIVE) GUIDANCE FOR THE APPLICATION OF THIS STANDARD TO APPLIANCES USED IN WARM DAMP EQUABLE CLIMATES		N
	Modifications applicable for class 0 and 01 appliances having a rated voltage exceeding 150V, intended to be used in countries having a warm damp equable climate and that are marked WDaE		N
	Modifications may also be applied to class 1 appliances having a rated voltage exceeding 150V, intended to be used in countries having a warm damp equable climate and that are marked WdaE, if liable to be connected to a supply mains that excludes the protective earthing conductor		N
5.7	The ambient temperature for the tests of clauses 11 and 13 is 40 +3/0 °C		N
7.1	The appliance marked with the letters symbol IEC 60417-6332 (2015-06)		N
7.6	Symbol IEC 60417-6332 (2015-06)		N
7.12	The instructions state that the appliance is to be supplied through a residual current device (RCD) having a rated residual operating current not exceeding 30 mA		N
	The instructions state that the appliance is considered to be suitable for use in countries having a warm damp equable climate, but may also be used in other countries		N
	If symbol IEC 60417-6332 (2015-06) is used, its meaning shall be explained		N
11.8	The values of Table 3 are reduced by 15 K		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
13.2	The leakage current for class I appliances not exceeding 0,5 mA		N
15.3	The value of t is 37 °C		N
16.2	The leakage current for class I appliances not exceeding 0,5 mA (mA):		N
19.13	The leakage current test of 16.2 is applied in addition to the electric strength test of 16.3		N
Q	ANNEX Q (INFORMATIVE) SEQUENCE OF TESTS FOR THE EVALUATION OF ELECTRONIC CIRCUITS		N
	Description of tests for appliances incorporating electronic circuits		N
R	ANNEX R (NORMATIVE) SOFTWARE EVALUATION		N
	Programmable electronic circuits requiring software incorporating measures to control the fault/error conditions specified in table R.1 or R.2 validated in accordance with the requirements of this annex		N
R.1	Programmable electronic circuits using software		N
	Programmable electronic circuits requiring software incorporating measures to control the fault/error conditions specified in table R.1 or R.2 constructed so that the software does not impair compliance with the requirements of this standard		N
R.2	Requirements for the architecture		N
	Programmable electronic circuits requiring software incorporating measures to control the fault/error conditions specified in table R.1 or R.2 use measures to control and avoid software-related faults/errors in safety-related data and safety-related segments of the software		N
R.2.1.1	Programmable electronic circuits requiring software incorporating measures to control the fault/error conditions specified in table R.2 have one of the following structures:		N
	- single channel with periodic self-test and monitoring		N
	- dual channel (homogenous) with comparison		N
	- dual channel (diverse) with comparison		N
	Programmable electronic circuits requiring software incorporating measures to control the fault/error conditions specified in table R.1 have one of the following structures:		N
	- single channel with functional test		N
	- single channel with periodic self-test		N
	- dual channel without comparison		N
R.2.2	Measures to control faults/errors		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
R.2.2.1	When redundant memory with comparison is provided on two areas of the same component, the data in one area is stored in a different format from that in the other area		N
R.2.2.2	Programmable electronic circuits with functions requiring software incorporating measures to control the fault/error conditions specified in table R.2 and that use dual channel structures with comparison, have additional fault/error detection means for any fault/errors not detected by the comparison		N
R.2.2.3	For programmable electronic circuits with functions requiring software incorporating measures to control the fault/error conditions specified in table R.1 or R.2, means are provided for the recognition and control of errors in transmissions to external safety-related data paths		N
R.2.2.4	For programmable electronic circuits with functions requiring software incorporating measures to control the fault/error conditions specified in table R.1 or R.2, the programmable electronic circuits incorporate measures to address the fault/errors in safety-related segments and data indicated in table R.1 and R.2 as appropriate		N
R.2.2.5	For programmable electronic circuits with functions requiring software incorporating measures to control the fault/error conditions specified in table R.1 or R.2, detection of a fault/error occur before compliance with clause 19 is impaired		N
R.2.2.6	The software is referenced to relevant parts of the operating sequence and the associated hardware functions		N
R.2.2.7	Labels used for memory locations are unique		N
R.2.2.8	The software is protected from user alteration of safety-related segments and data		N
R.2.2.9	Software and safety-related hardware under its control is initialized and terminates before compliance with clause 19 is impaired		N
R.3	Measures to avoid errors		N
R.3.1	General		N
	For programmable electronic circuits with functions requiring software incorporating measures to control the fault/error conditions specified in table R.1 or R.2, the following measures to avoid systematic fault in the software are applied		N
	Software that incorporates measures used to control the fault/error conditions specified in table R.2 is inherently acceptable for software required to control the fault/error conditions specified in table R.1		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
R.3.2	Specification		N
R.3.2.1	Software safety requirements:	Software Id:	N
	The specification of the software safety requirements includes the descriptions listed		N
R.3.2.2	Software architecture		N
R.3.2.2.1	The specification of the software architecture includes the aspects listed - techniques and measures to control software faults/errors (refer to R.2.2); - interactions between hardware and software; - partitioning into modules and their allocation to the specified safety functions; - hierarchy and call structure of the modules (control flow); - interrupt handling; - data flow and restrictions on data access; - architecture and storage of data; - time-based dependencies of sequences and data	Document ref. No:	N
R.3.2.2.2	The architecture specification is validated against the specification of the software safety requirements by static analysis		N
R.3.2.3	Module design and coding		N
R.3.2.3.1	Based on the architecture design, software is suitably refined into modules		N
	Software module design and coding is implemented in a way that is traceable to the software architecture and requirements		N
R.3.2.3.2	Software code is structured		N
R.3.2.3.3	Coded software is validated against the module specification by static analysis		N
	The module specification is validated against the architecture specification by static analysis		N
R.3.3.3	Software validation		N
	The software is validated with reference to the requirements of the software safety requirements specification		N
	Compliance is checked by simulation of:		N
	- input signals present during normal operation		N
	- anticipated occurrences		N
	- undesired conditions requiring system action		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict

TABLE R.1 ^e – GENERAL FAULT/ERROR CONDITIONS						
Component ^a	Fault/error	Acceptable measures ^{b, c}	Definitions	Document reference for applied measure	Document reference for applied test	Verdict
1 CPU						N
1.1 Registers	Stuck at	Functional test, or periodic self-test using either: - static memory test, or - word protection with single bit redundancy	H.2.16.5 H.2.16.6 H.2.19.6 H.2.19.8.2			N
1.2 VOID						N
1.3 Programme counter	Stuck at	Functional test, or Periodic self-test, or Independent time-slot monitoring, or Logical monitoring of the programme sequence	H.2.16.5 H.2.16.6 H.2.18.10.4 H.2.18.10.2			N
2 Interrupt handling and execution	No interrupt or too frequent interrupt	Functional test, or time-slot monitoring	H.2.16.5 H.2.18.10.4			N
3 Clock	Wrong frequency (for quartz synchronised clock: harmonics/sub-harmonics only)	Frequency monitoring, or time slot monitoring	H.2.18.10.1 H.2.18.10.4			N
4. Memory						N
4.1 Invariable memory	All single bit faults	Periodic modified checksum, or multiple checksum, or word protection with single bit redundancy	H.2.19.3.1 H.2.19.3.2 H.2.19.8.2			N
4.2 Variable memory	DC fault	Periodic static memory test, or word protection with single bit redundancy	H.2.19.6 H.2.19.8.2			N

IEC 60335-2-97						
Clause	Requirement + Test			Result - Remark		Verdict
4.3 Addressing (relevant to variable and invariable memory)	Stuck at	Word protection with single bit redundancy including the address	H.2.19.8.2			N
5 Internal data path	Stuck at	Word protection with single bit redundancy	H.2.19.8.2			N
5.1 VOID						N
5.2 Addressing	Wrong address	Word protection with single bit redundancy including the address	H.2.19.8.2			N
6 External communicati on	Hamming distance 3	Word protection with multi-bit redundancy, or CRC – single work, or Transfer redundancy, or Protocol test	H.2.19.8.1 H.2.19.4.1 H.2.18.2.2 H.2.18.14			N
6.1 VOID						N
6.2 VOID						N
6.3 Timing	Wrong point in time Wrong sequence	Time-slot monitoring, or scheduled transmission Time-slot and logical monitoring, or comparison of redundant communication channels by either: - reciprocal comparison - independent hardware comparator Logical monitoring, or time-slot monitoring, or Scheduled transmission	H.2.18.10.4 H.2.18.18 H.2.18.10.3 H.2.18.15 H.2.18.3 H.2.18.10.2 H.2.18.10.4 H.2.18.18			N
7 Input/output periphery	Fault conditions specified in 19.11.2	Plausibility check	H.2.18.13			N
7.1 VOID						N

IEC 60335-2-97						
Clause	Requirement + Test			Result - Remark		Verdict
7.2 Analog I/O						N
7.2.1 A/D and D/A- converter	Fault conditions specified in 19.11.2	Plausibility check	H.2.18.13			
7.2.2 Analog multiplexer	Wrong addressing	Plausibility check	H.2.18.13			N
8 VOID						N
9 Custom chips ^d e.g. ASIC, GAL, gate array	Any output outside the static and dynamic functional specification	Periodic self-test	H.2.16.6			N
NOTE A Stuck-at fault model denotes a fault model representing an open circuit or a non-varying signal level. A DC fault model denotes a stuck-at fault model incorporating short circuit between signal lines. a) For fault/error assessment, some components are divided into their sub-functions. b) For each sub-function in the table, the Table R.2 measure will cover the software fault/error. c) Where more than one measure is given for a sub-function, these are alternatives. d) To be divided as necessary by the manufacturer into sub-functions. e) Table R.1 is applied according to the requirements of R.1 to R.2.2.9 inclusive.						
S	ANNEX S (NORMATIVE) BATTERY OPERATED APPLIANCES POWERED BY BATTERIES THAT ARE NON-RECHARGEABLE OR NOT RECHARGED IN THE APPLIANCE					--
	The following modifications to this standard are applicable for battery-operated appliances where the batteries are either non-rechargeable (primary batteries), or					N
	rechargeable batteries (secondary batteries) that are not recharged in the appliance					N
5.8.1	If the supply terminals for the connection of the battery have no indication of polarity, the more unfavourable polarity is applied					N
5.S.101	Appliances intended for use with a battery box are tested with the battery box supplied with the appliance or with the battery box recommended in the instructions					N
5.S.102	Appliances are tested as motor-operated appliances.					N
7.1	Appliances marked with the battery voltage (V) and the polarity of the terminals, unless..... :					N
	the polarity is irrelevant					N
	Appliances also marked with:					N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
	– name, trade mark or identification mark of the manufacturer or responsible vendor..... :		N
	– model or type reference..... :		N
	– IP number according to degree of protection against ingress of water, other than IPX0 .. :		N
	– type reference of battery or batteries :		N
	If relevant, the positive terminal is indicated by the symbol IEC 60417-5005 and the negative terminal by the symbol IEC 60417-5006		N
	If appliances use more than one battery, they are marked to indicate correct polarity connection of the batteries		N
7.6	Additional symbols		N
7.12	The instructions contain the following, as applicable:		N
	– the types of batteries that may be used .. :		N
	– how to remove and insert the batteries		N
	– non-rechargeable batteries are not to be recharged		N
	– rechargeable batteries are to be removed from the appliance before being charged		N
	– different types of batteries or new and used batteries are not to be mixed		N
	– batteries are to be inserted with the correct polarity		N
	– exhausted batteries are to be removed from the appliance and safely disposed of		N
	– if the appliance is to be stored unused for a long period, the batteries are removed		N
	– the supply terminals are not to be short-circuited		N
11.5	Appliances are supplied with the most unfavourable supply voltage between		N
	– 0,55 and 1,0 times the battery voltage, if the appliance can be used with non-rechargeable batteries		N
	– 0,75 and 1,0 times battery voltage, if the appliance is designed for use with rechargeable batteries only		N
	The values specified in Table S.101 for the internal resistance per cell of the battery is taken into account		N
19.1	The tests are carried out with the battery fully charged unless otherwise specified		N
19.13	The battery does not rupture or ignite		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
19.S.101	Appliances are supplied with the voltage specified in 11.5. The supply terminals having an indication of polarity are connected to the opposite polarity, unless		N
	such a connection is unlikely to occur due to the construction of the appliance		N
19.S.102	For appliances with provision for multiple batteries, one or more of the batteries are reversed and the appliance is operated, if reversal of batteries is allowed by the construction		N
25.5	The flexible leads or flexible cord used to connect an external battery or battery box in is connected to the appliance by a type X attachment		N
25.13	This requirement is not applicable to the flexible leads or flexible cord connecting external batteries or a battery box with an appliance		N
25.S.101	Appliances have suitable means for connection of the battery. If the type of battery is marked on the appliance, the means of connection is suitable for this type of battery		N
26.5	Terminal devices in an appliance for the connection of the flexible leads or flexible cord connecting an external battery or battery box are so located or shielded that there is no risk of accidental connection between supply terminals		N
30.2.3.2	There is no battery in the area of the vertical cylinder used for the consequential needle flame test, unless		N
	the battery is shielded by a barrier that meets the needle flame test of Annex E, or		N
	that comprises material classified as V-0 or V-1 according to IEC 60695-11-10		N
T	ANNEX T (NORMATIVE) UV-C RADIATION EFFECT ON NON-METALLIC MATERIALS		--
	Requirements for non-metallic materials subject to direct or reflected UV-C radiation exposure and whose mechanical and electrical properties are relied upon for compliance with the		N
	Does not apply to glass, ceramic and similar materials		N
	Tested as specified in ISO 4892-1 and ISO 4892-2, with the following modifications:		N
	Modifications to ISO 4892-1:		N
5.1.6	The UV-C emitter is a low pressure mercury lamp with a quartz envelope having a continuous spectral irradiance of 10 W/m ² at 254 nm		N
	Subclause 5.1.6.1 and Table 1 are not applicable		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
5.2.4	The black-panel temperature shall be 63 °C +/- 3 °C		N
5.3.1	Humidification of the chamber air is specified in part 2 when necessary		N
9	This clause is not applicable		N
	Modifications to ISO 4892-2:		N
7.1	At least three test specimens are tested		N
	Ten samples of internal wiring is tested		N
7.2	The specimens are attached to the specimen holders such that they are not subject to any stress		N
7.3	Apparatus prepared as specified		N
	The test specimens and, if used, the irradiance-measuring instrument are exposed for 1 000 h		N
7.4	If used, a radiometer is mounted and calibrated such that it measures the irradiance at the exposed surface of the test specimen		N
7.5	Material properties and test methods for parts providing mechanical support or impact resistance as specified in Table T.1		N
	Material properties and test method for electrical insulation of internal wiring as specified in Table T.2		N
8	This clause is not applicable		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict

ATTACHMENT TO TEST REPORT			
IEC 60335-1:2010 + A1:2013 + A2:2016			
EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES			
Household and similar electrical appliances – Safety –			
Part 1: GENERAL REQUIREMENTS			
Differences according to		EN 60335-1:2012 + A11:2014 + A13:2017 + A1:2019 + A14:2019 + A2:2019 + A15:2021 EN 62233:2008	
TRF template used.....		IECEE OD-2020-F2:2020, Ed. 1.1	
Attachment Form No.		EU_GD_IEC60335_1X_II	
Attachment Originator.....		Nemko Group AS	
Master Attachment.....		2022-03-04	
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	CENELEC COMMON MODIFICATIONS (EN)		
6.1	Delete “class 0” and “class 01”		P
7.1	Single-phase appliances to be connected to the supply mains: 230 V covered	Class III appliance	N
	Multi-phase appliances to be connected to the supply mains: 400 V covered		N
7.12	The instructions include the substance of the following:		P
	- this appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved		P
	- children shall not play with the appliance		P
	- cleaning and user maintenance shall not be made by children without supervision		P
8.1.1	Also test probe 18 of EN 61032 is applied		N
	The appliance being in every possible position during the test, except that		N
	appliances normally used on the floor and having a mass exceeding 40 kg are not tilted		N
	The force on the probe in the straight position is increased to 10 N when probe 18 is used		N
	When using test probe 18 the appliance is fully assembled as in normal use without any parts removed, and		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
	parts intended to be removed for user maintenance are also not removed		N
8.1.3	Instead of test probe B, test probe 18 and test probe 13, for appliances other than those of class II, test probe 41 of IEC 61032 is applied with a force not exceeding 1 N to live parts of visibly glowing heating elements, all poles of which can be disconnected by a single switching action		N
8.2	Compliance is checked by inspection and by applying the test probes of EN 61032 in accordance with the conditions specified in 8.1.1		N
	Test probe B and probe 18 of EN 61032 are applied to built-in appliances and fixed appliances only after installation		N
15.1.2	Appliances with an automatic cord reel tested with the cord in the most unfavourable position so that the reeling of the wet cord may affect electrical insulation during operation, the cord not being dried before reeling		N
20.2	For appliances having hazardous moving parts, due to their working function, e.g. the needle of a sewing machine, tools of kitchen machines or the blade of an electrical knife, full protection is not possible for performing their intended use		N
	When using a test probe similar to test probe B of EN 61032, having a circular stop face and applied with a force of 5N, the accessories and detachable covers are removed		N
	When using test probe 18 it is applied with a force of 2,5N on the appliance fully assembled		N
22.12	Other parts intended to be detached during use, maintenance or cleaning (e.g. batteries, battery covers, lids, attachments, steam nozzles) are not considered as parts providing a similar function as handles, knobs, grips, levers		P
22.17	The requirement is not applicable to built-in appliances		N
22.44	An appliance is child-appealing if one of the following criteria is present:		N
	- appliance decorated using faces, cartoon like characters, or similar images		N
	- appliance using shapes representing animals, characters, persons or scale models		N
	An appliance is child-appealing if more than one of the following criteria are present:		N
	- using non-functional light (functional light is e.g. illumination of an object or area, signal indicating status of an appliance)		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
	- using non-functional sound (e.g. music)		N
	- using non-functional movement		N
	If the appliance is child-appealing, has a mass less than 4 kg or is mounted or normally intended for use at a height less than 850 mm, the following conditions shall be met:		N
	- surface temperature rise requirements not exceeded		N
	- hazardous moving parts not accessible		N
	- live parts not accessible		N
	- liquid temperature requirement not exceeded,		N
	unless for vessels in which two independent and sequential actions are needed to access the liquid		N
	- the requirement of 22.12 is applicable for all accessible parts of the appliance		N
24.1	Components comply with the safety requirements specified in the relevant EN standards as far as they reasonably apply		P
	Motors are not required to comply with EN 60034-1, but tested as part of the appliance according to this standard		P
	Relays are tested as part of the appliance according to this standard		N
	Relays may be alternatively tested to EN 60730-1 and the additional requirements in EN 60335-1		N
	The requirements of Clause 29 of this standard apply between live parts of components and accessible parts of the appliance		N
	Components may comply with the requirements for clearances and creepage distances for functional insulation as specified in the relevant component standard		N
	The requirements of 30.2 of this standard apply to parts of non-metallic material in components including parts of non-metallic material supporting current-carrying connections inside components		N
	Components that have not been tested and shown to comply with the EN standard for the relevant component are tested according to the requirements of 30.2 of this standard		P
	Components that have been tested and shown to comply with the resistance to fire requirements in the EN standard for the relevant component need not be retested provided that:		P
	- the severity specified in the component standard is not less than the severity specified in 30.2, and		P

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
	- the test report for the component states the values of t_e and t_i acc. to EN 60695-2-11		P
	If the above two conditions are not satisfied, the component is tested as part of the appliance		N
	Power electronic converter circuits are not required to comply with EN 62477-1, but tested as part of the appliance according to this standard		N
	Unless components have been tested and found to comply with the relevant EN standard for the number of cycles specified, they are tested in accordance with 24.1.1 to 24.1.9		N
	For components mentioned in 24.1.1 to 24.1.9, no additional tests specified in the relevant EN standard for the component are necessary other than those specified in 24.1.1 to 24.1.9		N
	Components that have not been tested and found to comply with the relevant EN standard, and		N
	components that are not marked or not used in accordance with their marking,		P
	are tested in accordance with the conditions occurring in the appliance, the number of samples being that required by the relevant standard		P
	Lamp-holders and starter-holders that have not been tested and found to comply with the relevant EN standard are tested as a part of the appliance and additionally comply with the gauging and interchangeability requirements of the relevant EN standard under the conditions occurring in the appliance		N
	Where the relevant EN standard specifies these gauging and interchangeability requirements at elevated temperatures, the temperatures measured during the tests of Clause 11 are used		N
	There are no additional tests specified for nationally standardized plugs such as those detailed in IEC/TR 60083 or connectors complying with the standard sheets of EN 60320-1 and EN 60309, unless they are specifically mentioned in the text of this standard		N
	Plugs and socket-outlets and other connecting devices of interconnection cords are not interchangeable with plugs and socket-outlets listed in IEC/TR 60083 or IEC 60906-1, or		N
	with connectors and appliance inlets complying with the standard sheets of EN 60320-1, if		N
	direct supply to these parts from the supply mains gives rise to a hazard		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
	For plugs used in CENELEC countries Annex ZH applies		N
24.Z1	Type S2 and S3 capacitors according to EN 60252-1 are not required to undergo the testing as required by 30.2.2 and 30.2.3.1		N
25.1	Plugs and pins for insertion into socket outlets follow the relevant standards sheets in Annex ZH		N
25.7	Rubber sheathed cords (60245 IEC 53) are not suitable for appliances intended to be used outdoors, or		N
	when they are liable to be exposed to significant amount of ultraviolet radiation		N
25.25	Instead of IEC/TR 60083, dimensions of the pins and engagement face of plugs of appliances that are inserted into socket-outlets are in accordance with the dimensions of the relevant plug standard		N
	Common plugs and socket-outlets types in CENELEC countries as shown in Annex ZH		N
26.11	Conductors connected by soldering are not considered to be positioned or fixed so that reliance is not placed upon the soldering alone to maintain them in position,		N
	unless they are held in place near the terminals independently of the solder		N
29.3.Z1	Appliance constructed so that if there is a possibility of damaging the insulation during installation, the insulation withstands the scratch and penetration test of 21.2		N
32	Compliance regarding electromagnetic fields is checked according to EN 62233	EN 62233	P
Annex I, 19.1.101	The appliance is supplied at rated voltage and operated under normal operation with each of the fault conditions specified		N
	The duration of any of the tests is as specified in 19.7		N
ZA	ANNEX ZA (NORMATIVE) SPECIAL NATIONAL CONDITIONS (EN)		N
	Denmark, Sweden, Norway and Finland		N
7.12.8	The maximum inlet water pressure is at least 1,0 MPa		N
	Norway		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
19.5	The test is also applicable to appliances intended to be permanently connected to fixed wiring		N
	Norway		N
22.2	The second paragraph of this subclause, dealing with single-phase, permanently connected class I appliances having heating elements, is not applicable due to the supply system		N
	Denmark		N
22.47	The maximum inlet water pressure is at least 1,0 MPa		N
	Ireland, United Kingdom and Cyprus		N
25.8	In the table, the line >10 A and ≤16 A is replaced with:		N
	> 10 and ≤ 13 1,25 (1,0) ^b		N
	> 13 and ≤ 16 1,5 (1,0) ^b		N
ZB	ANNEX ZB (INFORMATIVE) A-DEVIATIONS		N
	Ireland		N
25.1 and 25.25	These regulations apply to all plugs for domestic use at a voltage of not less than 200 V and in general allow only plugs complying with I.S. 401:1997, or equivalent, to be fitted to domestic appliances		N
	United Kingdom		N
25.1 and 25.25	These regulations apply to all plugs for domestic use at a voltage of not less than 200 V and in general allow only plugs to BS 1363 to be fitted to domestic appliances.		N
	It also allows plugs to BS 4573 and EN 50075 to be fitted to shavers and toothbrushes		N
ZC	ANNEX ZC (NORMATIVE) NORMATIVE REFERENCES TO INTERNATIONAL PUBLICATIONS WITH THEIR CORRESPONDING EUROPEAN PUBLICATIONS		P
	A list of documents referred to in the text of this standard in such a way that some or all of their content constitutes requirements of this document		P

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict

ZD	ANNEX ZD (INFORMATIVE) IEC and CENELEC CODE DESIGNATIONS FOR FLEXIBLE CORDS		N
	List of IEC and CENELEC code designations for flexible cords		N
ZE	ANNEX ZE (INFORMATIVE) SPECIFIC ADDITIONAL REQUIREMENTS FOR APPLIANCES AND MACHINES INTENDED FOR COMMERCIAL USE		N
7.1	Business name and full address of the manufacturer and, where applicable, his authorized representative		N
	Model or type reference		N
	Serial number, if any		N
	Production year		N
	Designation of the appliance		N
7.12	Instructions provided with the appliance so that the appliance can be used safely		N
	The instructions contain at least the following information:		N
	- the business name and full address of the manufacturer and, where applicable, his authorized representative		N
	- model or type reference of the appliance as marked on the appliance itself, except for the serial number		N
	- the designation of the appliance together with its explanation in case it is given by a combination of letters and/or numbers		N
	- the general description of the appliance, when needed due to the complexity of the appliance		N
	- specific precautions required during installation, operation, adjusting, user maintenance, cleaning, repairing or moving		N
	- when needed drawings, diagrams, descriptions and explanations necessary for the safe use and user maintenance of the appliance		N
	- the possible reasonably foreseeable misuse and, whenever relevant, a warning against the effects it may have on the safe use of the appliance		N
	The words "Original instructions" appear on the language version(s) verified by the manufacturer or by the authorized representative		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
	When a translation of the original instructions has been provided by a person introducing the appliance on the market; the meaning of the sentence "Translation of the original instructions" appear in the relevant instructions delivered with the appliance		N
	The instructions for maintenance/service to be done by specialized personnel, mandated by the manufacturer or the authorized representative may be supplied in only one Community language which the specialized personnel understand		N
	The instructions indicate the type and frequency of inspections and maintenance required for safe operation including the preventive maintenance measures		N
7.12.ZE1	If needed for specific appliances, the following information to be given:		N
	- on use, transportation, assembly, dismantling when out of service, testing or foreseeable breakdowns, if these operations have consequences on stability of the appliance in order to avoid overturning, falling or uncontrolled movements of the appliance or of its component parts		N
	- on how to maintain adequate mechanical stability when in use, during transportation, assembly, dismantling, scrapping and any other action involving the appliance		N
	- on the protective measures to be taken by the user, including, where appropriate, the personal protective equipment to be provided		N
	- on the operating method to be followed in the event of accident or breakdown; if a blockage is likely to occur the operating method to safely unblock the appliance		N
	- on the specifications on the spare parts to be used, when these affect the health and safety of the operator		N
	- on airborne noise emissions, determined and declared in accordance with the relevant Part 2, which includes:		N
	- the A-weighted emission sound pressure level at workstations, where this exceeds 70 dB(A).....;		N
	- where this level does not exceed 70 dB(A), this fact is indicated		N
	- the peak C-weighted instantaneous sound pressure value at workstations, where this exceeds 63 Pa (130 dB in relation to 20 µPa)		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict

	- the A-weighted sound power level emitted by the machinery, where the A-weighted emission sound pressure level at workstations exceeds 80 dB(A)		N
7.12.ZE2	The instructions include a warning to disconnect the appliance from its power source during service and when replacing parts		N
	If the removal of the plug is foreseen, it is clearly indicated that the removal of the plug is such that an operator can check from any of the points to which he has access that the plug remains removed		N
	If this is not possible, due to the construction of the appliance or its installation, a disconnection with a locking system in the isolated position is provided		N
19.11.4.8	The appliance continues to operate, without causing any hazard to the user, from the same point in its operating cycle at which the voltage fluctuation occurred, or		N
	a manual operation is required to restart it		N
20.1	Appliances and their components and fittings have adequate mechanical stability during transportation, assembly, dismantling and any other action involving the appliance		N
20.2	Dangerous moving transmission parts safeguarded either by design or guards		N
	When guards are used, they are fixed guards, interlocking movable guards or protective devices		N
	Moving parts directly involved in the function of the appliance which cannot be made completely inaccessible fitted with:		N
	- fixed guards or interlocking movable guards preventing access to those sections of the parts that are not used in the work, and		N
	- adjustable guards restricting access to those sections of the moving parts where access is necessary		N
	Interlocking movable guards used where frequent access is required		N
21.1	Appliances and their components and fittings have adequate mechanical strength and is constructed to withstand such rough handling that may be expected in normal use, during transportation, assembly, dismantling, scrapping and any other action involving the appliance		N
22.ZE.1	For appliances provided with a seat, the seat gives adequate stability		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
	The distance between the seat and the control devices capable of being adapted to the operator		N
22.ZE.2	For appliances provided with separate devices for the start and the stop functions, the stop function is unambiguously identifiable and does always override the start function		N
	For appliances provided with one device performing the start and the stop function, the stop function is unambiguously identifiable and does always override the start function		N
22.ZE.3	Appliances designed in such a way that incorrect mounting is avoided, if this can lead to an unsafe situation		N
	If this is not possible, information on the correct mounting is given directly on the part and/or the enclosure		N
22.ZE.4	Where the weight, size or shape prevents appliances from being moved manually, they are fitted with attachments for lifting gear, or		N
	so designed that they can be fitted with such attachments, or		N
	be shaped in such a way that standard lifting gear can easily be used		N
	Appliances to be moved manually are constructed or equipped so that they can be moved easily and safely		N
22.ZE.5	The fixing systems of fixed guards which prevent access to dangerous moving transmission parts only removable with the use of tools		N
	If such guards have to be removed by the user for routine cleaning or maintenance their fixing systems remain attached to the fixed guards or to the machine after removal		N
	Where possible, guards are incapable of remaining in place without their fixings		N
	This does not apply if, after removal of the screws, or if the component is incorrectly repositioned, the appliance becomes inoperative		N
	Movable guards are interlocked		N
	The interlocking devices prevent the start of hazardous appliance functions until the guards are fixed in their position, and give a stop command whenever they are no longer closed		N
	Where it is possible for an operator to reach the danger zone before the risk due to hazardous appliance functions has ceased, movable guards associated with a guard locking device in addition to an interlocking device that:		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
	- prevents the start of hazardous appliance functions until the guard is closed and locked, and		N
	- keeps the guard closed and locked until the risk of injury from the hazardous appliance functions has ceased		N
	Interlocking movable guards remain attached to the appliance when open, and		N
	they are designed and constructed in such a way that they can be adjusted only by means of an intentional action		N
22.ZE.6	Interlocking movable guards designed in such a way that the absence or failure of one of their components prevents starting or stops the hazardous appliance functions		N
	The guard is opened to the extent needed to cause the interlocking to operate and is then closed, the number of operations being defined in the specific Part 2		N
	After this test any defect that may be expected in normal use is applied to the interlock system, including interruption of the supply, only one defect being simulated at a time		N
	After these tests the interlock system is fit for further use		N
22.ZE.7	Adjustable guards restricting access to areas of the moving parts strictly necessary for the work are:		N
	- adjustable manually or automatically, depending on the type of work involved, and		N
	- readily adjustable without the use of tools		N
22.ZE.8	In case of interruption, re-establishment after an interruption or fluctuation in whatever manner of the power supply, the appliance does not restart		N
	However, automatic restarting of the operation is allowed if the appliance may continue to operate, without causing any hazard to the user, from the same point in its operating cycle at which the voltage interruption or fluctuation occurred		N
22.ZE.9	Appliances fitted with means to isolate them from all energy sources		N
	Such isolators are clearly identified, and		N
	they are capable of being locked if reconnection endanger persons		N
	After the energy source is disconnected, it is possible to dissipate any energy remaining or stored in the circuits of the appliance without risk to persons		N

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict

ZF	ANNEX ZF (INFORMATIVE) CRITERIA APPLIED FOR THE ALLOCATION OF PRODUCTS COVERED BY STANDARDS IN THE EN 60335 SERIES UNDER LVD OR MD		N
	List of standards under CENELEC/TC61 with the allocation under the LVD (Low Voltage Directive) or the MD (Machinery Directive)		N
ZG	ANNEX ZG (NORMATIVE) UV APPLIANCES		N
	The following modifications to this standard apply to appliances having UV emitters		N
	This annex is not applicable to appliances covered by the scopes of IEC 60335-2-27, IEC 60335-2-59 or IEC 60335-2-109		N
7.12.ZG	The instructions for appliances incorporating UVC emitters include the substance of the following: WARNING — This appliance contains a UV emitter. Do not stare at the light source		N
32	For appliances incorporating UV emitters the manufacturer delivers a declaration providing evidence that the plastic material exposed to the radiation is UV resistant		N
ZH	ANNEX ZH (INFORMATIVE) Common plug and socket-outlet types in CENELEC countries		P
	In general, supply cords of single-phase appliances having a rated current not exceeding 16 A are fitted with a plug complying with the following standard sheets:		P
	- for class I appliances or class II appliances with functional earth, standard sheet EU2, EU3 or EU4:		N
	- for class II appliances, standard sheet EU5, EU6 or EU7		P
	There are exemptions or differences in certain CENELEC countries		N
ZI	ANNEX ZI (INFORMATIVE) Information on the application of A11:2014 to EN 60335-1:2012 CENELEC CLC/TC 61(SEC)2096A		P
	Clarification of the application of parts 2 in conjunction with the 2002 or 2012 version of EN 60335-1		P

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict

ZZA	ANNEX ZZA (INFORMATIVE) RELATIONSHIP BETWEEN THIS EUROPEAN STANDARD AND THE SAFETY OBJECTIVES OF DIRECTIVE 2014/35/EU [2014 OJ L96] AIMED TO BE COVERED		P
	This standard provides one means of conforming to safety objectives of Directive 2014/35/EU		P
	When cited in the Official Journal under that Directive, compliance with the normative clauses of this standard given in Table ZZA.1 confers a presumption of conformity with the safety objectives of that Directive and associated EFTA regulations		P
	Compliance with this Part 1 when used together with the relevant Part 2 provides one means of conformity with the safety objectives		P
ZZB	ANNEX ZZB (INFORMATIVE) RELATIONSHIP BETWEEN THIS EUROPEAN STANDARD AND THE ESSENTIAL REQUIREMENTS OF DIRECTIVE 2006/42/EC AIMED TO BE COVERED		N
	This standard provides one means of conforming to essential requirements of EU Directive 2006/42/EC		N
	When cited in the Official Journal under that Directive, compliance with the normative clauses of this standard given in Table ZZB.1 confers a presumption of conformity with the essential requirements of that Directive and associated EFTA regulations		N
	Compliance with this Part 1 when used together with the relevant Part 2 provides one means of conformity with the essential health and safety requirements		N
	ANNEX EN 62233:2008 + AC:2008 EMF- ELECTROMAGNETICS FIELDS		P
	The tested product also complies with the requirements of EN 62233:2008		P
	Limit 100%	Measured max 0.60 %	P

IEC 60335-2-97					
Clause	Requirement + Test			Result - Remark	Verdict
10.2	TABLE: Current deviation				P
Current deviation of/at	I rated (A)	I measured (A)	ΔI (%)	Required ΔI (%)	Remark
DC5V	1	0.80	-20%	+20%	charged state
Remark: The most unfavourable condition was conducted.					

11.8	TABLE: Heating test, thermocouple measurements			P
	Test voltage (V)	A)Charging: DC5V, B)Discharging: DC7.3V		—
	Ambient (°C)	See below		—
Thermocouple locations		Max. temperature rise measured, dT (K)		Max.temperature rise limit, dT (K)
		Charging	Discharging	
Battery surface		6.2	2.7	Ref.
Motor surface		7.7	5.3	65
Plastic enclosure outside		2.0	2.3	60
Plastic enclosure internal		3.1	3.5	Ref.
PCB near U8		8.1	3.9	105
U4 body		7.8	3.7	80
Hand controller		2.2	4.7	60
Button		2.1	2.6	60
Internal wiring		7.2	3.3	50
Ambient		23.5°C	23.4°C	--
Supplementary information:				

11.8	TABLE: Heating test, resistance method					N
	Test voltage (V)	--				—
	Ambient, t1 (°C)	--				—
	Ambient, t2 (°C)	--				—
Temperature rise of winding		R1 (Ω)	R2 (Ω)	dT (K)	Max. dT (K)	Insulation class
--		--	--	--	--	--

13.2	TABLE: Leakage current			N
	Heating appliances: 1.15 x rated input (W).....:	--		—

IEC 60335-2-97			
Clause	Requirement + Test	Result - Remark	Verdict
	Motor-operated and combined appliances: 1.06 x rated voltage (V).....:	--	—
Leakage current between		I (mA)	Max. allowed I (mA)
--		--	--

13.3	TABLE: Electric strength		N
Test voltage applied between:		Voltage (V)	Breakdown (Yes/No)
--		--	--

14	TABLE: Transient overvoltages					N
Clearance between:		CI (mm)	Required CI (mm)	Rated impulse voltage (V)	Impulse test voltage (V)	Flashover (Yes/No)
--		--	--	--	--	--

16.2	TABLE: Leakage current			N
	Single phase appliances: 1.06 x rated voltage (V):	--		—
	Three phase appliances 1.06 x rated voltage divided by $\sqrt{3}$ (V):	--		—
Leakage current between		I (mA)	Max. allowed I (mA)	
--		--	--	

16.3	TABLE: Electric strength		N
Test voltage applied between:		Voltage (V)	Breakdown (Yes/No)
--		--	--

17	TABLE: Overload protection		N
Thermocouple locations:		Max. temperature rise measured, ΔT (K)	Max. temperature rise limit, ΔT (K)
--		--	--
Supplementary information:			

17	TABLE: Overload protection, resistance method					N
	Test voltage (V)	--				—
	Ambient, t1 (°C)	--				—
	Ambient, t2 (°C)	--				—
Temperature of winding:		R1 (Ω)	R2 (Ω)	Δ T (K)	T (°C)	Max. T (°C)
--		--	--	--	--	--
Supplementary information:						

19	Abnormal operation conditions						P
Operational characteristics			YES/NO	Operational conditions			
Are there electronic circuits to control the appliance operation?			YES	Refer to Cl.19.11			
Are there “off” or “stand-by” position?			Yes	Off position			
The unintended operation of the appliance results in dangerous malfunction?			NO	-			
Sub-clause	Operating conditions description	Test results description	PEC description	EMP 19.11.4	Software type required	19.11.3 PEC	Final result
19.2	N.A	N.A	N.A	N.A	N.A	N.A	N.A
19.3	N.A	N.A	N.A	N.A	N.A	N.A	N.A
19.4	N.A	N.A	N.A	N.A	N.A	N.A	N.A
19.5	N.A	N.A	N.A	N.A	N.A	N.A	N.A
19.6	N.A	N.A	N.A	N.A	N.A	N.A	N.A
19.7	Refer to Clause 19.7	No hazard	N.A	N.A	N.A	N.A	P
19.8	N.A	N.A	N.A	N.A	N.A	N.A	N.A
19.9	N.A	N.A	N.A	N.A	N.A	N.A	N.A
19.10	N.A	N.A	N.A	N.A	N.A	N.A	N.A
19.11.2	N.A	N.A	N.A	N.A	N.A	N.A	N.A
19.11.4.8	N.A	N.A	N.A	N.A	N.A	N.A	N.A
19.10X	N.A	N.A	N.A	N.A	N.A	N.A	N.A
Supplementary information:							

19.7	TABLE: Abnormal operation, locked rotor/moving parts					P
	Test voltage (V)	12Vdc				—
	Ambient, t1 (°C)	22.1				—
	Ambient, t2 (°C)	23.6				—
Temperature of winding:		R1 (Ω)	R2 (Ω)	Δ T (K)	T (°C)	Max. T (°C)
Motor winding		--	--	27.5	51.1	175
--		--	--	--	--	--
Supplementary information: Working to a stable state						

19.9	TABLE: Abnormal operation, running overload					N
	Test voltage (V)	--				—
	Ambient, t1 (°C)	--				—
	Ambient, t2 (°C)	--				—
Temperature of winding:		R1 (Ω)	R2 (Ω)	Δ T (K)	T (°C)	Max. T (°C)
--		--	--	--	--	--
Supplementary information:						

19.13	TABLE: Abnormal operation, temperature rises		P
Thermocouple locations:		Max. temperature rise measured, ΔT (K)	Max. temperature rise limit, ΔT (K)
Test corner		1.5	150
--		--	--
Supplementary information: Test at cl. 19.B.101			

21.1	TABLE: Impact resistance				P
Impacts per surface		Surface tested	Impact energy (Nm)	Comments	
3		Enclosure	0,5	No damaged	
--		--	--	--	
Supplementary information:					

24.1	TABLE: Components information					P
Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity	
Plastics enclosure	FORMOSA CHEMICALS & FIBRE CORP PLASTICS DIV	AC230(+)	ABS, HB, 60°C	UL 94 EN 60335-1	UL E162823 Test with appliance	

Lithium battery pack	Shenzhen Glotronics Technology Co.,Ltd.	18650-2S1P	7.3V, 2600mAh	IEC 62133-2:2017+AMD1:2021	Report: 211-SZMD20240611IEC01
PCB	KINGBOARD LAMINATES HOLDINGS LTD	KB-6164F	V-0, 130°C	UL 796 UL 94	UL E123995
Motor	KINGBOARD LAMINATES HOLDINGS LTD	NR2238I132_WA	DC 12V	EN 60335-2-97 EN 60335-1	Test with appliance

28.1	TABLE: Threaded part torque test			P
Threaded part identification	Diameter of thread (mm)	Column number (I, II, or III)	Applied torque (Nm)	
Fixed the plastic enclosure	1.69	II	0.4	

29.1	TABLE: Clearances					N
	Overvoltage category : II					—
		Type of insulation:				
Rated impulse voltage (V):	Min. cl (mm)	Basic (mm)	Supplementary (mm)	Reinforced (mm)	Functional (mm)	Verdict / Remark
330	0,2* / 0,5 / 0,8**	—	—	—	—	N
500	0,2* / 0,5 / 0,8**	—	—	—	—	N
800	0,2* / 0,5 / 0,8**	—	—	—	—	N
1 500	0,5 / 0,8** / 1,0***	—	—	—	—	N
2 500	1,5 / 2,0***	—	—	—	—	N
4 000	3,0 / 3,5***	—	—	—	—	N
6 000	5,5 / 6,0***	—	—	—	—	N
8 000	8,0 / 8,5***	—	—	—	—	N
10 000	11,0 / 11,5***	—	—	—	—	N
Supplementary information: *) For tracks on printed circuit boards if pollution degree 1 and 2 **) For pollution degree 3 ***) If the construction is affected by wear, distortion, movement of the parts or during assembly						

29.2	TABLE: Creepage distances, basic, supplementary and reinforced insulation										N
Working voltage (V)	Creepage distance (mm) Pollution degree										
	1	2			3			Type of insulation			
		Material group			Material group						
		I	II	IIIa/IIIb	I	II	IIIa/IIIb*)	B**)	S**)	R**)	Verdict
≤50	0,18	0,6	0,85	1,2	1,5	1,7	1,9		—	—	N
≤50	0,18	0,6	0,85	1,2	1,5	1,7	1,9	—		—	N
≤50	0,36	1,2	1,7	2,4	3,0	3,4	3,8	—	—		N
125	0,28	0,75	1,05	1,5	1,9	2,1	2,4		—	—	N
125	0,28	0,75	1,05	1,5	1,9	2,1	2,4	—		—	N
125	0,56	1,5	2,1	3,0	3,8	4,2	4,8	—	—		N
250	0,56	1,25	1,8	2,5	3,2	3,6	4,0		—	—	N
250	0,56	1,25	1,8	2,5	3,2	3,6	4,0	—		—	N
250	1,12	2,5	3,6	5,0	6,4	7,2	8,0	—	—		N
400	1,0	2,0	2,8	4,0	5,0	5,6	6,3		—	—	N
400	1,0	2,0	2,8	4,0	5,0	5,6	6,3	—		—	N
400	2,0	4,0	5,6	8,0	10,0	11,2	12,6	—	—		N
500	1,3	2,5	3,6	5,0	6,3	7,1	8,0		—	—	N
500	1,3	2,5	3,6	5,0	6,3	7,1	8,0	—		—	N
500	2,6	5,0	7,2	10,0	12,6	14,2	16,0	—	—		N
>630 and ≤800	1,8	3,2	4,5	6,3	8,0	9,0	10,0		—	—	N
>630 and ≤800	1,8	3,2	4,5	6,3	8,0	9,0	10,0	—		—	N
>630 and ≤800	3,6	6,4	9,0	12,6	16,0	18,0	20,0	—	—		N
>800 and ≤1000	2,4	4,0	5,6	8,0	10,0	11,0	12,5		—	—	N
>800 and ≤1000	2,4	4,0	5,6	8,0	10,0	11,0	12,5	—		—	N
>800 and ≤1000	4,8	8,0	11,2	16,0	20,0	22,0	25,0	—	—		N
Supplementary information:											
*) Material group IIIb is allowed if the working voltage does not exceed 50 V											
**) B = Basic insulation, S = Supplementary insulation, R = Reinforced insulation											

29.2	TABLE: Creepage distances, functional insulation										N
Working voltage (V)	Creepage distance (mm) Pollution degree										
	1	2			3						
		Material group			Material group						
		I	II	IIIa/IIIb	I	II	IIIa/IIIb*)	Verdict / Remark			
≤50	0,18	0,6	0,85	1,2	1,5	1,7	1,9	N			
125	0,28	0,75	1,05	1,4	1,9	2,1	2,4	N			
250	0,56	1,25	1,8	2,0	3,2	3,6	4,0	N			

400	1,0	2,0	2,8	4,0	5,0	5,6	6,3	N
500	1,3	2,5	3,6	5,0	6,3	7,1	8,0	N
>630 and ≤800	1,8	3,2	4,5	6,3	8,0	9,0	10,0	N
>800 and ≤1000	2,4	4,0	5,6	8,0	10,0	11,0	12,5	N
>1000 and ≤1250	3,2	5,0	7,1	10,0	12,5	14,0	16,0	N

Supplementary information: *) Material group IIIb is allowed if the working voltage does not exceed 50 V

30.1	TABLE: Ball Pressure Test of Thermoplastics							P
Allowed impression diameter (mm)					2			—
Object/ Part No./ Material		Manufacturer/ trademark		Test temperature (°C)		Impression diameter (mm)		
Plastic enclosure		-		75		0.9		

Supplementary information:

30.2	TABLE: Resistance to heat and fire - Glow wire tests							P
Object/ Part No./ Material	Manufacturer / trademark	Glow wire test (GWT); (°C)						Verdict
		550	650		750		850	
			te	ti	te	ti		
DC inlet	-	--	--	--	0	0	√	P
Motor enclosure	-	--	--	--	0	0	√	P
Plastic enclosure	--	No flame	--	--	--	--	--	P
Object/ Part No./ Material	Manufacturer / trademark	Glow-wire flammability index (GWFI), °C				GW ignition temp. (GWIT), °C		Verdict
		550	650	750	850	675	775	
--	--	--	--	--	--	--	--	N/A
--	--	--	--	--	--	--	--	N/A
--	--	--	--	--	--	--	--	N/A
The test specimen passed the glow wire test (GWT) with no ignition [(te – ti) ≤ 2s] (Yes/No):								-
If no, then surrounding parts passed the needle-flame test of annex E (Yes/No)..... :								-
The test specimen passed the test by virtue of most of the flaming material being withdrawn with the glow-wire (Yes/No)?								-
Ignition of the specified layer placed underneath the test specimen (Yes/No)..... :								-

Supplementary information:

- 550 °C GWT not relevant (or applicable) to parts of material classified at least HB40 or if relevant HBF
- The GWIT pre-selection option, the 850 °C GWFI pre-selection option, and the 850 °C GWT are not relevant (or applicable) for attended appliances

30.2/30.2.4 TABLE: Needle- flame test (NFT)					N
Object/ Part No./ Material	Manufacturer/ trademark	Duration of application of test flame (ta); (s)	Ignition of specified layer Yes/No	Duration of burning (tb) (s)	Verdict
Supplementary information:					
- NFT not relevant (or applicable) for Parts of material classified as V-0 or V-1 - NFT not relevant (or applicable) for Base material of PCBs classified as V-0 or if relevant VTM-0					

Appendix 1: Photos



Fig.1



Fig.2



Fig.3



Fig.4

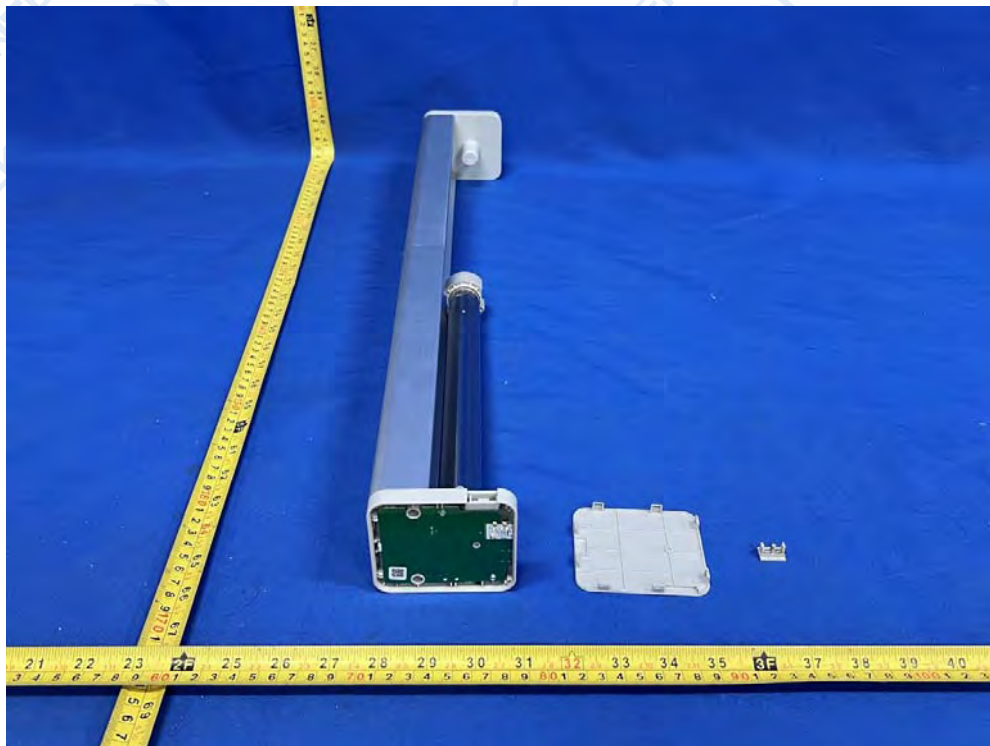


Fig.5

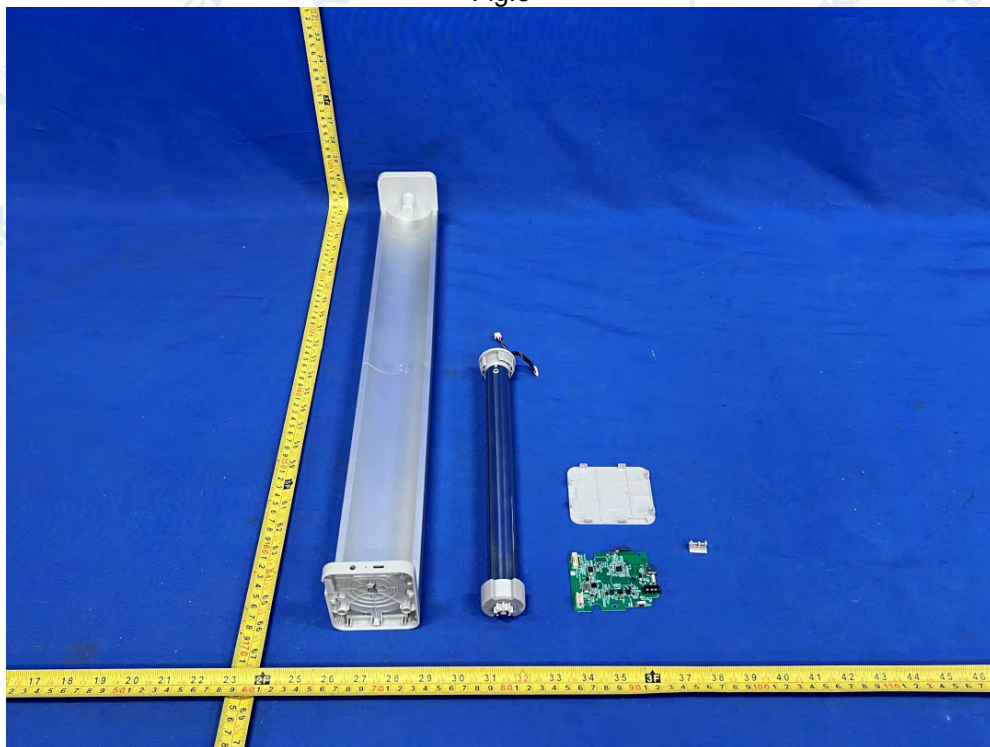


Fig.6



Fig.7



Fig.8

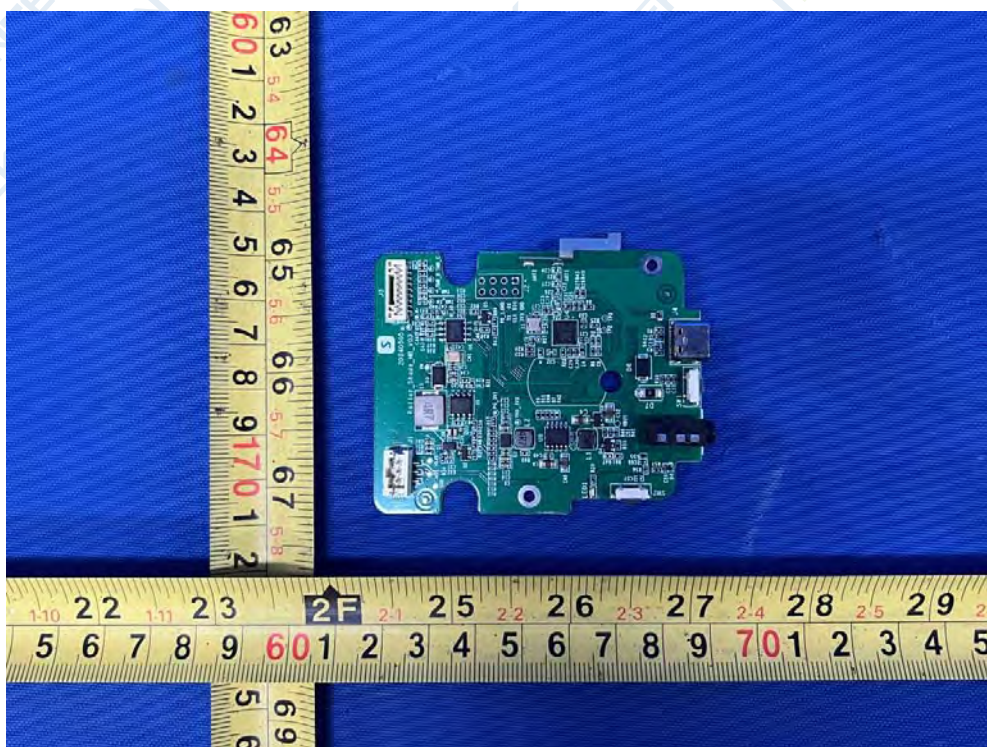


Fig.9

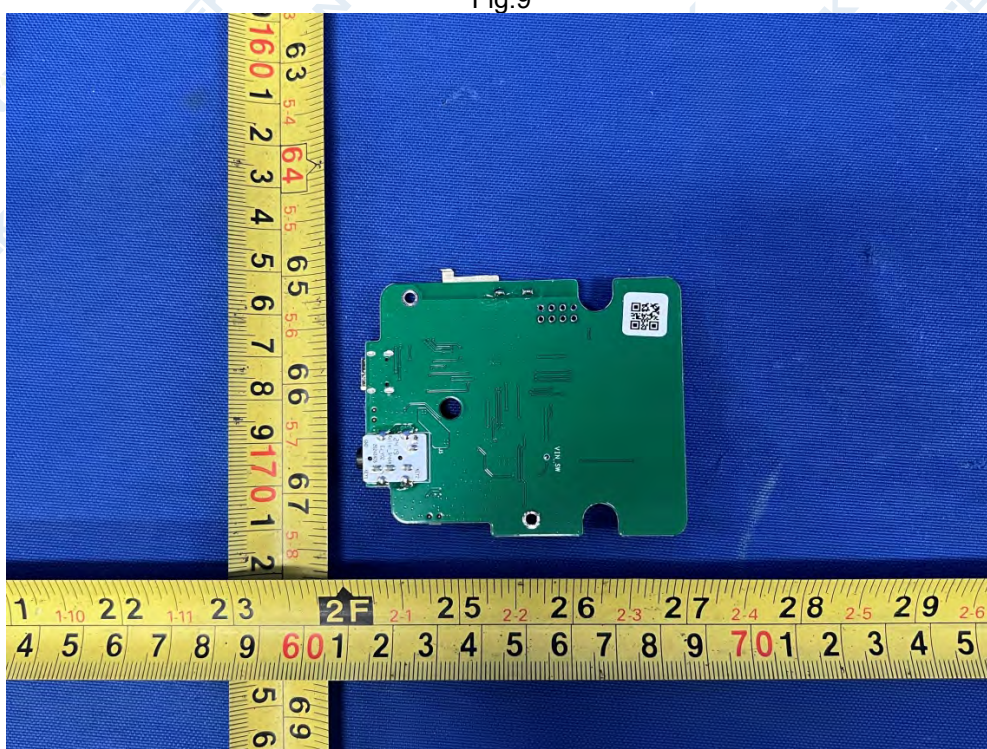


Fig.10

*****END OF REPORT*****



RADIO TEST REPORT

ETSI EN 300 328 V2.2.2 (2019-07)

Product : SwitchBot Roller Shade

Trade Mark : SwitchBot

Model Name : W5000000

Family Model : W5000001, W5000002, W5000003, W5000004,
W5000005, W5000006

Report No. : S24042502508001

Prepared for

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TEST RESULT CERTIFICATION

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Address: Room 1101, Qiancheng Commercial Center, No. 5 Haicheng Road,
Mabu Community, Xixiang Sub-district, Bao'an District, Shenzhen,
Guangdong, P.R.China, 518100

Product description

Product name: SwitchBot Roller Shade
Trade Mark.....: SwitchBot
Model Name: W5000000
Family Model.....: W5000001, W5000002, W5000003, W5000004, W5000005,
W5000006

Standards.....: ETSI EN 300 328 V2.2.2 (2019-07)

This device described above has been tested by Shenzhen NTEK, and the test results show that the equipment under test (EUT) is in compliance with the 2014/53/EU RED Directive Art.3.2 requirements. And it is applicable only to the tested sample identified in the report.

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Test Sample Number: S240425025012

Date of Test.....

Date (s) of performance of tests: Jun 05, 2024 ~ Jun 21, 2024

Date of Issue: Jun 21, 2024

Test Result: **Pass**

Prepared By: Gavan Zhang
Gavan Zhang
(Project Engineer)

Reviewed By: Aaron Cheng
Aaron Cheng
(Supervisor)

Approved By: Alex Li
Alex Li
(Manager)



Table of Contents

Page

1 . GENERAL INFORMATION	6
1.1 GENERAL DESCRIPTION OF EUT	6
1.2 INFORMATION ABOUT THE EUT	7
1.3 TEST CONDITIONS AND CHANNEL	12
1.4 DESCRIPTION OF TEST CONDITIONS	13
1.5 DESCRIPTION OF SUPPORT UNITS	14
1.6 EQUIPMENTS LIST FOR ALL TEST ITEMS	15
2 . SUMMARY OF TEST RESULTS	16
2.1 TEST FACILITY	17
2.2 MEASUREMENT UNCERTAINTY	17
3 . TEST PROCEDURES AND RESUTLS	18
3.1 EQUIVALENT ISOTROPIC RADIATED POWER	18
3.1.1 LIMITS OF EQUIVALENT ISOTROPIC RADIATED POWER	18
3.1.2 TEST PROCEDURE	18
3.1.3 TEST SETUP	18
3.1.4 TEST RESULTS	19
3.2 . PEAK POWER DENSITY	20
3.2.1 LIMITS OF POWER SPECTRAL DENSITY	20
3.2.2 TEST PROCEDURE	20
3.2.3 TEST SETUP	20
3.2.4 TEST RESULTS	21
3.3 . OCCUPIED CHANNEL BANDWIDTH	22
3.3.1 LIMITS OF OCCUPIED CHANNEL BANDWIDTH	22
3.3.2 TEST PROCEDURE	22
3.3.3 DEVIATION FROM TEST STANDARD	22
3.3.4 TEST SETUP	22
3.3.5 TEST RESULTS	23
3.4 . TRANSMITTER UNWANTED EMISSIONS IN THE OUT-OF-BAND DOMAIN	24
3.4.1 LIMITS OF TRANSMITTER UNWANTED EMISSIONS IN THE OUT-OF-BAND DOMAIN	24
3.4.2 TEST PROCEDURE	24
3.4.3 DEVIATION FROM TEST STANDARD	25
3.4.4 TEST SETUP	25
3.4.5 TEST RESULTS	26
3.5 . ADAPTIVE (CHANNEL ACCESS MECHANISM)	27
3.5.1 APPLICABILITY OF ADAPTIVE REQUIREMENTS AND LILIT FOR WIDE BAND MODULATION TECHNIQUES	27
3.5.2 TEST PROCEDURE	28
3.5.3 TEST SETUP CONFIGURATION	28

Table of Contents	Page
3.5.4 LIST OF MEASUREMENTS	29
3.5.5 TEST RESULTS	30
3.6 . TRANSMITTER UNWANTED EMISSIONS IN THE SPURIOUS DOMAIN	31
3.6.1 LIMITS OF TRANSMITTER UNWANTED EMISSIONS IN THE SPURIOUS DOMAIN	31
3.6.2 TEST PROCEDURE	31
3.6.3 DEVIATION FROM TEST STANDARD	31
3.6.4 TEST SETUP	32
3.6.5 TEST RESULTS(Radiated measurement)	33
3.6.6 TEST RESULTS (Conducted measurement)	34
3.7 . RECEIVER SPURIOUS RADIATION	35
3.7.1 LIMITS OF RECEIVER SPURIOUS RADIATION	35
3.7.2 TEST PROCEDURE	35
3.7.3 DEVIATION FROM TEST STANDARD	35
3.7.4 TEST SETUP	36
3.7.5 TEST RESULTS(Radiated measurement)	37
3.7.6 TEST RESULTS (Conducted measurement)	38
3.8 . RECEIVER BLOCKING	39
3.8.1 PERFORMANCE CRITERIA	39
3.8.2 LIMITS OF RECEIVER BLOCKING	39
3.8.3 TEST PROCEDURE	41
3.8.4 DEVIATION FROM TEST STANDARD	41
3.8.5 TEST SETUP	41
3.8.6 TEST RESULTS	42
4 . TEST RESULTS	44
4.1 1M	44
4.1.1 RF Output Power	44
4.1.2 Power Spectral Density	47
4.1.3 Occupied Channel Bandwidth	50
4.1.4 Transmitter unwanted emissions in the out-of-band domain	53
4.1.5 Transmitter unwanted emissions in the spurious domain	56
4.1.6 Receiver spurious emissions	59
4.2 2M	62
4.2.1 RF Output Power	62
4.2.2 Power Spectral Density	65
4.2.3 Occupied Channel Bandwidth	68
4.2.4 Transmitter unwanted emissions in the out-of-band domain	71
4.2.5 Transmitter unwanted emissions in the spurious domain	73
4.2.6 Receiver spurious emissions	76
5 . EUT TEST PHOTO	79

Revision History

Report No.	Version	Description	Issued Date
S24042502508001	Rev.01	Initial issue of report	Jun 21, 2024

1. GENERAL INFORMATION

1.1 GENERAL DESCRIPTION OF EUT

Equipment	SwitchBot Roller Shade	
Trade Mark	SwitchBot	
Model Name.	W5000000	
Family Model	W5000001, W5000002, W5000003, W5000004, W5000005, W5000006	
Model Difference	All models are the same except for the model names and appearance lengths	
Product Description	The EUT is SwitchBot Roller Shade	
	Operation Frequency:	2402~2480 MHz
	Modulation Type:	BLE(1Mbps/2Mbps): GFSK
	Adaptive/non-adaptive	Adaptive equipment
	Receiver categories	2
	Number Of Channel	Please see Note 2.
	Antenna Designation:	PIFA Antenna
	Antenna Gain(Peak)	2.81 dBi
Channel List	Refer to below	
Adapter	N/A	
Battery	DC 7.3V 2600mAh 18.98Wh	
Rating	DC 5V/1A from adapter;Max 24MHz or 7.3V from battery	
I/O Ports	Refer to users manual	
Hardware Version	N/A	
Software Version	N/A	

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

2.

Channel	Frequency (MHz)
00	2402
01	2404
.....	
.....	
38	2478
39	2480

1.2 INFORMATION ABOUT THE EUT

a) The type of modulation used by the equipment:

- ☐ FHSS
- ☒ other forms of modulation

b) In case of FHSS modulation:

- In case of non-Adaptive Frequency Hopping equipment:

The number of Hopping Frequencies:

- In case of Adaptive Frequency Hopping Equipment:

The maximum number of Hopping Frequencies:

The minimum number of Hopping Frequencies:

- The (average) Dwell Time:

c) Adaptive / non-adaptive equipment:

- ☐ non-adaptive Equipment
- ☒ adaptive Equipment without the possibility to switch to a non-adaptive mode
- ☐ adaptive Equipment which can also operate in a non-adaptive mode

d) In case of adaptive equipment:

The maximum Channel Occupancy Time implemented by the equipment: ./ ms

- ☒ The equipment has implemented an LBT based DAA mechanism

- In case of equipment using modulation different from FHSS:

- ☐ The equipment is Frame Based equipment
- ☒ The equipment is Load Based equipment
- ☐ The equipment can switch dynamically between Frame Based and Load Based equipment

The CCA time implemented by the equipment: / μ s

- ☐ The equipment has implemented a non-LBT based DAA mechanism
- ☐ The equipment can operate in more than one adaptive mode

e) In case of non-adaptive Equipment:

The maximum RF Output Power (e.i.r.p.):

The maximum (corresponding) Duty Cycle:

Equipment with dynamic behaviour, that behaviour is described here. (e.g. the different combinations of duty cycle and corresponding power levels to be declared):

f) The worst case operational mode for each of the following tests:

- RF Output Power
GFSK
- Power Spectral Density
GFSK
- Duty cycle, Tx-Sequence, Tx-gap
N/A
- Accumulated Transmit time, Frequency Occupation & Hopping Sequence (only for FHSS equipment)
N/A
- Hopping Frequency Separation (only for FHSS equipment)
N/A
- Medium Utilization
N/A
- Adaptivity
N/A
- Receiver Blocking
GFSK
- Nominal Channel Bandwidth
GFSK
- Transmitter unwanted emissions in the OOB domain
GFSK
- Transmitter unwanted emissions in the spurious domain
GFSK
- Receiver spurious emissions
GFSK

g) The different transmit operating modes (tick all that apply):

- ☒ Operating mode 1: Single Antenna Equipment
 - ☒ Equipment with only one antenna
 - ☐ Equipment with two diversity antennas but only one antenna active at any moment in time
 - ☐ Smart Antenna Systems with two or more antennas, but operating in a (legacy) mode where only one antenna is used (e.g. IEEE 802.11™ [i.3] legacy mode in smart antenna systems)
- ☐ Operating mode 2: Smart Antenna Systems - Multiple Antennas without beam forming
- ☐ Single spatial stream / Standard throughput / (e.g. IEEE 802.11™ [i.3] legacy mode)

- ☐ High Throughput (> 1 spatial stream) using Nominal Channel Bandwidth 1
- ☐ High Throughput (> 1 spatial stream) using Nominal Channel Bandwidth 2

NOTE 1: Add more lines if more channel bandwidths are supported.

- ☐ Operating mode 3: Smart Antenna Systems - Multiple Antennas with beam forming
- ☐ Single spatial stream / Standard throughput (e.g. IEEE 802.11™ [i.3] legacy mode)
- ☐ High Throughput (> 1 spatial stream) using Nominal Channel Bandwidth 1
- ☐ High Throughput (> 1 spatial stream) using Nominal Channel Bandwidth 2

NOTE 2: Add more lines if more channel bandwidths are supported.

h) In case of Smart Antenna Systems:

- The number of Receive chains:
- The number of Transmit chains:
- ☐ symmetrical power distribution
- ☐ asymmetrical power distribution

In case of beam forming, the maximum (additional) beam forming gain: dB

NOTE: The additional beam forming gain does not include the basic gain of a single antenna.

i) Operating Frequency Range(s) of the equipment:

- Operating Frequency Range 1: 2402 MHz to 2480 MHz
 - Operating Frequency Range 2: MHz to MHz
- NOTE: Add more lines if more Frequency Ranges are supported.

j) Nominal Channel Bandwidth(s):

- Nominal Channel Bandwidth 1: 1.049MHz(1M)
- Nominal Channel Bandwidth 2: 2.082MHz(2M)

NOTE: Add more lines if more channel bandwidths are supported.

k) Type of Equipment (stand-alone, combined, plug-in radio device, etc.):

- ☒ Stand-alone
- ☐ Combined Equipment (Equipment where the radio part is fully integrated within another type of equipment)
- ☐ Plug-in radio device (Equipment intended for a variety of host systems)
- ☐ Other

l) The normal and the extreme operating conditions that apply to the equipment:

Normal operating conditions (if applicable):

Operating temperature: 15°C~35°C

Other (please specify if applicable):

Extreme operating conditions:

Operating temperature range: Minimum: -10°C Maximum 40°C

Other (please specify if applicable): Minimum: Maximum

Details provided are for the:

- ☒ stand-alone equipment
- ☐ combined (or host) equipment
- ☐ test jig

m) The intended combination(s) of the radio equipment power settings and one or more antenna assemblies and their corresponding e.i.r.p. levels:

• Antenna Type: PIFA Antenna

☒ Integral Antenna (information to be provided in case of conducted measurements)

Antenna Gain: 2.81 dBi

If applicable, additional beamforming gain (excluding basic antenna gain): dB

☐ Temporary RF connector provided

☐ No temporary RF connector provided

☐ Dedicated Antennas (equipment with antenna connector)

☐ Single power level with corresponding antenna(s)

☐ Multiple power settings and corresponding antenna(s)

Number of different Power Levels:

Power Level 1: dBm

Power Level 2: dBm

Power Level 3: dBm

NOTE 1: Add more lines in case the equipment has more power levels.

NOTE 2: These power levels are conducted power levels (at antenna connector).

• For each of the Power Levels, provide the intended antenna assemblies, their corresponding gains

(G) and the resulting e.i.r.p. levels also taking into account the beamforming gain (Y) if applicable

Power Level 1: dBm

Number of antenna assemblies provided for this power level:

Assembly #	Gain (dBi)	e.i.r.p. (dBm)	Part number or model name
1M	2.81	6.26	
2M	2.81	5.9	

NOTE 3: Add more rows in case more antenna assemblies are supported for this power level.

Power Level 2: dBm

Number of antenna assemblies provided for this power level:

Assembly #	Gain (dBi)	e.i.r.p. (dBm)	Part number or model name
1			
2			
3			

NOTE 4: Add more rows in case more antenna assemblies are supported for this power level.

Power Level 3: dBm

Number of antenna assemblies provided for this power level:

Assembly #	Gain (dBi)	e.i.r.p. (dBm)	Part number or model name
1			
2			
3			

NOTE 5: Add more rows in case more antenna assemblies are supported for this power level.

n) The nominal voltages of the stand-alone radio equipment or the nominal voltages of the combined (host) equipment or test jig in case of plug-in devices:

Details provided are for the:

- ☒ stand-alone equipment
☐ combined (or host) equipment
☐ test jig

Supply Voltage ☐ AC mains State AC voltage V
☒ DC State DC voltage: 5 V

In case of DC, indicate the type of power source

- ☐ Internal Power Supply
☐ External Power Supply or AC/DC adapter: DC 5V
☒ Battery: DC 7.3V
☐ Other:

o) Describe the test modes available which can facilitate testing:

See clause 1.3

p) The equipment type (e.g. Bluetooth®, IEEE 802.11™ [i.3], IEEE 802.15.4™ [i.4], proprietary, etc.):

Bluetooth®

q) If applicable, the statistical analysis referred to in clause 5.4.1 q)

(to be provided as separate attachment)

r) If applicable, the statistical analysis referred to in clause 5.4.1 r)

(to be provided as separate attachment)

s) Geo-location capability supported by the equipment:

- ☐ Yes
☐ The geographical location determined by the equipment as defined in clause 4.3.1.13.2 or clause 4.3.2.12.2 is not accessible to the user
☒ No

t) Describe the minimum performance criteria that apply to the equipment (see clause 4.3.1.12.3 or clause 4.3.2.11.3):

GFSK(CH39)=0.74% (1M)

GFSK(CH39)=0.97% (2M)

1.3 TEST CONDITIONS AND CHANNEL

	Normal Test Conditions	Extreme Test Conditions
Temperature	15°C - 35°C	40°C ~ -10°C Note: (1)
Relative Humidity	20% - 75%	N/A
Supply Voltage	DC 5V	/

Test Channel	EUT Channel	Test Frequency (MHz)
Lowest	CH00	2402
Middle	CH19	2440
Highest	CH39	2480

Note:

(1) The HT 45°C and LT -10°C was declared by manufacturer, The EUT couldn't be operate normally with higher or lower temperature.

(2) The measurements are performed at the highest, middle, lowest available channels.

1.4 DESCRIPTION OF TEST CONDITIONS

**E-1
EUT**

1.5 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Model/Type No.	Series No.	Note
E-1	SwitchBot Roller Shade	W5000000	N/A	EUT

Item	Type	Shielded Type	Ferrite Core	Length	Note

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.

1.6 EQUIPMENTS LIST FOR ALL TEST ITEMS

EQUIPMENT TYPE	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
EMI Test Receiver	R&S	ESPI7	101318	2024.03.12	2025.03.11	1 year
Bilog Antenna	TESEQ	CBL6111D	31216	2024.03.11	2025.03.10	1 year
Turn Table	EM	SC100_1	60531	N/A	N/A	N/A
Antnna Mast	EM	SC100	N/A	N/A	N/A	N/A
Horn Antenna	EM	EM-AH-10180	2011071402	2022.03.31	2025.03.30	3 year
Horn Ant	Schwarzbeck	BBHA 9170	9170-181	2022.11.07	2025.11.06	3 year
Test Cable (30MHz-1GHz)	N/A	R-01	N/A	2022.06.17	2025.06.16	3 year
Test Cable (1-18GHz)	N/A	R-02	N/A	2022.06.17	2025.06.16	3 year
50Ω Coaxial Switch	Anritsu	MP59B	6200983705	2023.05.06	2026.05.05	3 year
Pre-Amplifier	EMC	EMC051835SE	980246	2024.01.23	2025.01.22	1 year
Spectrum Analyzer	Agilent	E4407B	MY45108040	2024.03.12	2025.03.11	1 year
Filter	TRILTHIC	2400MHz	29	2023.03.26	2026.03.25	3 year
Attenuator	Weinschel	33-10-33	AR4010	2023.03.27	2026.03.26	3 year
Attenuator	Weinschel	24-20-34	BP4485	2023.03.27	2026.03.26	3 year
MXA Signal Analyzer	Agilent	N9020A	MY49100060	2024.04.26	2025.04.25	1 year
ESG VETCTOR SIGNAL GENERAROR	Agilent	E4438C	MY45093347	2024.04.13	2025.04.12	1 year
Power Splitter	Mini-Circuits/ USA	ZN2PD-63-S+	SF025101428	2023.03.27	2026.03.26	3 year
Coupler	Mini-Circuits	ZADC-10-63-S +	SF794101410	2023.03.27	2026.03.26	3 year
Directional Coupler	MCLI/USA	CB11-20	0D2L51502	2023.07.07	2026.07.06	3 year
Attenuator	Agilent	8495B	MY42147029	2023.03.27	2026.03.26	3 year
Power Meter	DARE	RPR3006W	15I00041SNO 84	2024.04.25	2025.04.24	1 year
MXG Vector Signal Generator	Agilent	N5182A	MY47070317	2024.04.25	2025.04.24	1 year
Wideband Radio Communication Tester Specifications	R&S	CMW500	148500	2024.04.25	2025.04.24	1 year
temporary antenna connector (Note)	NTS	R001	N/A	N/A	N/A	N/A

Note:

We will use the temporary antenna connector (soldered on the PCB board) When conducted test
And this temporary antenna connector is listed within the instrument list

2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

ETSI EN 300 328 V2.2.2 (2019-07)		
Clause	Test Item	Results
TRANSMITTER PARAMETERS		
4.3.2.2	RF Output Power	Pass
4.3.2.3	Power Spectral Density	Pass
4.3.2.4	Duty cycle, Tx-Sequence, Tx-gap	Not Applicable (See Note 1/2)
4.3.2.5	Medium Utilization (MU) factor	Not Applicable (See Note 1/2)
4.3.2.6	Adaptivity	Not Applicable (See Note 1)
4.3.2.7	Occupied Channel Bandwidth	Pass
4.3.2.8	Transmitter unwanted emission in the OOB domain	Pass
4.3.2.9	Transmitter unwanted emissions in the spurious domain	Pass
RECEIVER PARAMETERS		
4.3.2.10	Receiver Spurious Emissions	Pass
4.3.2.11	Receiver Blocking	Pass

Note:

1. These requirements do not apply for equipment with a maximum declared RF output power of less than 10 dBm EIRP or for equipment when operating in a mode where the RF output power is less than 10 dBm EIRP.
2. These requirements apply to non-adaptive frequency hopping equipment or to adaptive frequency hopping equipment operating in a non-adaptive mode
3. The antenna gain provided by customer is used to calculate the EIRP result. NTEK is not responsible for the accuracy of antenna gain parameter.

2.1 TEST FACILITY

Shenzhen NTEK Testing Technology Co., Ltd.

Add. : 1/F, Building E, Fenda Science Park, Sanwei Community, Xixiang Street, Bao'an District, Shenzhen 518126 P.R. China

FCC Registered No.: 463705 IC Registered No.:9270A-1

CNAS Registration No.:L5516

2.2 MEASUREMENT UNCERTAINTY

For the test methods, according to ETSI EN 300 328 standard, the measurement uncertainty figures shall be calculated in accordance with ETR 100 028-1[4] and shall correspond to an expansion factor(coverage factor) $k=1.96$ or $k=2$ (which provide confidence levels of respectively **95 %** and **95.45 %** in the case where the distributions characterizing the actual measurement uncertainties are normal (Gaussian)).

Measurement uncertainty

No.	Item	Uncertainty (P=95)
1	Occupied Channel Bandwidth	$\pm 4.7\%$
2	RF output Power,conducted	$\pm 0.9\text{dB}$
3	Power Spectral Density, conducted	$\pm 2.6\text{dB}$
4	Unwanted emissions, conducted	$\pm 2.2\text{dB}$
5	All emissions,radiated	$\pm 5.3\text{dB}$
6	Temperature	$\pm 0.5^{\circ}\text{C}$
7	Humidity	$\pm 2.0\%$
8	Time	$\pm 1.0\%$

3. TEST PROCEDURES AND RESULTS

3.1 EQUIVALENT ISOTROPIC RADIATED POWER

3.1.1 LIMITS OF EQUIVALENT ISOTROPIC RADIATED POWER

Refer to chapter 4.3.2.2.3 of ETSI EN 300 328 V2.2.2 (2019-07)

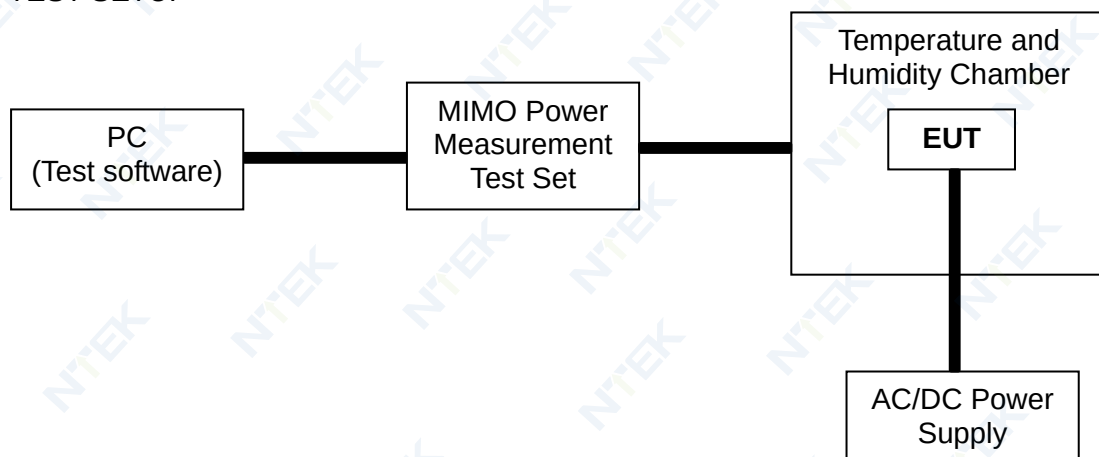
RF OUTPUT POWER	
Condition	Limit
☐ Non-adaptive wide band modulations systems	Equal to or less than the value declared by the supplier. This declared value shall be equal to or less than 20 dBm.
☒ Adaptive wide band modulations systems	≤20dBm

3.1.2 TEST PROCEDURE

Refer to chapter 5.4.2.2 of ETSI EN 300 328 V2.2.2 (2019-07)

Measurement	
☒ Conducted measurement	☐ Radiated measurement

3.1.3 TEST SETUP



3.1.4 TEST RESULTS

EUT :	SwitchBot Roller Shade	Model Name :	W5000000
Temperature :	20℃	Relative Humidity:	55 %
Pressure :	1012 hPa	Test Voltage :	DC 5V
Test Mode :	TX Low channel / Middle Channel / High Channel		

Test data reference attachment

3.2. PEAK POWER DENSITY

3.2.1 LIMITS OF POWER SPECTRAL DENSITY

Refer to chapter 4.3.2.3.3 of ETSI EN 300 328 V2.2.2 (2019-07)

RF OUTPUT POWER	
Condition	Limit
For equipment using wide band modulations other than FHSS	≤10 dBm/MHz

3.2.2 TEST PROCEDURE

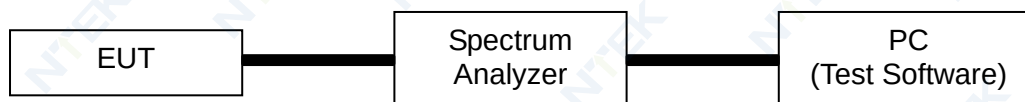
Refer to chapter 5.4.3.2 of ETSI EN 300 328 V2.2.2 (2019-07)

Measurement	
☒ Conducted measurement	☐ Radiated measurement

The setting of the Spectrum Analyzer

Start Frequency	2400MHz
Stop Frequency	2483.5MHz
Detector	RMS
Sweep Point	> 8 350; for spectrum analysers not supporting this number of sweep points, the frequency band may be segmented
Sweep time:	For non-continuous transmissions: 2 × Channel Occupancy Time × number of sweep points For continuous transmissions: 10 s; the sweep time may be increased further until a value where the sweep time has no further impact anymore on the RMS value of the signal.
RBW / VBW	10KHz / 30KHz

3.2.3 TEST SETUP



3.2.4 TEST RESULTS

EUT :	SwitchBot Roller Shade	Model Name :	W5000000
Temperature :	26℃	Relative Humidity:	60 %
Pressure :	1012 hPa	Test Voltage :	DC 5V
Test Mode :	TX-GFSK(CH00/CH19/CH39)		

Test data reference attachment

3.3. OCCUPIED CHANNEL BANDWIDTH

3.3.1 LIMITS OF OCCUPIED CHANNEL BANDWIDTH

Refer to chapter 4.3.2.7.3 of ETSI EN 300 328 V2.2.2 (2019-07)

OCCUPIED CHANNEL BANDWIDTH		
Condition		Limit
All types of equipment using wide band modulations other than FHSS		Shall fall completely within the band 2400 to 2483.5 MHz
Additional requirement	For non-adaptive using wide band modulations other than FHSS system and E.I.R.P >10 dBm	Less than 20 MHz
	For non-adaptive frequency hopping system and E.I.R.P >10 dBm	Less than 5 MHz

3.3.2 TEST PROCEDURE

Refer to chapter 5.4.7.2 of ETSI EN 300 328 V2.2.2 (2019-07)

Measurement	
☒ Conducted measurement	☐ Radiated measurement

The setting of the Spectrum Analyzer

Center Frequency	The centre frequency of the channel under test
Frequency Span	2 × Nominal Channel Bandwidth
Detector	RMS
RBW	~ 1 % of the span without going below 1 %
VBW	3 × RBW
Trace	Max hold
Sweep time	1s

3.3.3 DEVIATION FROM TEST STANDARD

No deviation

3.3.4 TEST SETUP



These measurements only were performed at normal test conditions. The measurement shall be performed only on the lowest and the highest frequency within the ststed frequency range. In case of conducted measurements the transmitter shall be connected to the measuring equipment via a suitable attenuator. Controlling software has been activated to set the EUT on specific status.

3.3.5 TEST RESULTS

EUT :	SwitchBot Roller Shade	Model Name :	W5000000
Temperature :	26℃	Relative Humidity :	60 %
Pressure :	1012 hPa	Test Voltage :	DC 5V
Test Mode :	TX-GFSK(CH00/CH19/CH39)		

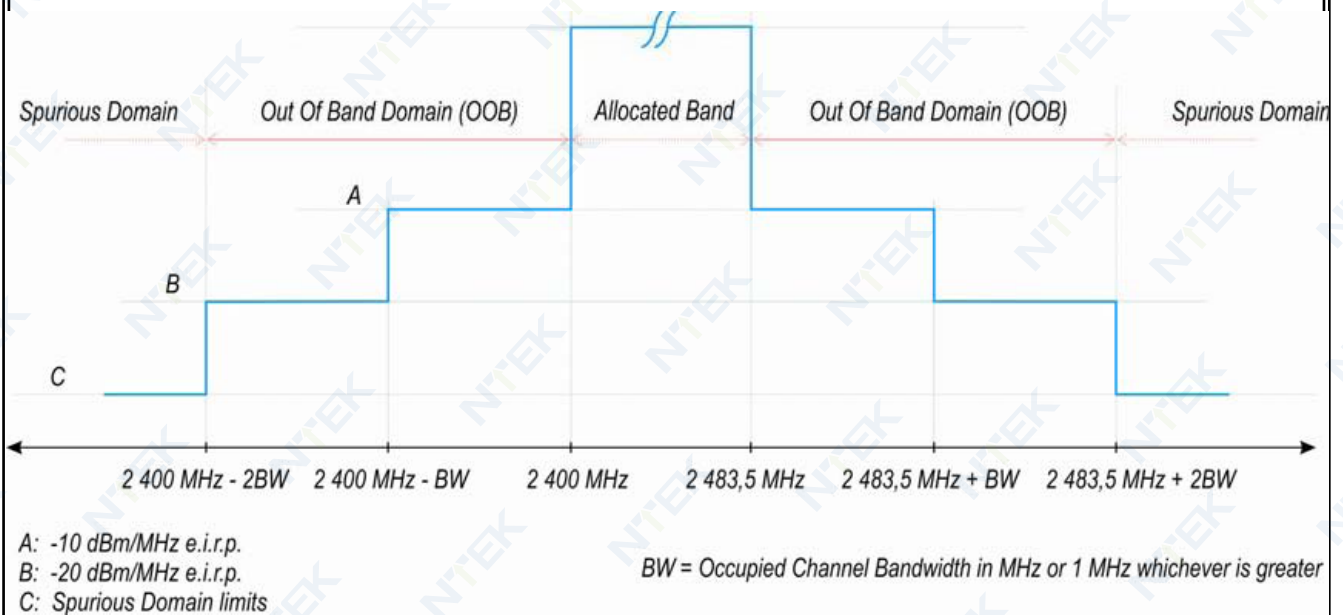
Test data reference attachment

3.4. TRANSMITTER UNWANTED EMISSIONS IN THE OUT-OF-BAND DOMAIN

3.4.1 LIMITS OF TRANSMITTER UNWANTED EMISSIONS IN THE OUT-OF-BAND DOMAIN

Refer to chapter 4.3.2.8.3 of ETSI EN 300 328 V2.2.2 (2019-07)

TRANSMITTER UNWANTED EMISSIONS IN THE OUT-OF-BAND DOMAIN	
Condition	Limit
Under all test conditions	The transmitter unwanted emissions in the out-of-band domain but outside the allocated band, shall not exceed the values provided by the mask in below figure.



3.4.2 TEST PROCEDURE

Refer to chapter 5.4.8.2 of ETSI EN 300 328 V2.2.2 (2019-07)

Measurement	
☒ Conducted measurement	☐ Radiated measurement

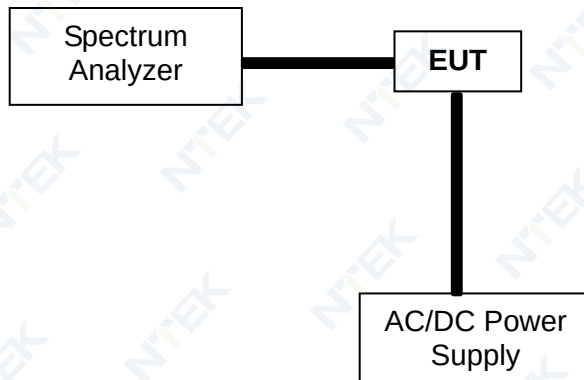
The setting of the Spectrum Analyzer

Span	0Hz
Filter Mode	Channel Filter
Trace Mode	Max Hold
Trigger Mode	Video trigger; in case video triggering is not possible, an external trigger source may be used
Detector	RMS
Sweep Point / Sweep Mode	Sweep Time [s] / (1 μ s) or 5 000 whichever is greater/ Continuous
RBW / VBW	1MHz / 3MHz

3.4.3 DEVIATION FROM TEST STANDARD

No deviation

3.4.4 TEST SETUP



According to the ETSI EN 300328 V2.2.2 clause 5.4.8.1: These measurements shall only be performed at normal test conditions. For equipment using FHSS modulation, the measurements shall be performed during normal operation (hopping).

For equipment using wide band modulations other than FHSS, the measurement shall be performed at the lowest and the highest channel on which the equipment can operate. These operating channels shall be recorded.

The equipment shall be configured to operate under its worst case situation with respect to output power.

If the equipment can operate with different Nominal Channel Bandwidths (e.g. 20 MHz and 40 MHz), then each channel bandwidth shall be tested separately.

3.4.5 TEST RESULTS

EUT :	SwitchBot Roller Shade	Model Name :	W5000000
Temperature :	24 °C	Relative Humidity :	54%
Pressure :	1010 hPa	Test Power :	DC 5V
Test Mode :	TX-GFSK(CH00/CH39)		

Test data reference attachment

3.5. ADAPTIVE (CHANNEL ACCESS MECHANISM)

3.5.1 APPLICABILITY OF ADAPTIVE REQUIREMENTS AND LILT FOR WIDE BAND MODULATION TECHNIQUES

Refer to chapter ETSI EN 300 328 V2.2.2 (2019-07)

Requirement	Operational Mode			
	☐ Non-LBT based Detect and Avoid	☐ LBT based Detect and Avoid		
		☐ Frame Based Equipment	☐ Load Based Equipment (CCA using 'energy detect')	☐ Load Based Equipment (CCA not using any of the mechanisms referenced as note 2)
Minimum Clear Channel Assessment (CCA) Time	NA	not less than 18 us (see note 1)	(see note 2)	not less than 18 us (see note 1)
Maximum Channel Occupancy (COT) Time	<40 ms	1ms to 10 ms	(see note 2)	(13/32)*q ms (see note 3)
Minimum Idle Period	5 % minimum of 100 μs	5% of COT	(see note 2)	NA
Extended CCA check	NA	NA	(see note 2)	R*CCA (see note 4)
Short Control Signalling Transmissions	Maximum duty cycle of 10% within an observation period of 50 ms (see note 5)			

Note 1: The CCA time used by the equipment shall be declared by the supplier.

Note 2: Load Based Equipment may implement an LBT based spectrum sharing mechanism based on the Clear Channel Assessment (CCA) mode using energy detect as described in IEEE 802.11™-2012 [i.3], clause 9, clause 10, clause 16, clause 17, clause 19 and clause 20, or in IEEE 802.15.4™-2011 [i.4], clause 4, clause 5 and clause 8 providing the equipment complies with the conformance requirements referred to in clause 4.3.2.6.3.4.

Note 3: q is selected by the manufacturer in the range [4...32]

Note 4: The value of R shall be randomly selected in the range [1...q]

Note 5: Adaptive equipment may or may not have Short Control Signaling Transmissions.

Interference threshold level

The detection threshold shall be proportional to the transmit power of the transmitter: for a 20 dBm e.i.r.p. transmitter the detection threshold level (TL) shall be equal to or less than -70 dBm/MHz at the input to the receiver assuming a 0 dBi (receive) antenna assembly. This threshold level (TL) may be corrected for the (receive) antenna assembly gain (G); however, beamforming gain (Y) shall not be taken into account. For power levels less than 20 dBm e.i.r.p., the detection threshold level may be relaxed to:

$$TL = -70 \text{ dBm/MHz} + 10 \times \log_{10} (100 \text{ mW} / P_{out}) \text{ (Pout in mW e.i.r.p.)}$$

Table 9: Unwanted Signal parameters

Wanted signal mean power from companion device (dBm)	Unwanted signal frequency (MHz)	Unwanted CW signal power (dBm)
-30/ sufficient to maintain the link(see note 2)	2 395 or 2 488,5 (see note 1)	-35 (see note 2)
NOTE 1: The highest frequency shall be used for testing operating channels within the range 2 400 MHz to 2 442 MHz, while the lowest frequency shall be used for testing operating channels within the range 2 442 MHz to 2 483,5 MHz. See clause 5.4.6.1. NOTE 2: A typical value which can be used in most cases is -50 dBm/MHz. NOTE 3: The level specified is the level in front of the UUT antenna. In case of conducted measurements, this level has to be corrected by the actual antenna assembly gain.		

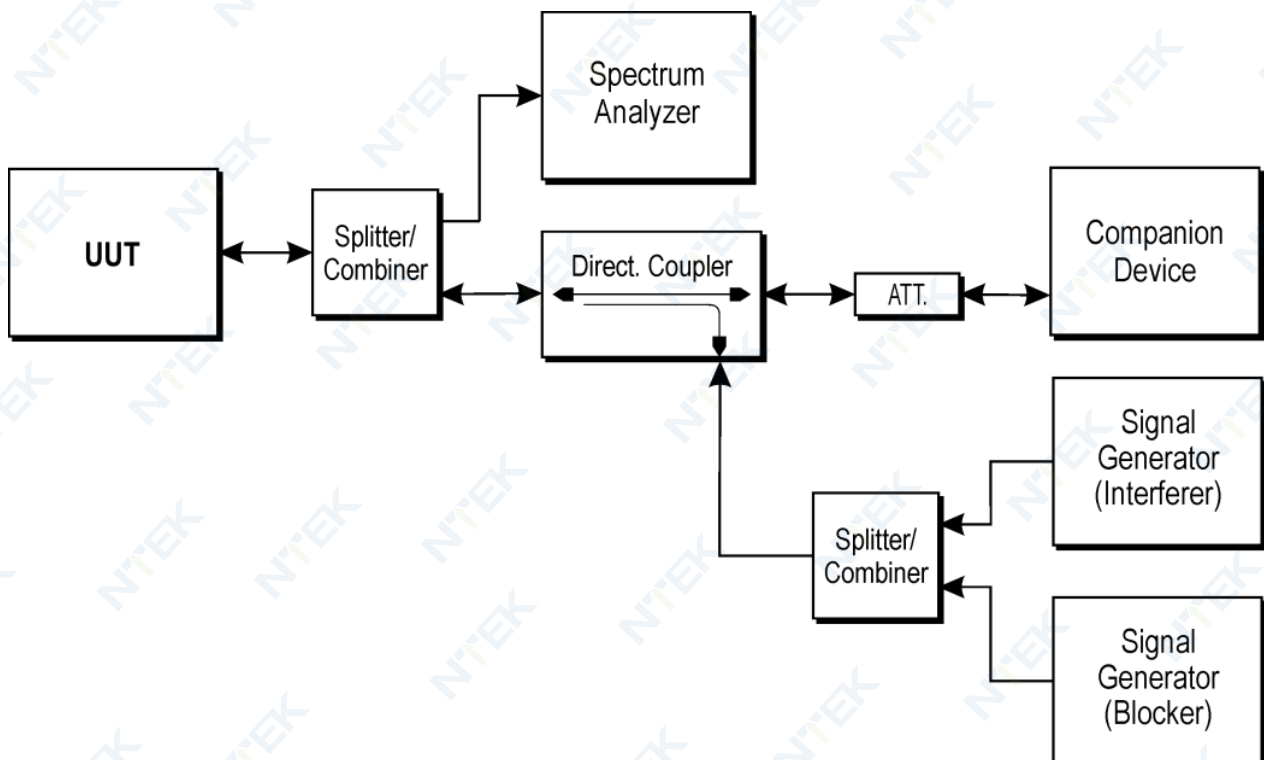
3.5.2 TEST PROCEDURE

Refer to chapter 5.4.6.2 of ETSI EN 300 328 V2.2.2 (2019-07)

Measurement	
☒ Conducted measurement	☐ Radiated measurement

Test method please refer to the 5.4.6.2.1.4 of ETSI EN 300 328 V2.2.2 (2019-07)

3.5.3 TEST SETUP CONFIGURATION



3.5.4 LIST OF MEASUREMENTS

UUT operational Mode		
Frame Based Equipment	Load Based Equipment (CCA using 'energy detect')	Load Based Equipment (CCA not using any of the mechanisms referenced)
	V	

Clause	Test Parameter	Remarks	PASS/FAIL
4.3.2.5.2.2.1	Adaptive (Frame Based Equipment)	Not Applicable	N/A
4.3.2.5.2.2.2	Adaptive (Load Based Equipment)	N/A	N/A
4.3.2.5.3	Short Control Signaling Transmissions	N/A	N/A

3.5.5 TEST RESULTS

EUT :	SwitchBot Roller Shade	Model Name :	W5000000
Temperature :	24 °C	Relative Humidity :	54%
Pressure :	1010 hPa	Test Power :	N/A
Test Mode :	N/A		

Note: Not Applicable

3.6. TRANSMITTER UNWANTED EMISSIONS IN THE SPURIOUS DOMAIN

3.6.1 LIMITS OF TRANSMITTER UNWANTED EMISSIONS IN THE SPURIOUS DOMAIN

Refer to chapter 4.3.2.9.3 of ETSI EN 300 328 V2.2.2 (2019-07)

TRANSMITTER UNWANTED EMISSIONS IN THE SPURIOUS DOMAIN		
Frequency Range	Maximum Power Limit (E.R.P.(≤1 GHz) E.I.R.P.(> 1 GHz))	Bandwidth
30 MHz to 47 MHz	-36dBm	100 kHz
47 MHz to 74 MHz	-54dBm	100 kHz
74 MHz to 87.5 MHz	-36dBm	100 kHz
87.5 MHz to 118 MHz	-54dBm	100 kHz
118 MHz to 174 MHz	-36dBm	100 kHz
174 MHz to 230 MHz	-54dBm	100 kHz
230 MHz to 470 MHz	-36dBm	100 kHz
470 MHz to 694 MHz	-54dBm	100 kHz
694 MHz to 1 GHz	-36dBm	100 kHz
1 GHz ~ 12.75 GHz	-30dBm	1 MHz

3.6.2 TEST PROCEDURE

Refer to chapter 5.4.9.2 of ETSI EN 300 328 V2.2.2 (2019-07)

Measurement	
☒ Conducted measurement	☒ Radiated measurement

The setting of the Spectrum Analyzer

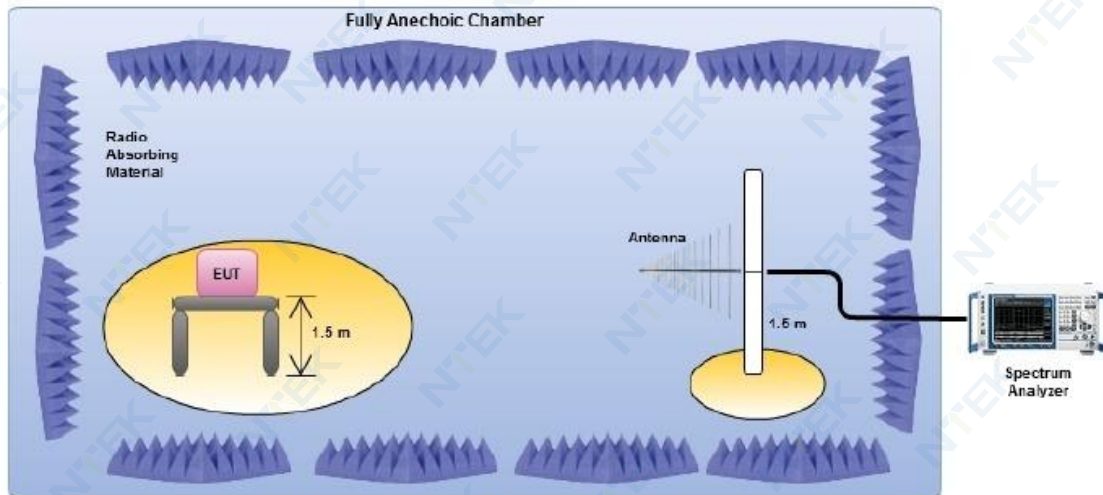
RBW	100K(<1GHz) / 1M(>1GHz)
VBW	300K(<1GHz) / 3M(>1GHz)

3.6.3 DEVIATION FROM TEST STANDARD

No deviation

3.6.4 TEST SETUP

Radiated measurement:



Conducted measurement:



1. For the actual test configuration, please refer to the related Item in this test report (Photographs of the Test Configuration).
2. The measurements were performed when normal hopping was disabled. In this case measurements were performed when operating at the lowest and the highest hopping frequency.
3. The equipment was configured to operate under its worst case situation with respect to output power.
4. The test setup has been constructed as the normal use condition. Controlling software has been activated to set the EUT on specific status.

3.6.5 TEST RESULTS(Radiated measurement)

BELOW 1 GHz WORST- CASE DATA(30 MHz ~ 1GHz)

EUT :	SwitchBot Roller Shade	Model Name :	W5000000
Temperature :	24℃	Relative Humidity :	57 %
Pressure :	1012 hPa	Test Voltage :	DC 5V
Test Mode :	TX--GFSK(CH39)		

Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Remark
	(MHz)	(dBm)	(dB)	(dBm)	(dBm)	(dB)	
V	37.588	-71.05	11.08	-59.97	-36.00	-23.97	peak
V	98.612	-76.38	9.95	-66.43	-54.00	-12.43	peak
V	201.399	-68.17	11.04	-57.13	-54.00	-3.13	peak
V	267.119	-70.46	9.57	-60.89	-36.00	-24.89	peak
V	635.071	-75.69	10.86	-64.83	-54.00	-10.83	peak
H	44.287	-70.01	10.51	-59.50	-36.00	-23.50	peak
H	109.969	-72.46	9.86	-62.60	-54.00	-8.60	peak
H	225.324	-70.90	9.67	-61.23	-54.00	-7.23	peak
H	241.933	-76.13	11.36	-64.77	-36.00	-28.77	peak
H	541.021	-71.53	10.32	-61.21	-54.00	-7.21	peak

Remark:

- 1.Emission Level= Meter Reading+ Factor, Margin= Limit- Emission Level.
- 2.All the modes had been tested, but only the worst data recorded in the report.

ABOVE 1 GHz WORST- CASE DATA (1GHz ~ 12.75GHz)

EUT :	SwitchBot Roller Shade	Model Name :	W5000000
Temperature :	26℃	Relative Humidity :	60 %
Pressure :	1012 hPa	Test Voltage :	DC 5V
Test Mode :	TX-GFSK (CH00/CH19/CH39)		

Polar (H/V)	Frequency (MHz)	Meter Reading (dBm)	Factor (dB)	Emission Level (dBm)	Limits (dBm)	Margin (dB)	Remark
operation frequency:2402							
V	2246.941	-75.53	10.04	-65.49	-30.00	-35.49	peak
V	3066.277	-77.72	9.58	-68.14	-30.00	-38.14	peak
V	2194.118	-68.72	10.53	-58.19	-30.00	-28.19	peak
V	5979.924	-71.87	10.65	-61.22	-30.00	-31.22	peak
H	2264.229	-77.85	10.83	-67.02	-30.00	-37.02	peak
H	5246.322	-74.39	11.07	-63.32	-30.00	-33.32	peak
H	2141.531	-74.60	10.74	-63.86	-30.00	-33.86	peak
H	3893.420	-68.17	11.31	-56.86	-30.00	-26.86	peak
operation frequency:2440							
V	2203.299	-67.72	10.97	-56.75	-30.00	-26.75	peak
V	3198.430	-74.68	9.77	-64.91	-30.00	-34.91	peak
V	2065.667	-74.06	11.48	-62.58	-30.00	-32.58	peak
V	5597.512	-77.25	10.84	-66.41	-30.00	-36.41	peak
H	2485.620	-77.94	9.93	-68.01	-30.00	-38.01	peak
H	3413.320	-74.12	11.34	-62.78	-30.00	-32.78	peak
H	2054.736	-72.31	9.65	-62.66	-30.00	-32.66	peak
H	4628.043	-77.98	9.59	-68.39	-30.00	-38.39	peak
operation frequency:2480							
V	2281.817	-69.83	9.93	-59.90	-30.00	-29.90	peak
V	4526.588	-72.13	10.19	-61.94	-30.00	-31.94	peak
V	2092.742	-70.78	10.59	-60.19	-30.00	-30.19	peak
V	4984.321	-73.72	11.39	-62.33	-30.00	-32.33	peak
H	2409.051	-73.69	9.99	-63.70	-30.00	-33.70	peak
H	4988.371	-70.92	11.47	-59.45	-30.00	-29.45	peak
H	2045.746	-76.73	10.96	-65.77	-30.00	-35.77	peak
H	4209.188	-76.53	10.50	-66.03	-30.00	-36.03	peak

Remark:

1. Emission Level= Meter Reading+ Factor, Margin= Limit- Emission Level.
2. All the modes had been tested, but only the worst data recorded in the report.

3.6.6 TEST RESULTS (Conducted measurement)

Test data reference attachment

3.7. RECEIVER SPURIOUS RADIATION

3.7.1 LIMITS OF RECEIVER SPURIOUS RADIATION

Refer to chapter 4.3.2.10.3 of ETSI EN 300 328 V2.2.2 (2019-07)

RECEIVER SPURIOUS EMISSIONS		
Frequency Range	Maximum Power Limit (E.R.P.(≤ 1 GHz) E.I.R.P.(> 1 GHz))	Measurement Bandwidth
30 MHz ~ 1 GHz	-57dBm	100KHz
1 GHz ~ 12.75 GHz	-47dBm	1MHz

3.7.2 TEST PROCEDURE

Refer to chapter 5.4.10.2 of ETSI EN 300 328 V2.2.2 (2019-07)

Measurement	
☒ Conducted measurement	☒ Radiated measurement

The setting of the Spectrum Analyzer

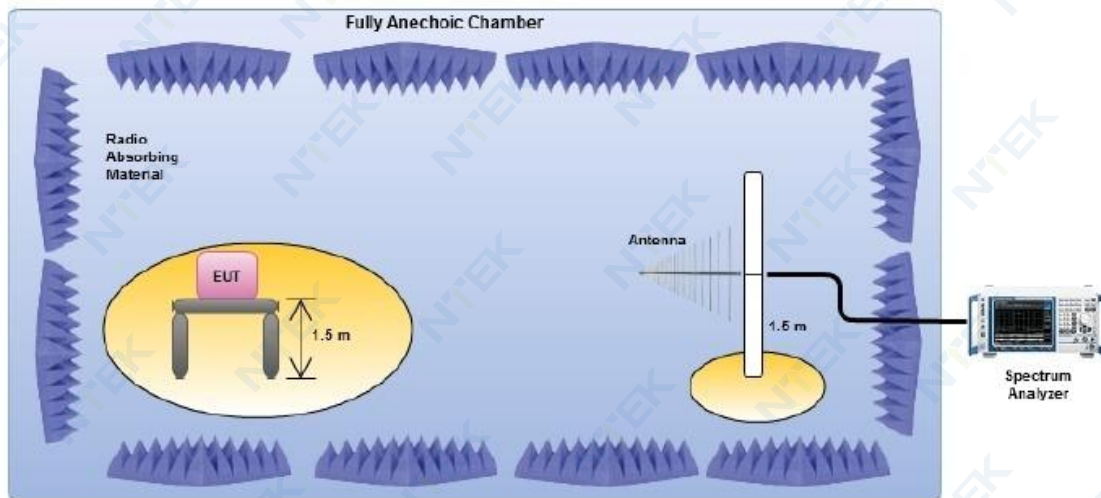
RBW	100K(<1GHz) / 1M(>1GHz)
VBW	300K(<1GHz) / 3M(>1GHz)

3.7.3 DEVIATION FROM TEST STANDARD

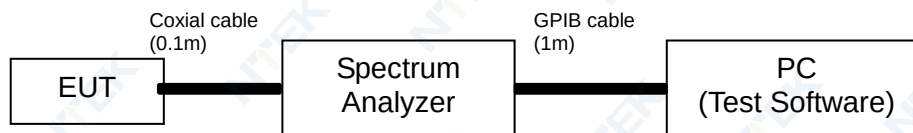
No deviation

3.7.4 TEST SETUP

Radiated measurement:



Conducted measurement:



1. For the actual test configuration, please refer to the related Item in this test report (Photographs of the Test Configuration).
2. Testing was performed when the equipment was in a receive-only mode.
3. The measurements were performed when normal hopping was disabled. In this case measurements were performed when operating at the lowest and the highest hopping frequency.
4. The test setup has been constructed as the normal use condition. Controlling software has been activated to set the EUT on specific status.

3.7.5 TEST RESULTS(Radiated measurement)

RX BELOW 1 GHz WORST- CASE DATA(30 MHz ~ 1GHz)

EUT :	SwitchBot Roller Shade	Model Name :	W5000000
Temperature :	26℃	Relative Humidity :	60 %
Pressure :	1012 hPa	Test Voltage :	DC 5V
Test Mode :	RX Mode-GFSK(CH39)		

Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Remark
	(MHz)	(dBm)	(dB)	(dBm)	(dBm)	(dB)	
V	42.725	-81.98	12.98	-69.00	-57.00	-12.00	peak
V	95.093	-83.10	11.67	-71.43	-57.00	-14.43	peak
V	200.660	-80.71	18.94	-61.77	-57.00	-4.77	peak
V	438.399	-79.69	11.65	-68.04	-57.00	-11.04	peak
V	592.943	-84.94	11.45	-73.49	-57.00	-16.49	peak
H	34.806	-77.41	18.60	-58.81	-57.00	-1.81	peak
H	95.924	-81.62	18.11	-63.51	-57.00	-6.51	peak
H	202.582	-80.40	10.30	-70.10	-57.00	-13.10	peak
H	263.138	-84.69	15.00	-69.69	-57.00	-12.69	peak
H	690.504	-83.83	14.63	-69.20	-57.00	-12.20	peak

Remark:

1. Emission Level = Meter Reading + Factor, Margin= Emission Level - Limit
2. All the modes had been tested, but only the worst data recorded in the report.

RX ABOVE 1 GHz WORST- CASE DATA(1GHz ~ 12.75GHz)

EUT :	SwitchBot Roller Shade	Model Name :	W5000000
Temperature :	24 °C	Relative Humidity	54%
Pressure :	1010 hPa	Test Power :	DC 5V
Test Mode :	RX Mode-GFSK(CH39)		

Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Remark
	(MHz)	(dBm)	(dB)	(dBm)	(dBm)	(dB)	
V	2843.876	-84.88	9.94	-74.94	-47.00	-27.94	peak
V	4034.024	-80.50	9.82	-70.68	-47.00	-23.68	peak
V	2247.958	-80.73	10.02	-70.71	-47.00	-23.71	peak
V	3580.112	-78.36	16.13	-62.23	-47.00	-15.23	peak
H	2970.893	-83.57	10.11	-73.46	-47.00	-26.46	peak
H	4812.894	-83.61	10.68	-72.93	-47.00	-25.93	peak
H	2703.452	-84.02	7.00	-77.02	-47.00	-30.02	peak
H	4918.136	-77.16	14.56	-62.60	-47.00	-15.60	peak

1. Emission Level = Meter Reading + Factor, Margin= Emission Level - Limit
2. All the modes had been tested, but only the worst data recorded in the report.

3.7.6 TEST RESULTS (Conducted measurement)

Test data reference attachment

3.8. RECEIVER BLOCKING

3.8.1 PERFORMANCE CRITERIA

The minimum performance criterion shall be a PER less than or equal to 10 %. The manufacturer may declare alternative performance criteria as long as that is appropriate for the intended use of the equipment (see clause 5.4.1.t)).

3.8.2 LIMITS OF RECEIVER BLOCKING

While maintaining the minimum performance criteria as defined in clause 4.3.2.11.3, the blocking levels at specified frequency offsets shall be equal to or greater than the limits defined for the applicable receiver category provided in table 14, table 15 or table 16.

☐ Table 14: Receiver Blocking parameters for Receiver Category 1 equipment

Wanted signal mean power from companion device (dBm) (see notes 1 and 4)	Blocking signal Frequency (MHz)	Blocking signal power (dBm) (see note 4)	Type of blocking signal
$(-133 \text{ dBm} + 10 \times \log_{10}(\text{OCBW}))$ or -68 dBm whichever is less (see note 2)	2 380 2 504	-34	CW
$(-139 \text{ dBm} + 10 \times \log_{10}(\text{OCBW}))$ or -74 dBm whichever is less (see note 3)	2 300 2 330 2 360 2524 2584 2674		

NOTE 1: OCBW is in Hz.

NOTE 2: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative test may be performed using a wanted signal up to $P_{\min} + 26 \text{ dB}$ where $P_{\min}$ is the minimum level of wanted signal required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal.

NOTE 3: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative test may be performed using a wanted signal up to $P_{\min} + 20 \text{ dB}$ where $P_{\min}$ is the minimum level of wanted signal required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal.

NOTE 4: The level specified is the level at the UUT receiver input assuming a 0 dBi antenna assembly gain. In case of conducted measurements, this level has to be corrected for the (in-band) antenna assembly gain (G). In case of radiated measurements, this level is equivalent to a power flux density (PFD) in front of the UUT antenna with the UUT being configured/positioned as recorded in clause 5.4.3.2.2.

☒ **Table 15: Receiver Blocking parameters receiver category 2 equipment**

Wanted signal mean power from companion device (dBm) (see notes 1 and 3)	Blocking signal Frequency (MHz)	Blocking signal power (dBm) (see note 3)	Type of blocking signal
$(-139 \text{ dBm} + 10 \times \log_{10}(\text{OCBW}) + 10 \text{ dB})$ or $(-74 \text{ dBm} + 10 \text{ dB})$ whichever is less (see note 2)	2 380	-34	CW
	2 504		
	2 300		
	2 584		

NOTE 1: OCBW is in Hz.

NOTE 2: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative test may be performed using a wanted signal up to $P_{\min} + 26 \text{ dB}$ where $P_{\min}$ is the minimum level of wanted signal required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal.

NOTE 3: The level specified is the level at the UUT receiver input assuming a 0 dBi antenna assembly gain. In case of conducted measurements, this level has to be corrected for the (in-band) antenna assembly gain (G). In case of radiated measurements, this level is equivalent to a power flux density (PFD) in front of the UUT antenna with the UUT being configured/positioned as recorded in clause 5.4.3.2.2.

☐ **Table 16: Receiver Blocking parameters receiver category 3 equipment**

Wanted signal mean power from companion device (dBm)	Blocking signal Frequency (MHz)	Blocking signal power (dBm) (see note 2)	Type of blocking signal
$(-139 \text{ dBm} + 10 \times \log_{10}(\text{OCBW}) + 20 \text{ dB})$ or $(-74 \text{ dBm} + 20 \text{ dB})$ whichever is less (see note 2)	2 380	-34	CW
	2 504		
	2 300		
	2 584		

NOTE 1: OCBW is in Hz.

NOTE 2: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative the test may be performed using a wanted signal up to $P_{\min} + 30 \text{ dB}$ where $P_{\min}$ is the minimum level of wanted signal required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal.

NOTE 3: The level specified is the level at the UUT receiver input assuming a 0 dBi antenna assembly gain. In case of conducted measurements, this level has to be corrected for the (in-band) antenna assembly gain (G). In case of radiated measurements, this level is equivalent to a power flux density (PFD) in front of the UUT antenna with the UUT being configured/positioned as recorded in clause 5.4.3.2.2.

3.8.3 TEST PROCEDURE

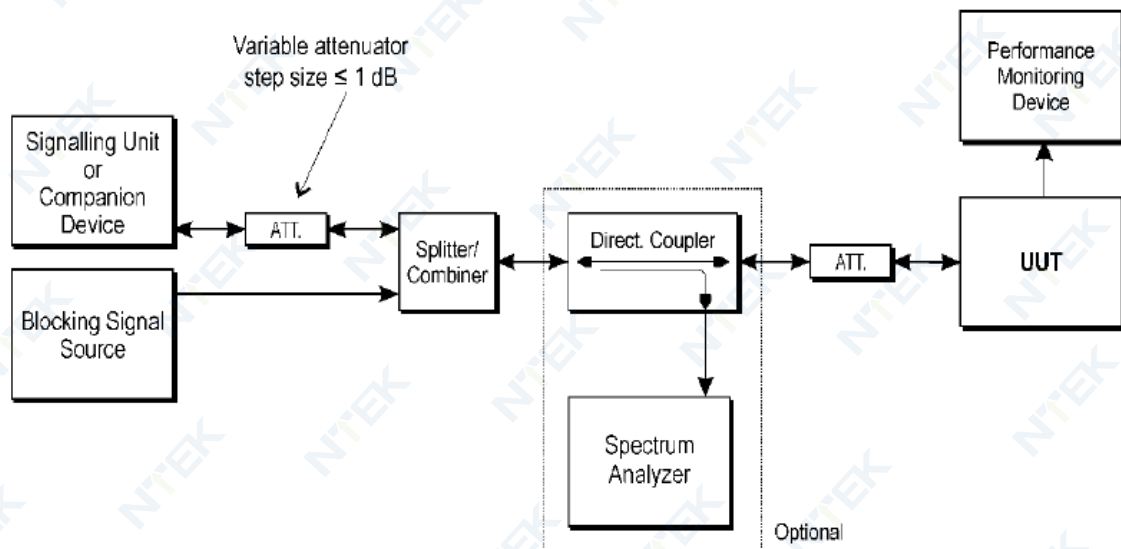
Refer to chapter 5.4.11.2 of ETSI EN 300 328 V2.2.2 (2019-07)

Measurement	
☒ Conducted measurement	☐ Radiated measurement

3.8.4 DEVIATION FROM TEST STANDARD

No deviation

3.8.5 TEST SETUP



3.8.6 TEST RESULTS

EUT :	SwitchBot Roller Shade	Model Name :	W5000000
Temperature :	24 °C	Relative Humidity	54%
Pressure :	1010 hPa	Test Power :	DC 5V
Test Mode :	GFSK-RX Mode (CH00/CH39)		

BLE 1M

CH00:

receiver category 2

Wanted signal mean power from companion device (dBm) Note(1)	Blocking signal Frequency (MHz)	Blocking signal power (dBm)	PER %	PER Limit %
-68.87	2 380	-34	0.48%	≤10%
	2 504		0.05%	
	2 300		0.08%	≤10%
	2 584		0.40%	

CH39:

receiver category 2

Wanted signal mean power from companion device (dBm) Note(1)	Blocking signal Frequency (MHz)	Blocking signal power (dBm)	PER %	PER Limit %
-68.88	2 380	-34	0.74%	≤10%
	2 504		0.64%	
	2 300		0.29%	≤10%
	2 584		0.54%	

BLE 2M

CH00:

receiver category 2

Wanted signal mean power from companion device (dBm) Note(1)	Blocking signal Frequency (MHz)	Blocking signal power (dBm)	PER %	PER Limit %
-65.83	2 380	-34	0.79%	≤10%
	2 504		0.52%	
	2 300		0.94%	≤10%
	2 584		0.71%	

CH39:

receiver category 2

Wanted signal mean power from companion device (dBm) Note(1)	Blocking signal Frequency (MHz)	Blocking signal power (dBm)	PER %	PER Limit %
-65.82	2 380	-34	0.11%	≤10%
	2 504		0.91%	
	2 300		0.97%	≤10%
	2 584		0.15%	

4. TEST RESULTS

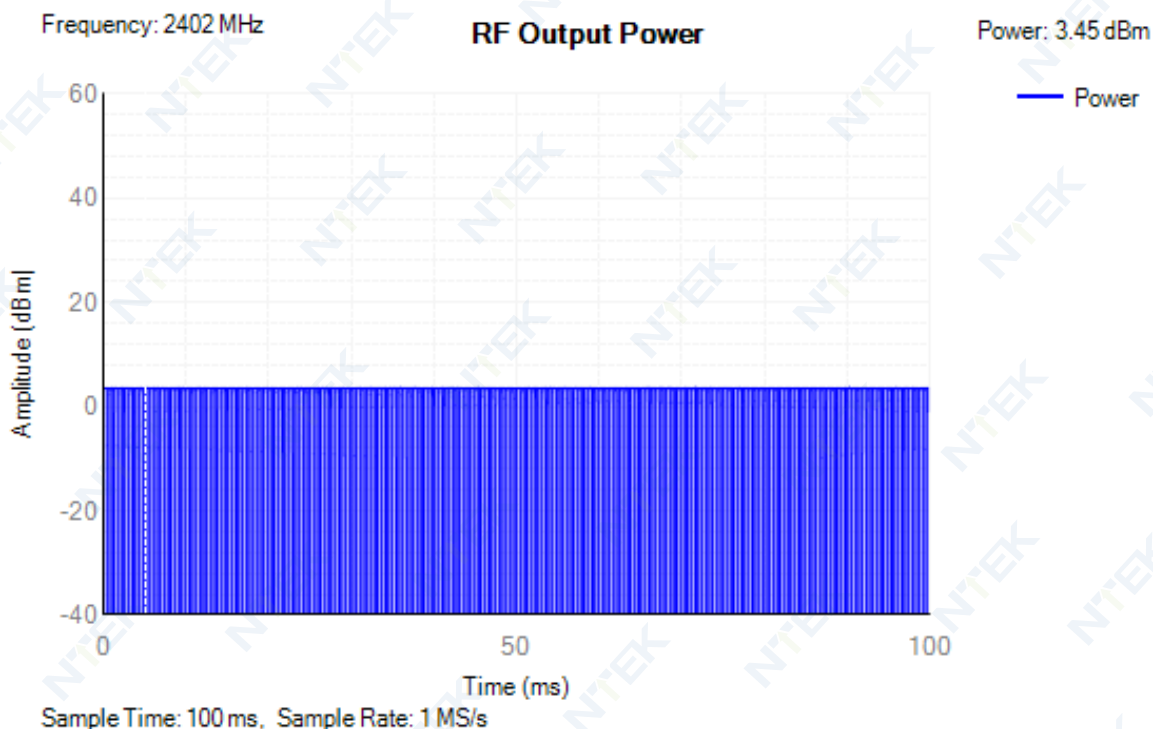
4.1 1M

4.1.1 RF Output Power

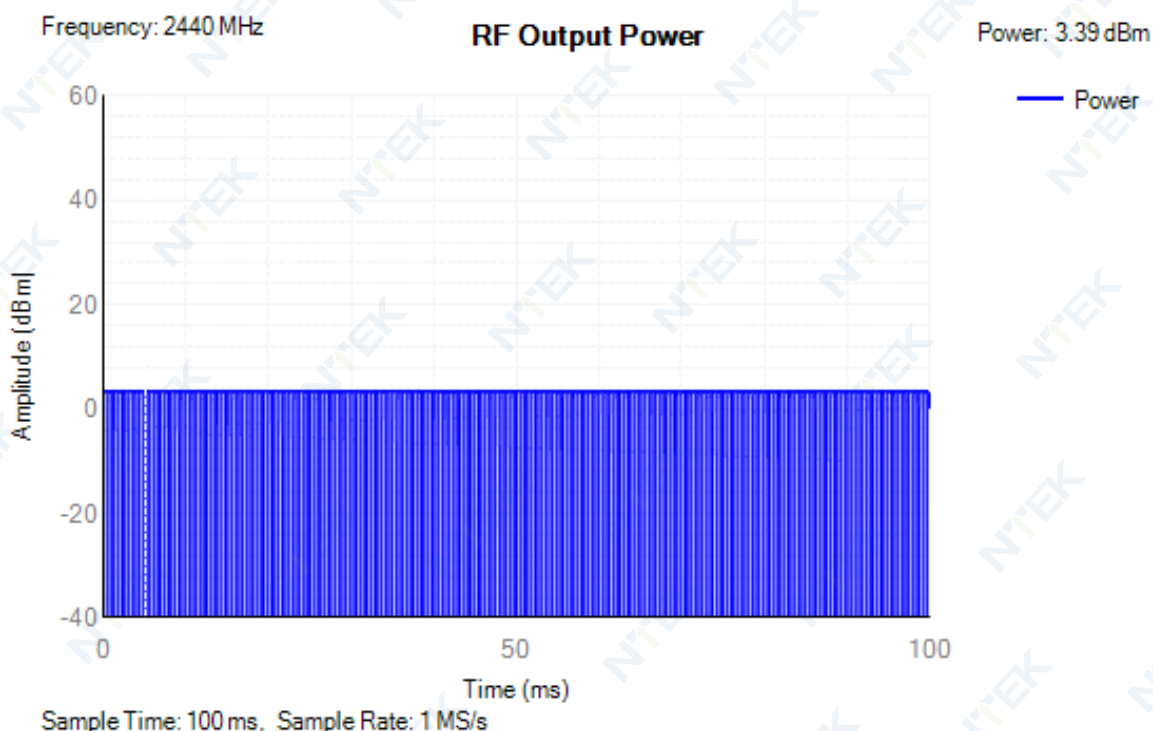
Condition	Mode	Frequency (MHz)	Antenna	Max Burst RMS Power (dBm)	Burst Number	Max EIRP (dBm)	Limit (dBm)	Verdict
NVNT	BLE 1M	2402	Ant1	3.45	160	6.26	20	Pass
NVNT	BLE 1M	2440	Ant1	3.39	161	6.2	20	Pass
NVNT	BLE 1M	2480	Ant1	2.97	160	5.78	20	Pass
NVLT	BLE 1M	2402	Ant1	3.36	160	6.17	20	Pass
NVLT	BLE 1M	2440	Ant1	3.2	161	6.01	20	Pass
NVLT	BLE 1M	2480	Ant1	2.8	160	5.61	20	Pass
NVHT	BLE 1M	2402	Ant1	3.33	160	6.14	20	Pass
NVHT	BLE 1M	2440	Ant1	3.26	161	6.07	20	Pass
NVHT	BLE 1M	2480	Ant1	2.91	160	5.72	20	Pass

Test Graphs

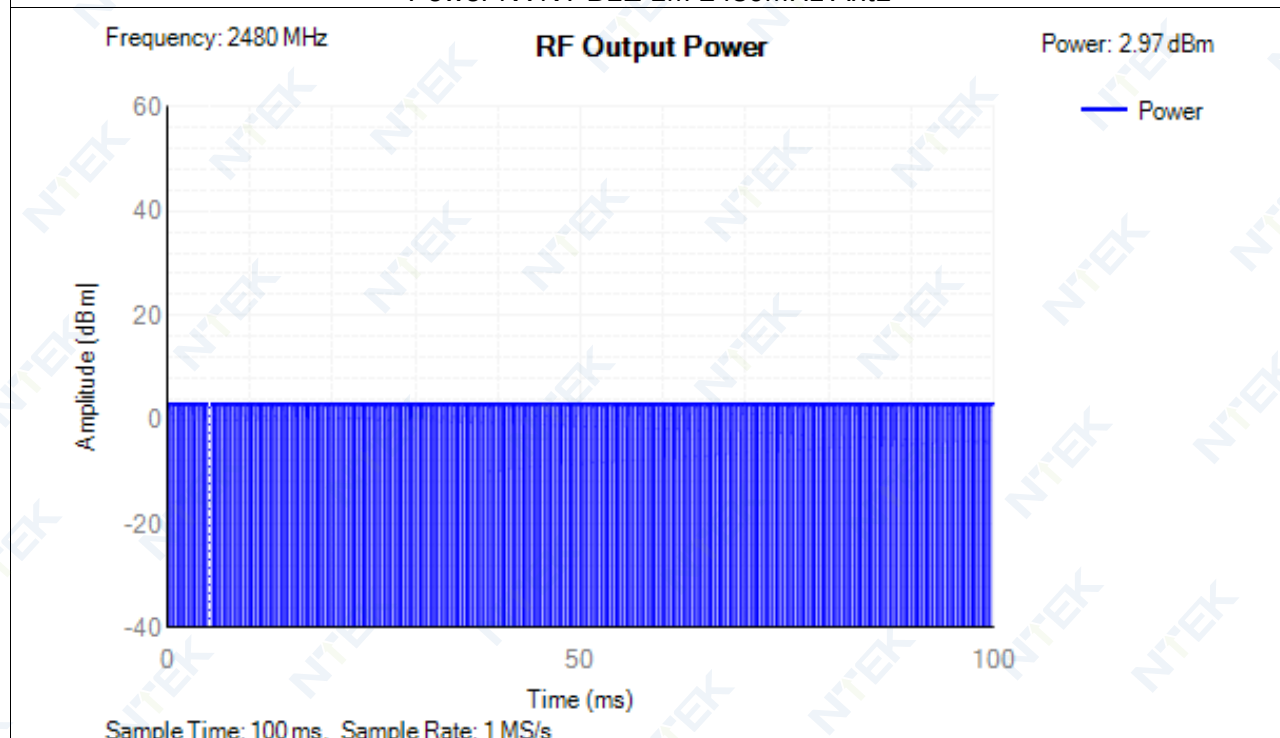
Power NVNT BLE 1M 2402MHz Ant1



Power NVNT BLE 1M 2440MHz Ant1



Power NVNT BLE 1M 2480MHz Ant1

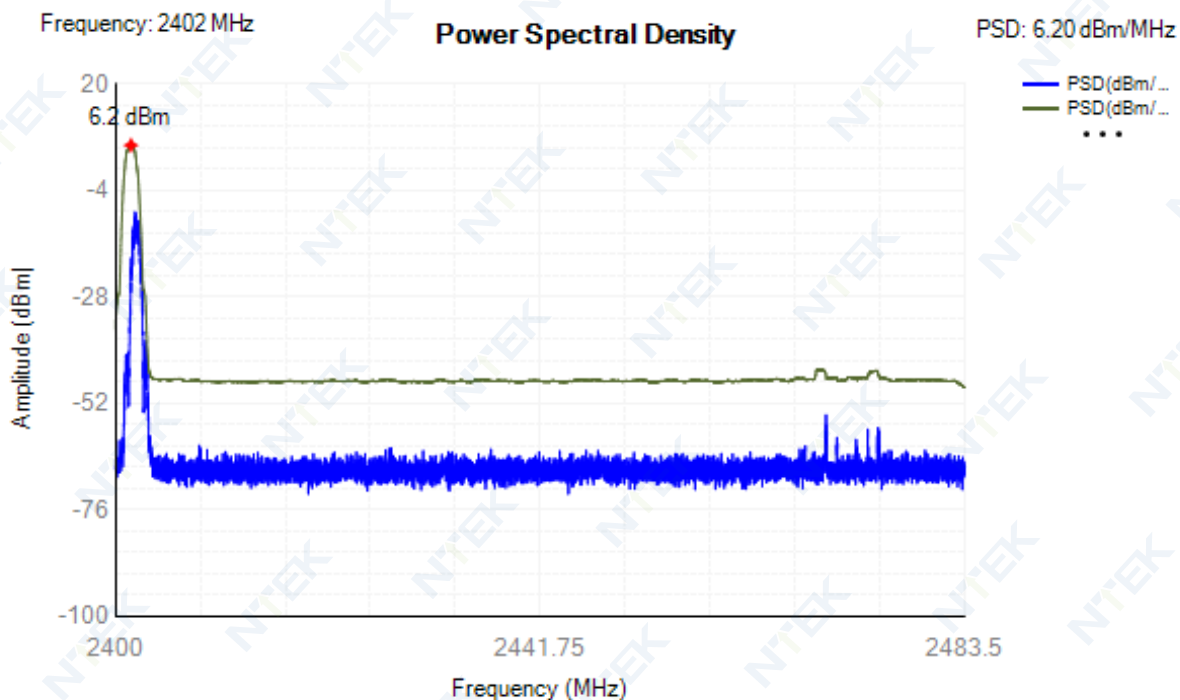


4.1.2 Power Spectral Density

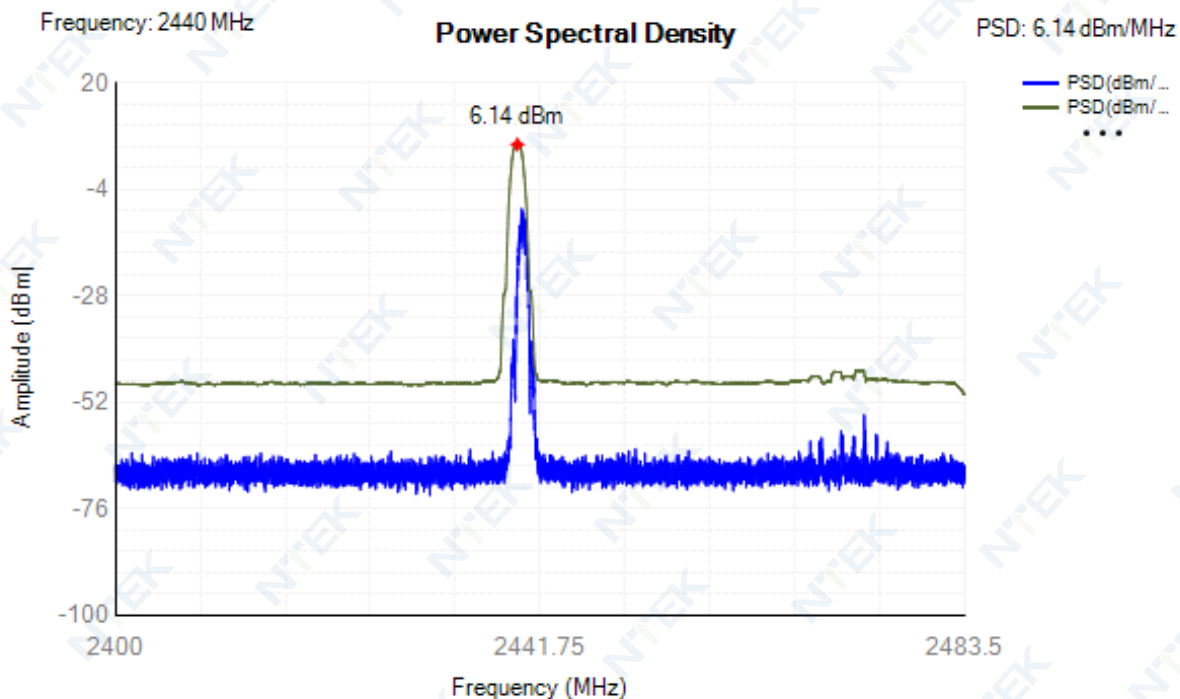
Condition	Mode	Frequency (MHz)	Antenna	Max PSD (dBm/MHz)	Limit (dBm/MHz)	Verdict
NVNT	BLE 1M	2402	Ant1	6.2	10	Pass
NVNT	BLE 1M	2440	Ant1	6.14	10	Pass
NVNT	BLE 1M	2480	Ant1	5.72	10	Pass

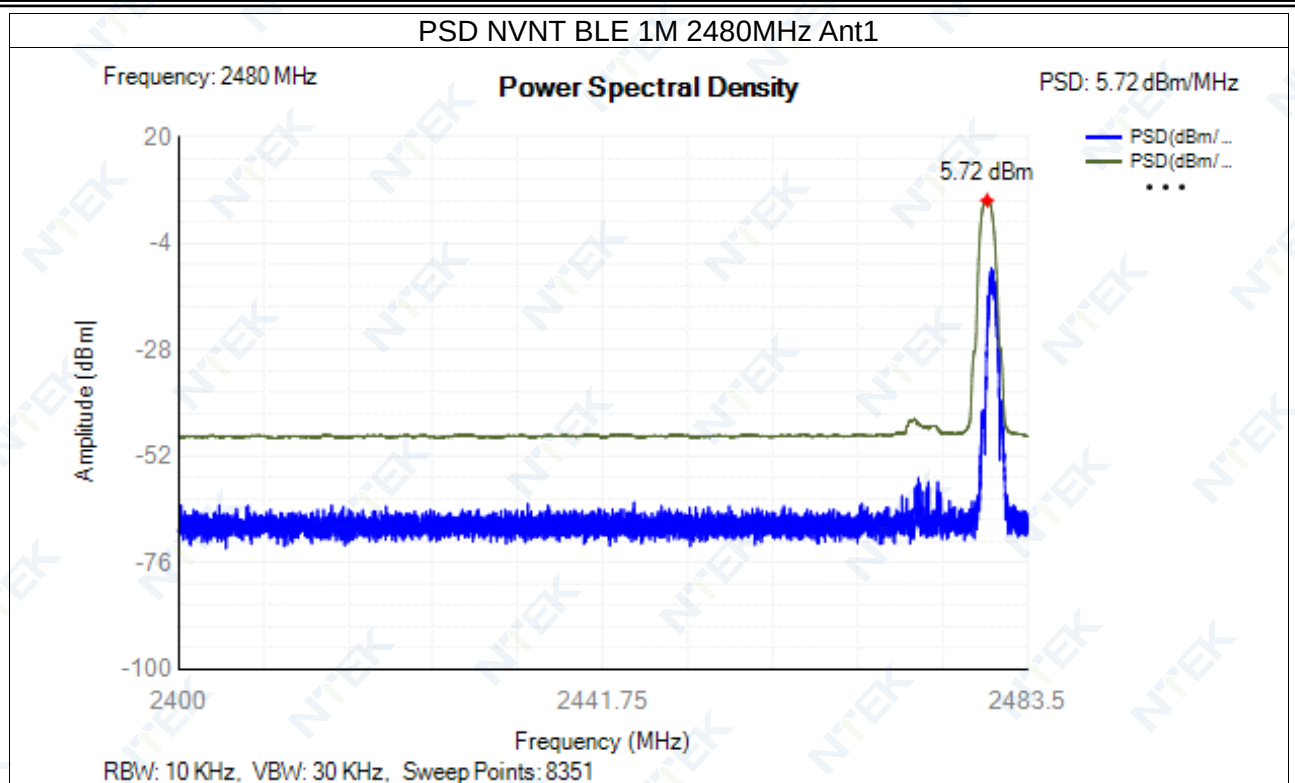
Test Graphs

PSD NVNT BLE 1M 2402MHz Ant1



PSD NVNT BLE 1M 2440MHz Ant1



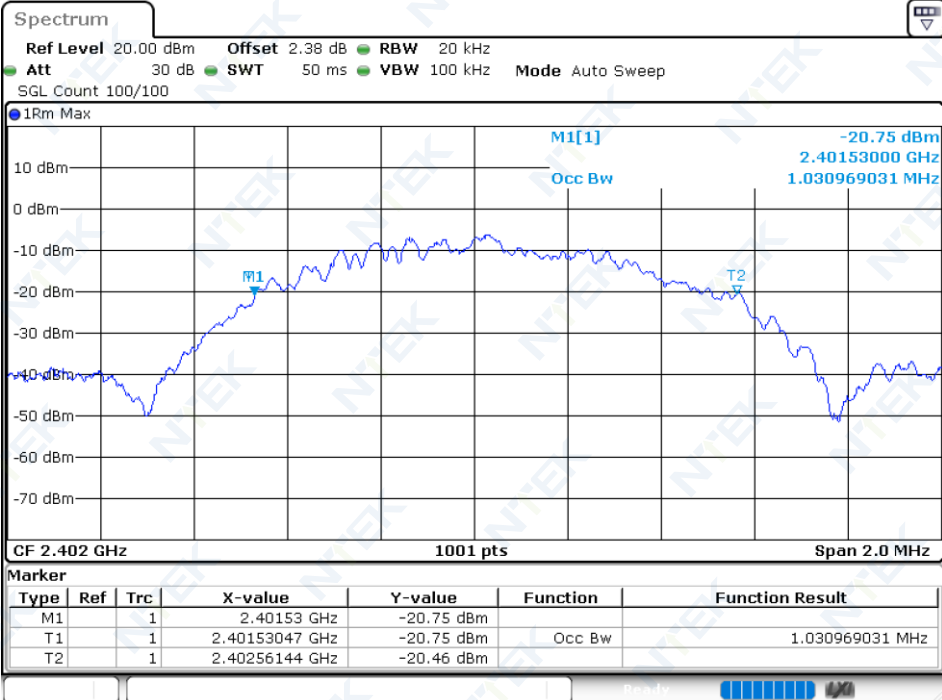


4.1.3 Occupied Channel Bandwidth

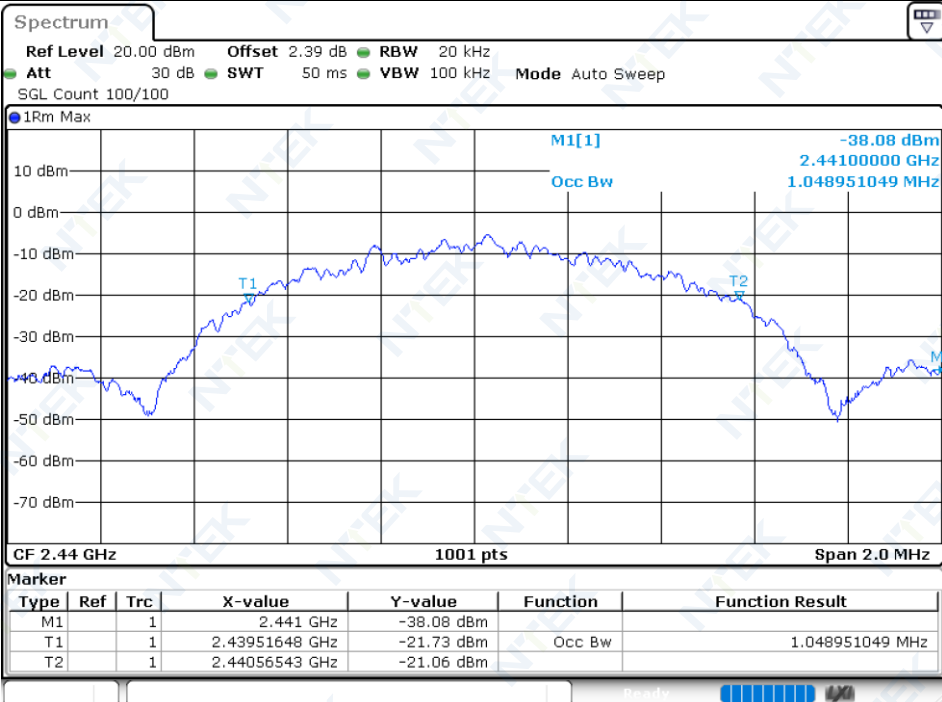
Condition	Mode	Frequency (MHz)	Antenna	Center Frequency (MHz)	OBW (MHz)	Lower Edge (MHz)	Upper Edge (MHz)	Limit OBW (MHz)	Verdict
NVNT	BLE 1M	2402	Ant1	2402.046	1.031	2401.53	2402.561	2400 - 2483.5MHz	Pass
NVNT	BLE 1M	2440	Ant1	2440.041	1.049	2439.516	2440.565	2400 - 2483.5MHz	Pass
NVNT	BLE 1M	2480	Ant1	2480.047	1.029	2479.532	2480.561	2400 - 2483.5MHz	Pass

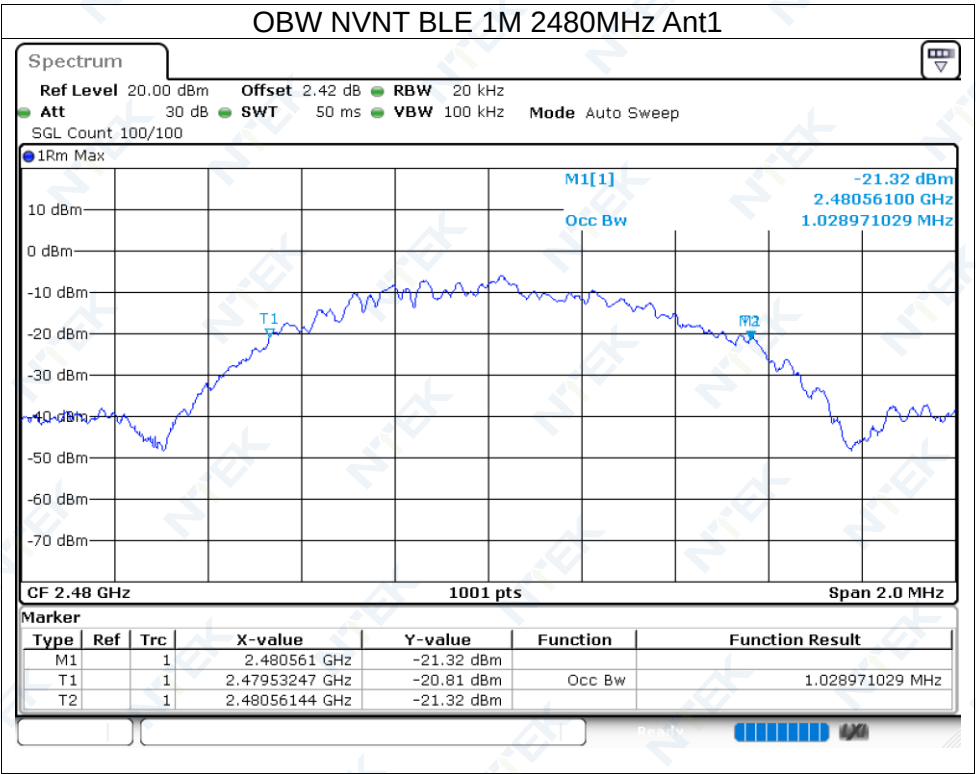
Test Graphs

OBW NVNT BLE 1M 2402MHz Ant1



OBW NVNT BLE 1M 2440MHz Ant1



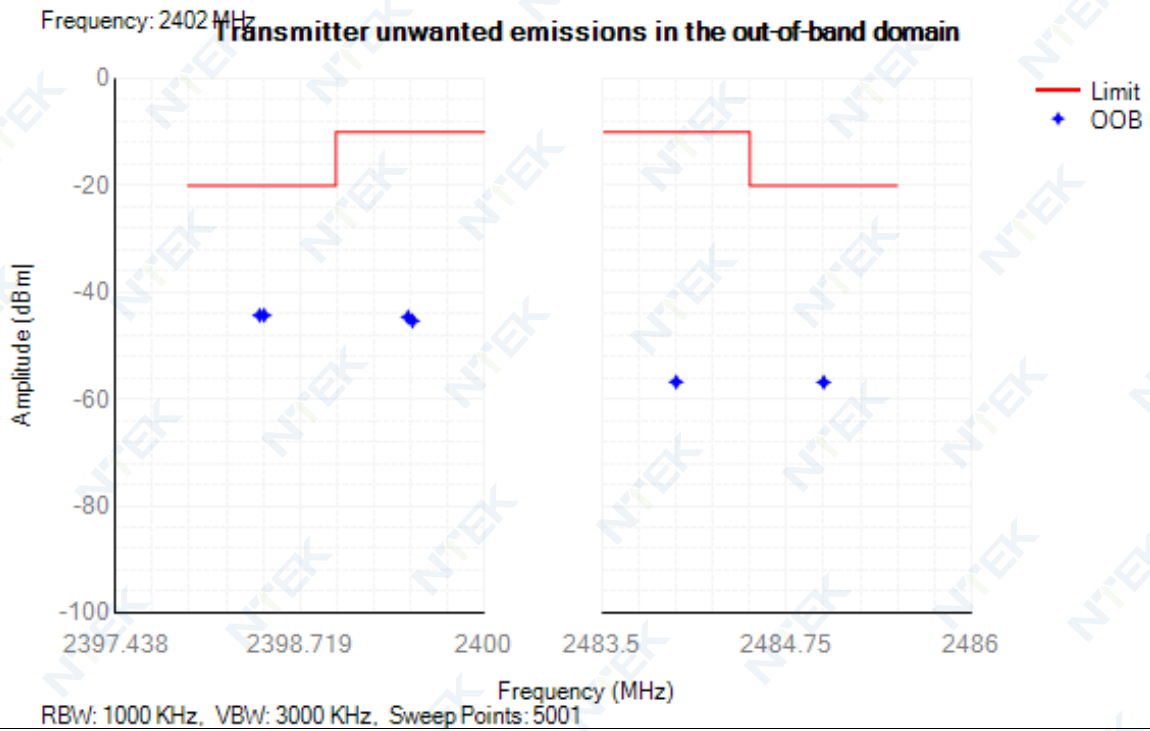


4.1.4 Transmitter unwanted emissions in the out-of-band domain

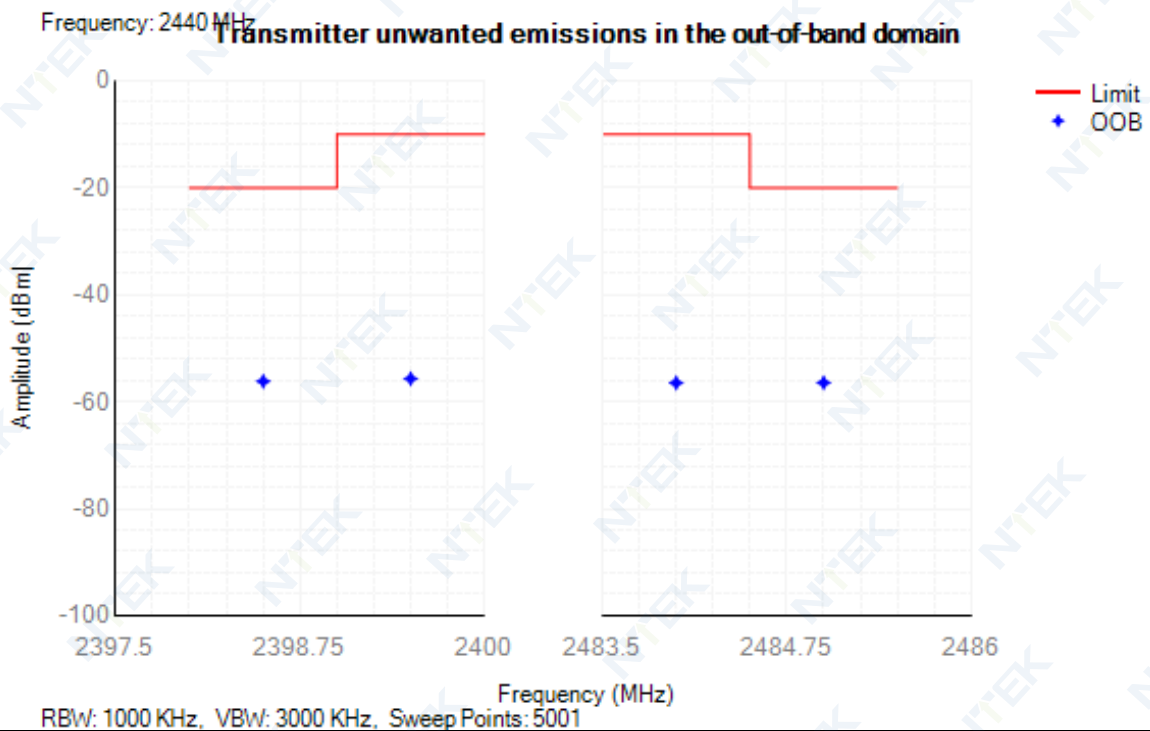
Condition	Mode	Frequency (MHz)	Antenna	OOB Frequency (MHz)	Level (dBm/MHz)	Limit (dBm/MHz)	Verdict
NVNT	BLE 1M	2402	Ant1	2399.5	-45.35	-10	Pass
NVNT	BLE 1M	2402	Ant1	2399.469	-44.63	-10	Pass
NVNT	BLE 1M	2402	Ant1	2398.469	-44.29	-20	Pass
NVNT	BLE 1M	2402	Ant1	2398.438	-44.3	-20	Pass
NVNT	BLE 1M	2402	Ant1	2484	-56.78	-10	Pass
NVNT	BLE 1M	2402	Ant1	2485	-56.83	-20	Pass
NVNT	BLE 1M	2440	Ant1	2399.5	-55.69	-10	Pass
NVNT	BLE 1M	2440	Ant1	2398.5	-56.17	-20	Pass
NVNT	BLE 1M	2440	Ant1	2484	-56.47	-10	Pass
NVNT	BLE 1M	2440	Ant1	2485	-56.44	-20	Pass
NVNT	BLE 1M	2480	Ant1	2399.5	-55.55	-10	Pass
NVNT	BLE 1M	2480	Ant1	2398.5	-56.72	-20	Pass
NVNT	BLE 1M	2480	Ant1	2484	-46.47	-10	Pass
NVNT	BLE 1M	2480	Ant1	2484.029	-46.65	-10	Pass
NVNT	BLE 1M	2480	Ant1	2485.029	-51.75	-20	Pass
NVNT	BLE 1M	2480	Ant1	2485.058	-51.81	-20	Pass

Test Graphs

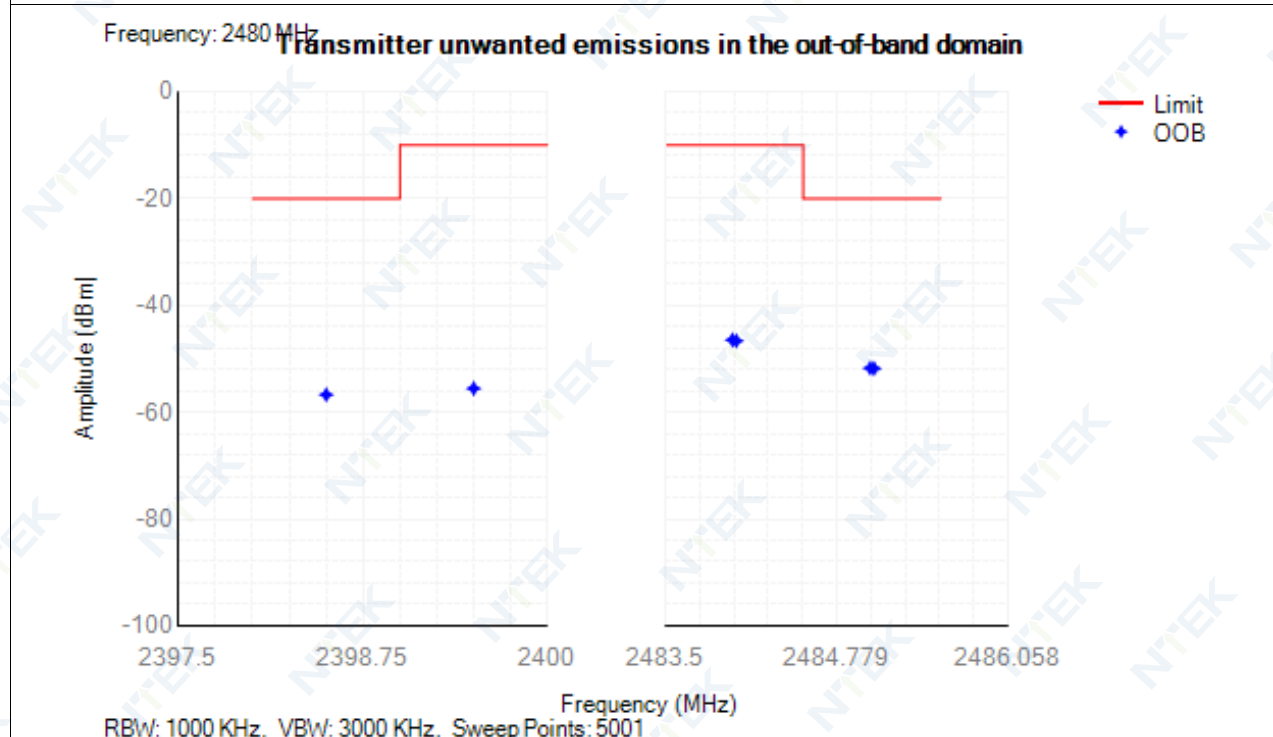
Tx. Emissions OOB NVNT BLE 1M 2402MHz Ant1



Tx. Emissions OOB NVNT BLE 1M 2440MHz Ant1



Tx. Emissions OOB NVNT BLE 1M 2480MHz Ant1



4.1.5 Transmitter unwanted emissions in the spurious domain

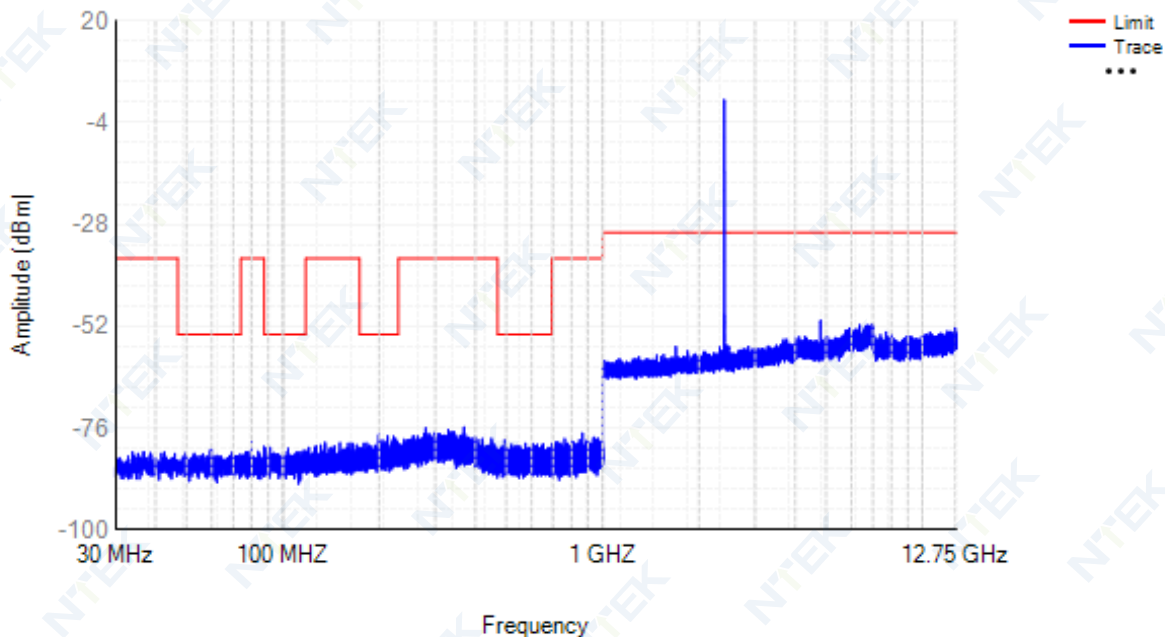
Condition	Mode	Frequency (MHz)	Antenna	Range (MHz)	Spur Freq (MHz)	Peak (dBm)	RMS (dBm)	Limit (dBm)	Verdict
NVNT	BLE 1M	2402	Ant1	30 -47	36.70	-81.56	NA	-36	Pass
NVNT	BLE 1M	2402	Ant1	47 -74	59.85	-80.98	NA	-54	Pass
NVNT	BLE 1M	2402	Ant1	74 -87.5	80.00	-79.32	NA	-36	Pass
NVNT	BLE 1M	2402	Ant1	87.5 -118	91.30	-80.52	NA	-54	Pass
NVNT	BLE 1M	2402	Ant1	118 -174	135.60	-79.38	NA	-36	Pass
NVNT	BLE 1M	2402	Ant1	174 -230	199.55	-77.54	NA	-54	Pass
NVNT	BLE 1M	2402	Ant1	230 -470	368.60	-75.74	NA	-36	Pass
NVNT	BLE 1M	2402	Ant1	470 -694	493.95	-78.72	NA	-54	Pass
NVNT	BLE 1M	2402	Ant1	694 -1000	865.10	-77.17	NA	-36	Pass
NVNT	BLE 1M	2402	Ant1	1000 -2398	2396.50	-49.29	NA	-30	Pass
NVNT	BLE 1M	2402	Ant1	2485.5 -12750	4803.50	-50.67	NA	-30	Pass
NVNT	BLE 1M	2440	Ant1	30 -47	39.95	-80.38	NA	-36	Pass
NVNT	BLE 1M	2440	Ant1	47 -74	55.50	-81.37	NA	-54	Pass
NVNT	BLE 1M	2440	Ant1	74 -87.5	79.95	-79.60	NA	-36	Pass
NVNT	BLE 1M	2440	Ant1	87.5 -118	91.70	-80.68	NA	-54	Pass
NVNT	BLE 1M	2440	Ant1	118 -174	120.00	-78.21	NA	-36	Pass
NVNT	BLE 1M	2440	Ant1	174 -230	206.15	-78.45	NA	-54	Pass
NVNT	BLE 1M	2440	Ant1	230 -470	346.45	-75.07	NA	-36	Pass
NVNT	BLE 1M	2440	Ant1	470 -694	528.55	-78.69	NA	-54	Pass
NVNT	BLE 1M	2440	Ant1	694 -1000	978.80	-78.25	NA	-36	Pass
NVNT	BLE 1M	2440	Ant1	1000 -2398	2363.00	-57.28	NA	-30	Pass
NVNT	BLE 1M	2440	Ant1	2485.5 -12750	6881.50	-50.73	NA	-30	Pass
NVNT	BLE 1M	2480	Ant1	30 -47	32.95	-80.69	NA	-36	Pass
NVNT	BLE 1M	2480	Ant1	47 -74	71.65	-80.60	NA	-54	Pass
NVNT	BLE 1M	2480	Ant1	74 -87.5	80.00	-79.16	NA	-36	Pass
NVNT	BLE 1M	2480	Ant1	87.5 -118	97.60	-79.88	NA	-54	Pass
NVNT	BLE 1M	2480	Ant1	118 -174	142.00	-78.85	NA	-36	Pass
NVNT	BLE 1M	2480	Ant1	174 -230	210.10	-78.38	NA	-54	Pass
NVNT	BLE 1M	2480	Ant1	230 -470	320.00	-75.84	NA	-36	Pass
NVNT	BLE 1M	2480	Ant1	470 -694	668.55	-79.40	NA	-54	Pass
NVNT	BLE 1M	2480	Ant1	694 -1000	880.25	-77.60	NA	-36	Pass
NVNT	BLE 1M	2480	Ant1	1000 -2398	2283.00	-58.12	NA	-30	Pass
NVNT	BLE 1M	2480	Ant1	2485.5 -12750	4960.50	-50.54	NA	-30	Pass

Test Graphs

Tx. Spurious NVNT BLE 1M 2402MHz Ant1

Frequency: 2402 MHz

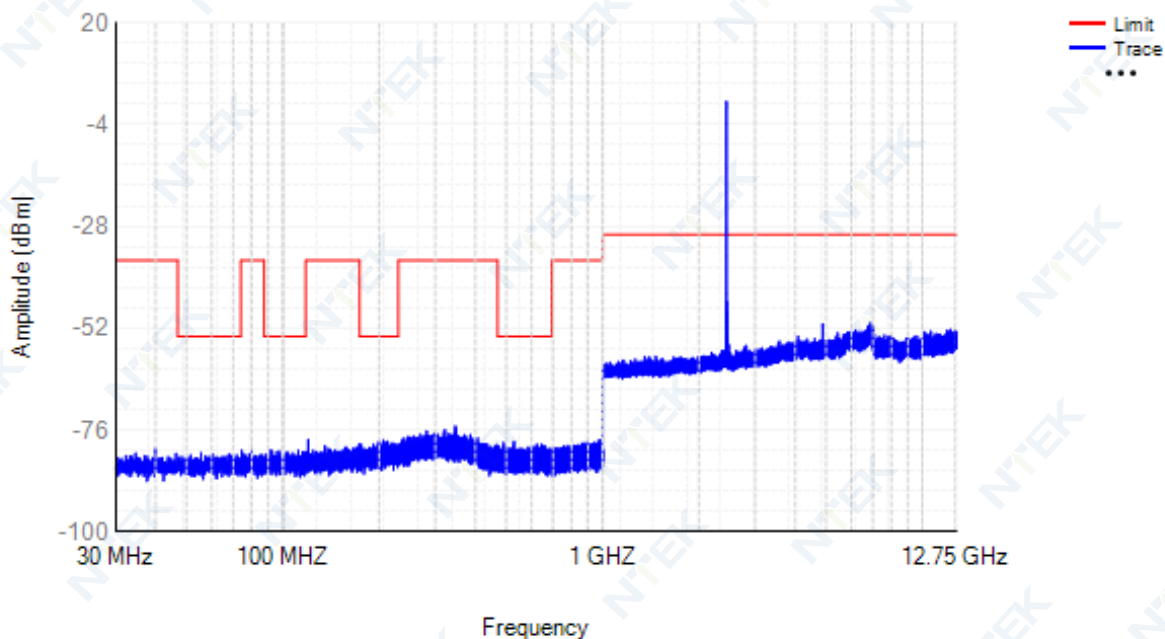
Transmitter unwanted emissions in the spurious domain



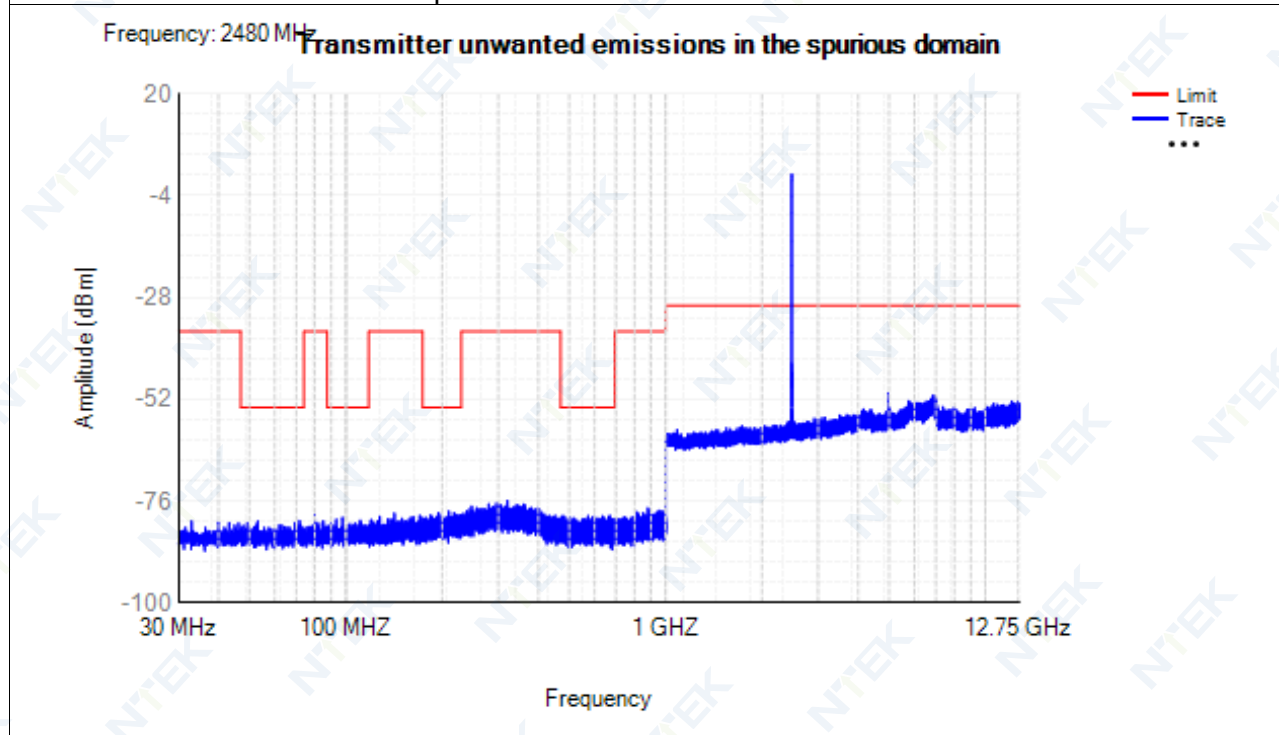
Tx. Spurious NVNT BLE 1M 2440MHz Ant1

Frequency: 2440 MHz

Transmitter unwanted emissions in the spurious domain



Tx. Spurious NVNT BLE 1M 2480MHz Ant1

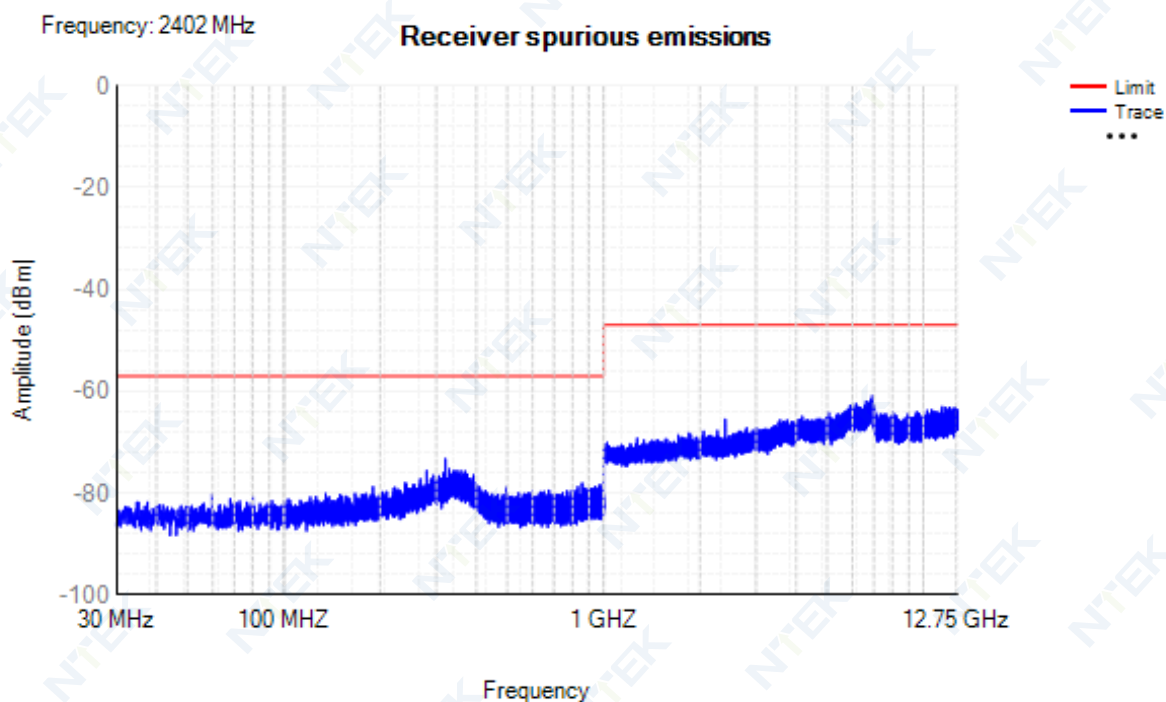


4.1.6 Receiver spurious emissions

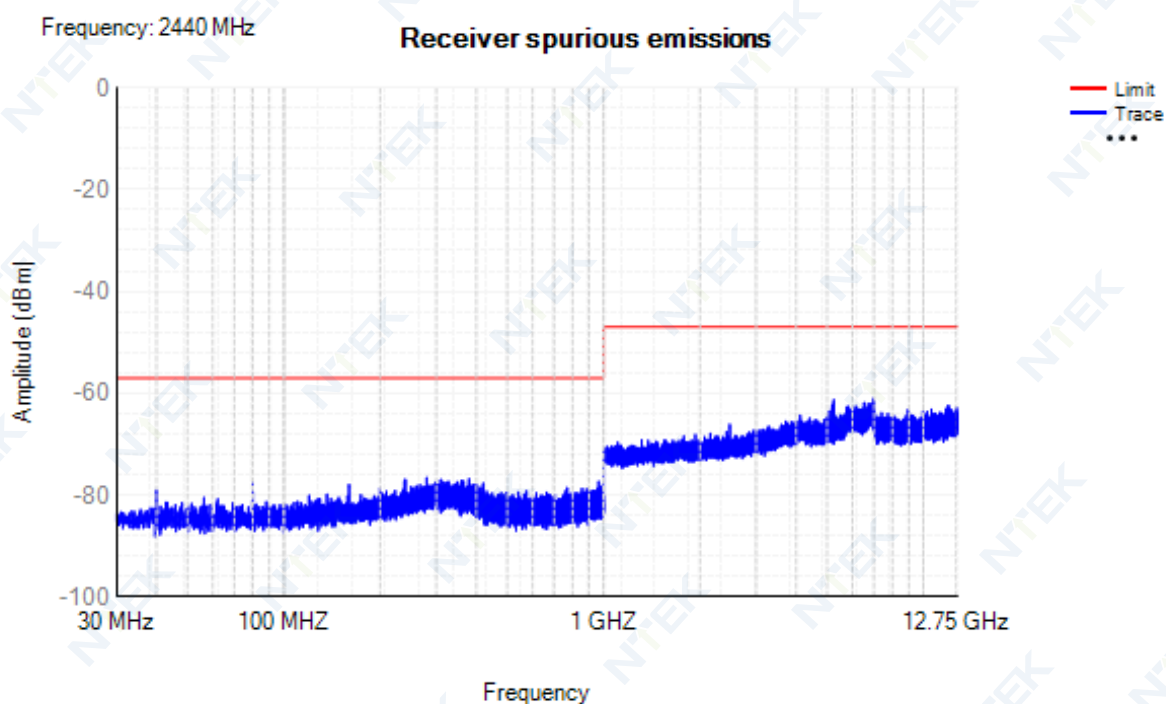
Condition	Mode	Frequency (MHz)	Antenna	Range (MHz)	Spur Freq (MHz)	Peak (dBm)	RMS (dBm)	Limit (dBm)	Verdict
NVNT	BLE 1M	2402	Ant1	30 -1000	320.05	-73.31	NA	-57	Pass
NVNT	BLE 1M	2402	Ant1	1000 -12750	6912	-60.89	NA	-47	Pass
NVNT	BLE 1M	2440	Ant1	30 -1000	280	-76.57	NA	-57	Pass
NVNT	BLE 1M	2440	Ant1	1000 -12750	6937.5	-61.04	NA	-47	Pass
NVNT	BLE 1M	2480	Ant1	30 -1000	320.05	-73.96	NA	-57	Pass
NVNT	BLE 1M	2480	Ant1	1000 -12750	6967	-60.73	NA	-47	Pass

Test Graphs

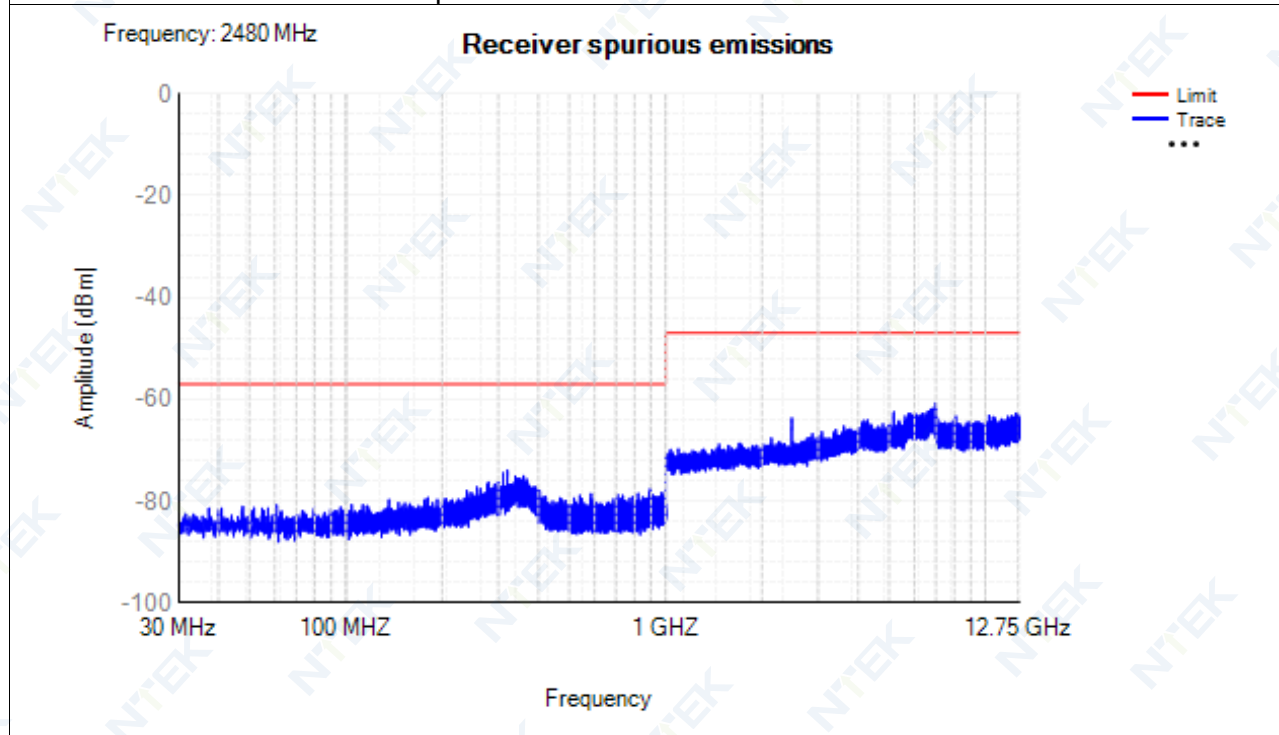
Rx. Spurious NVNT BLE 1M 2402MHz Ant1



Rx. Spurious NVNT BLE 1M 2440MHz Ant1



Rx. Spurious NVNT BLE 1M 2480MHz Ant1



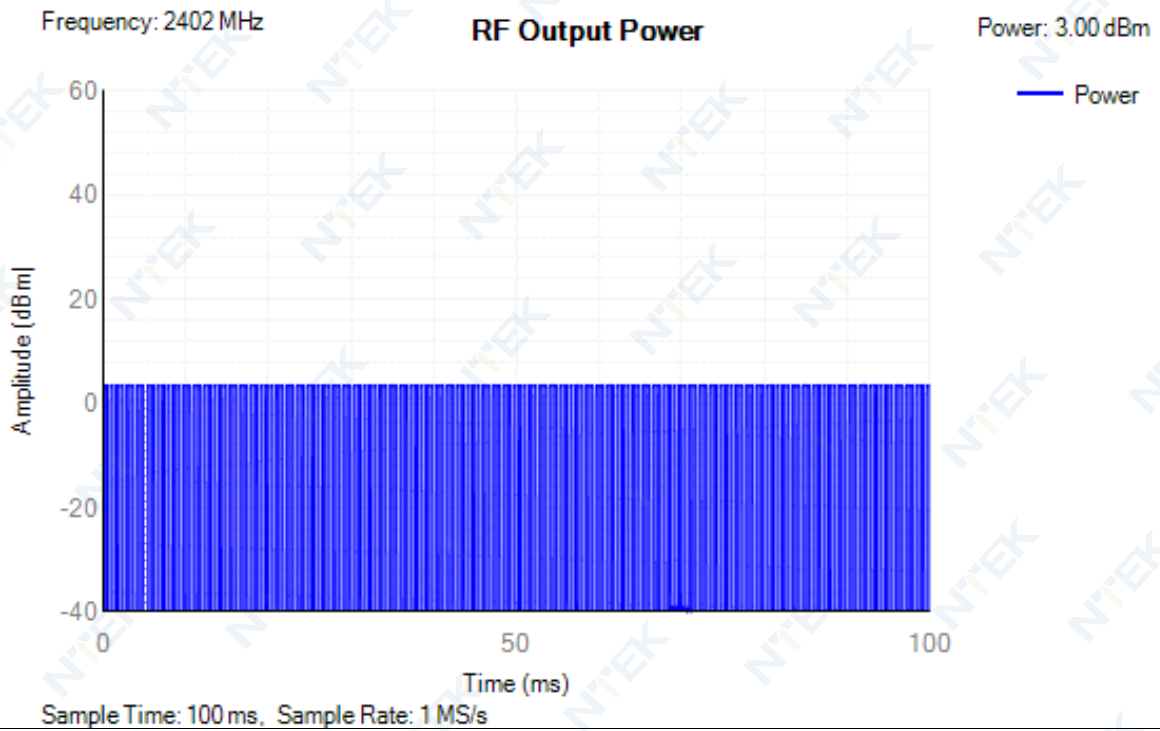
4.2 2M

4.2.1 RF Output Power

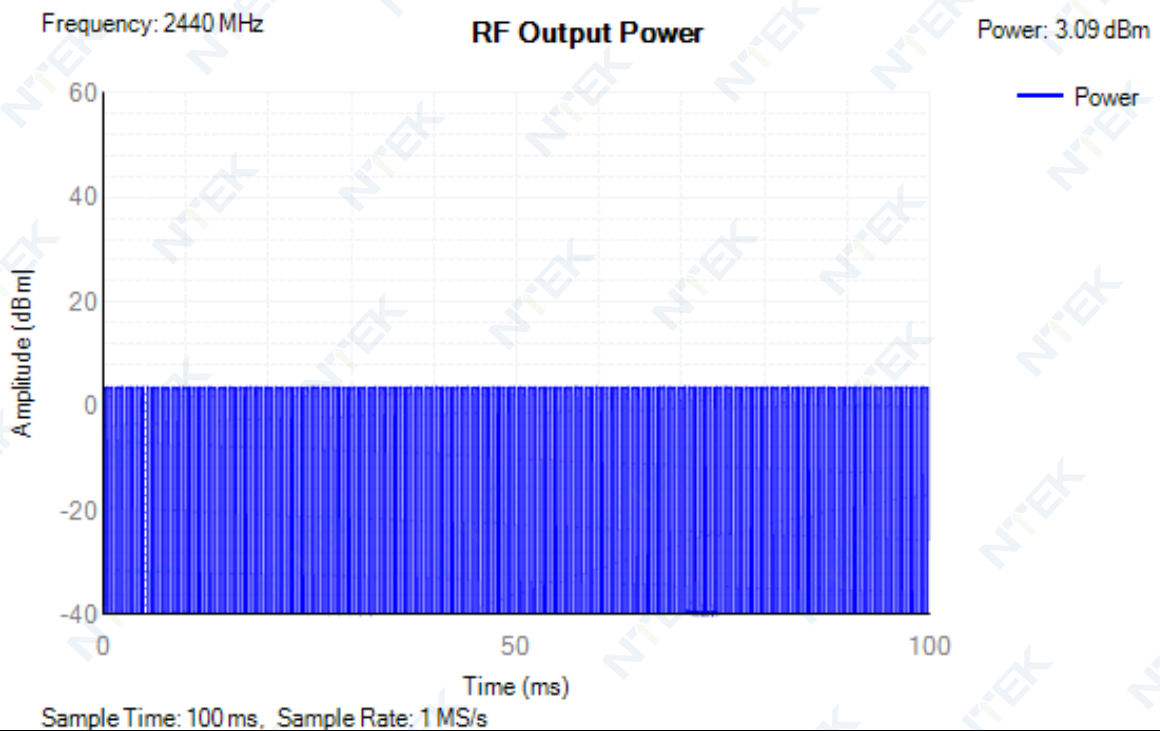
Condition	Mode	Frequency (MHz)	Antenna	Max Burst RMS Power (dBm)	Burst Number	Max EIRP (dBm)	Limit (dBm)	Verdict
NVNT	BLE 2M	2402	Ant1	3	156	5.81	20	Pass
NVNT	BLE 2M	2440	Ant1	3.09	164	5.9	20	Pass
NVNT	BLE 2M	2480	Ant1	2.65	156	5.46	20	Pass
NVLT	BLE 2M	2402	Ant1	2.92	156	5.73	20	Pass
NVLT	BLE 2M	2440	Ant1	3.06	164	5.87	20	Pass
NVLT	BLE 2M	2480	Ant1	2.45	156	5.26	20	Pass
NVHT	BLE 2M	2402	Ant1	2.87	156	5.68	20	Pass
NVHT	BLE 2M	2440	Ant1	3.03	164	5.84	20	Pass
NVHT	BLE 2M	2480	Ant1	2.45	156	5.26	20	Pass

Test Graphs

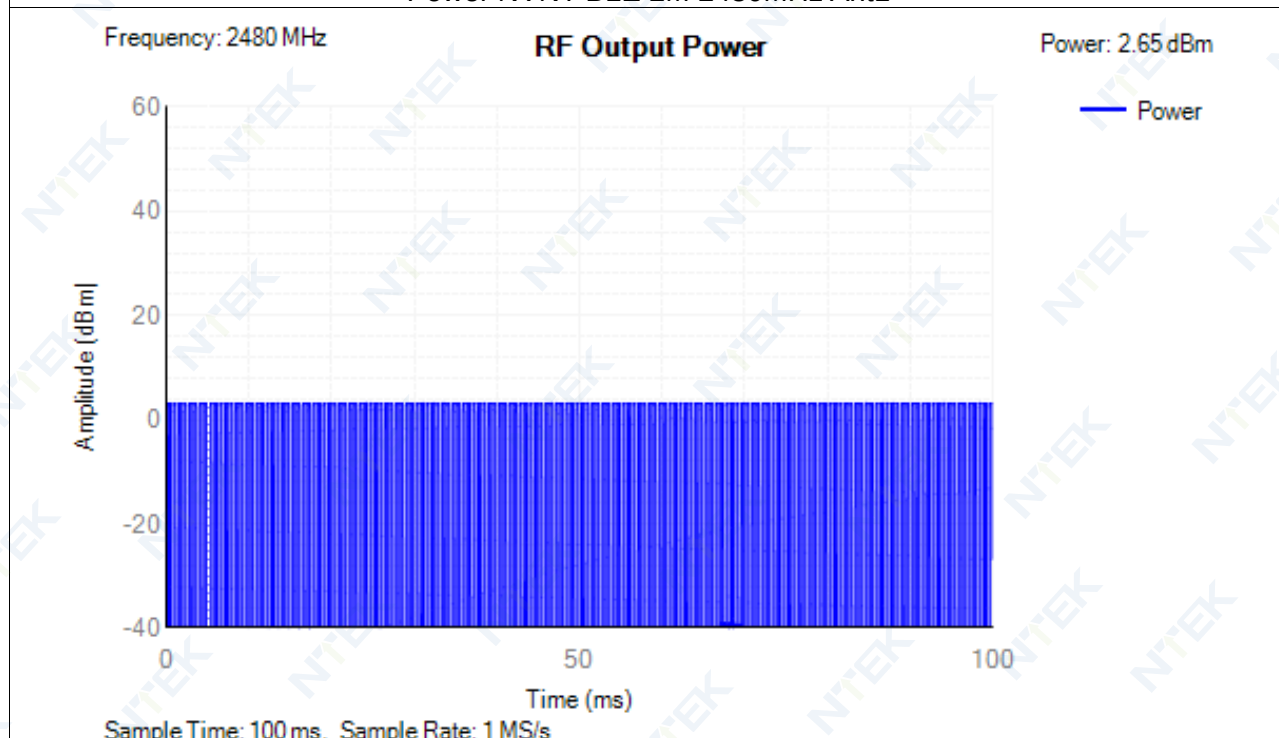
Power NVNT BLE 2M 2402MHz Ant1



Power NVNT BLE 2M 2440MHz Ant1



Power NVNT BLE 2M 2480MHz Ant1

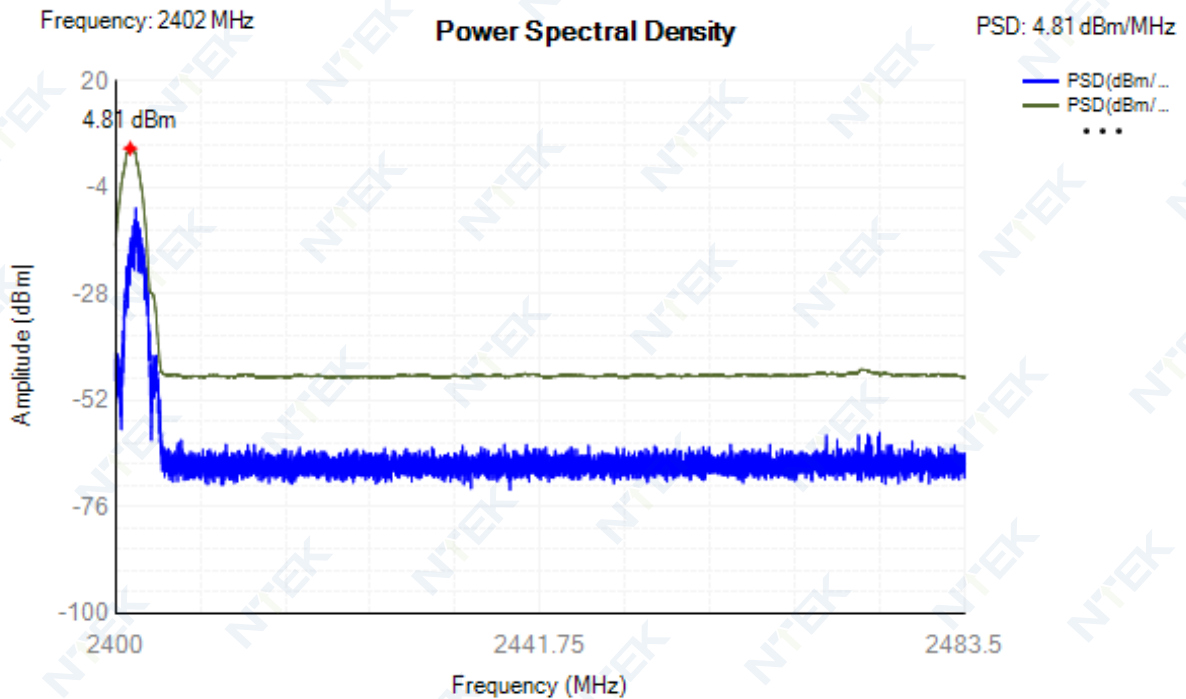


4.2.2 Power Spectral Density

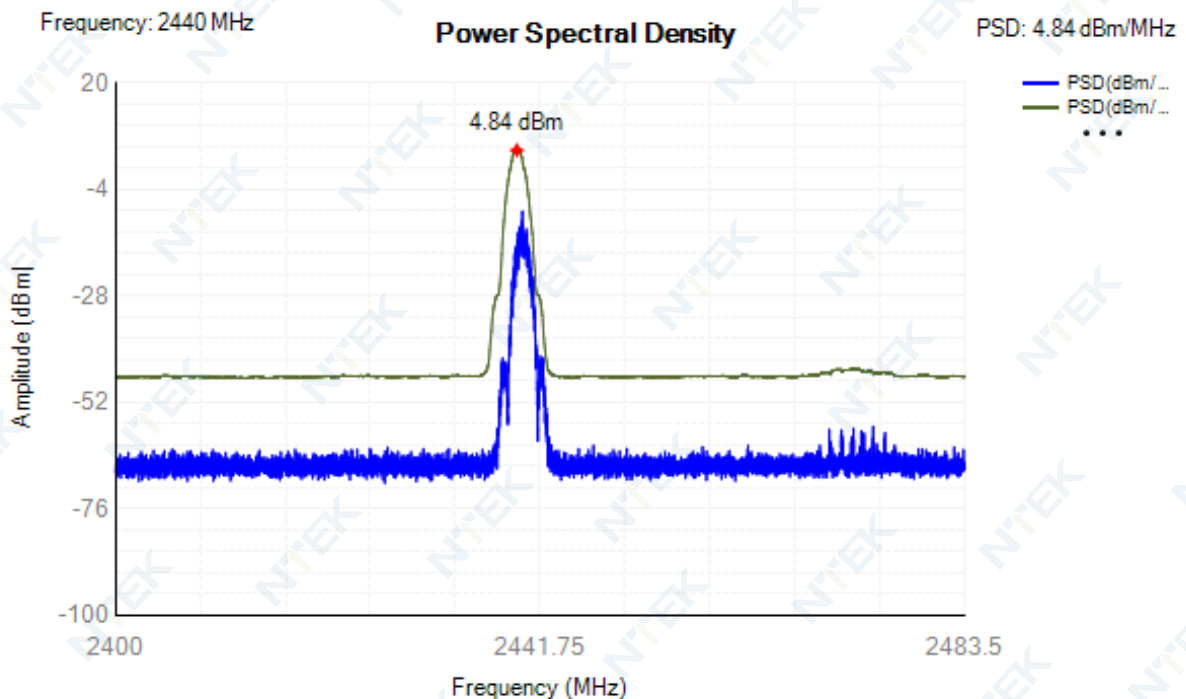
Condition	Mode	Frequency (MHz)	Antenna	Max PSD (dBm/MHz)	Limit (dBm/MHz)	Verdict
NVNT	BLE 2M	2402	Ant1	4.81	10	Pass
NVNT	BLE 2M	2440	Ant1	4.84	10	Pass
NVNT	BLE 2M	2480	Ant1	4.47	10	Pass

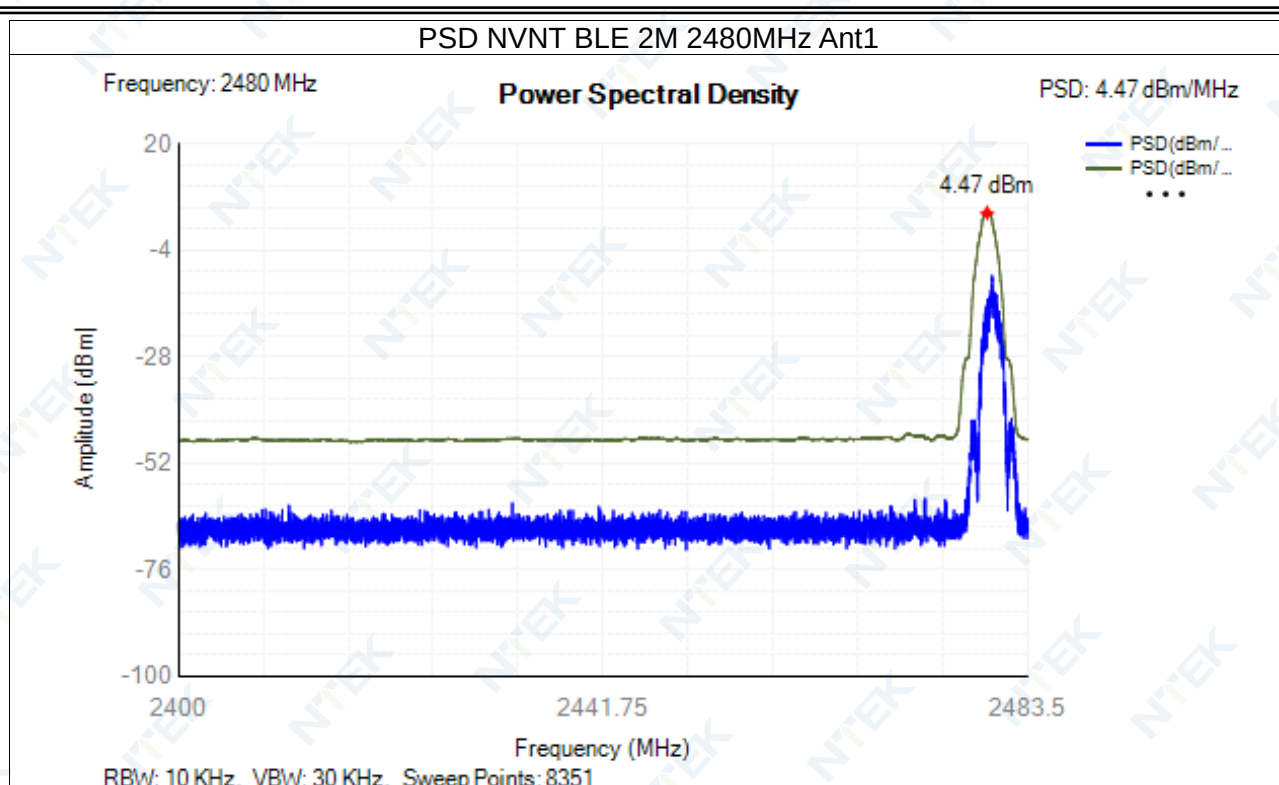
Test Graphs

PSD NVNT BLE 2M 2402MHz Ant1



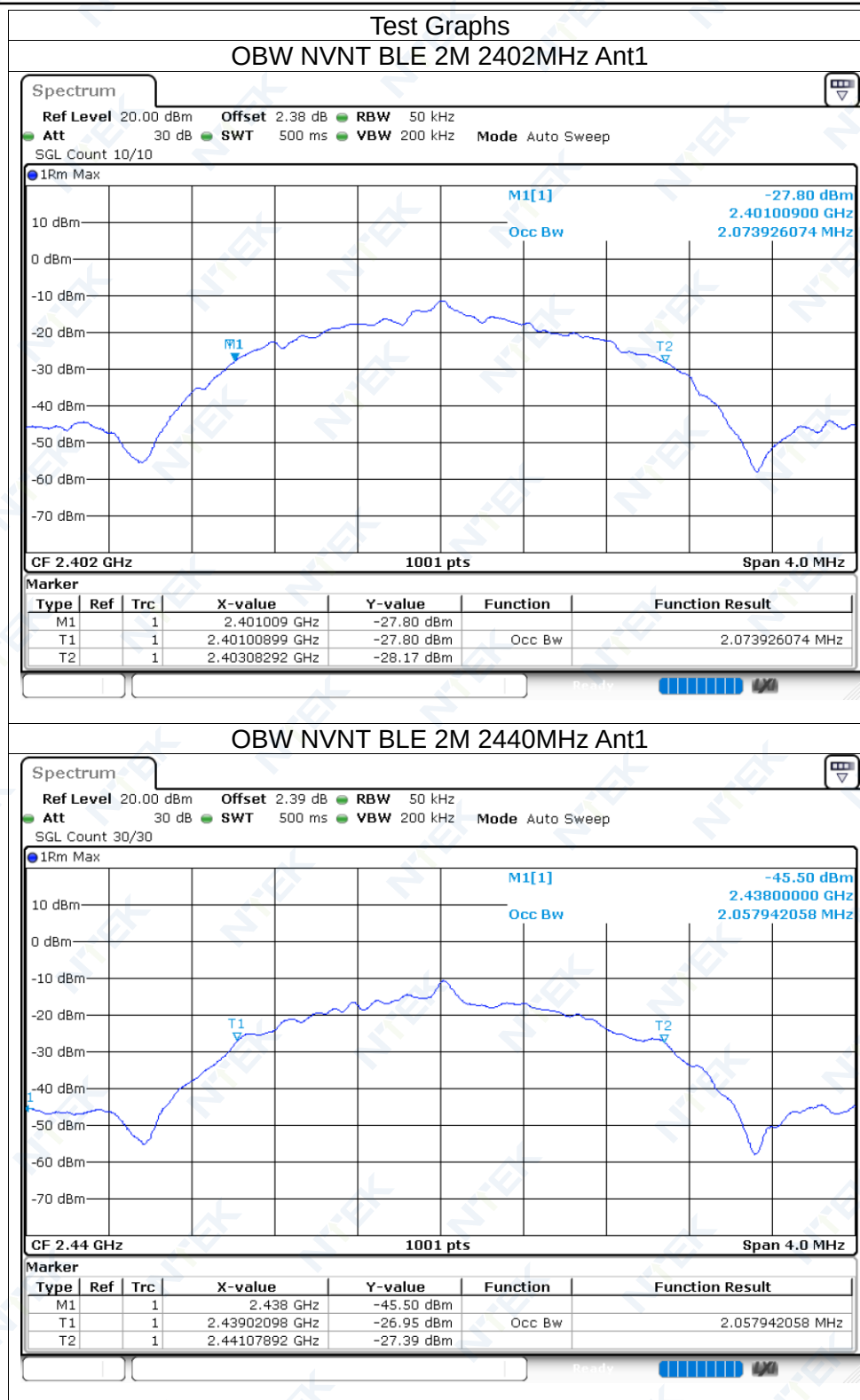
PSD NVNT BLE 2M 2440MHz Ant1

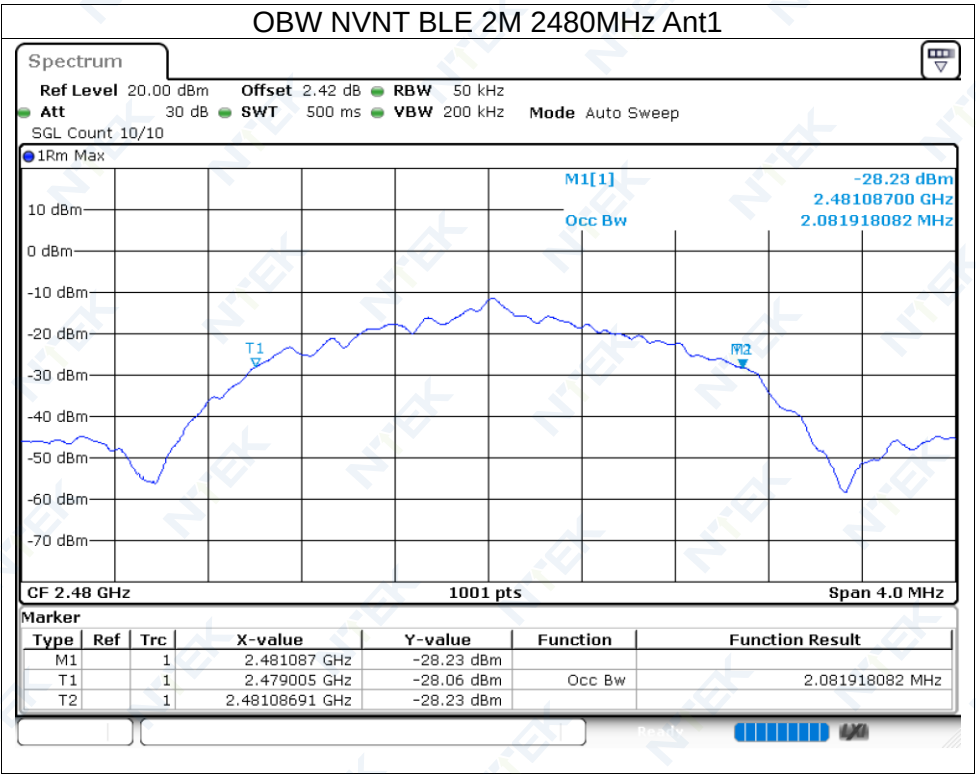




4.2.3 Occupied Channel Bandwidth

Condition	Mode	Frequency (MHz)	Antenna	Center Frequency (MHz)	OBW (MHz)	Lower Edge (MHz)	Upper Edge (MHz)	Limit OBW (MHz)	Verdict
NVNT	BLE 2M	2402	Ant1	2402.046	2.074	2401.009	2403.083	2400 - 2483.5MHz	Pass
NVNT	BLE 2M	2440	Ant1	2440.05	2.058	2439.021	2441.079	2400 - 2483.5MHz	Pass
NVNT	BLE 2M	2480	Ant1	2480.046	2.082	2479.005	2481.087	2400 - 2483.5MHz	Pass



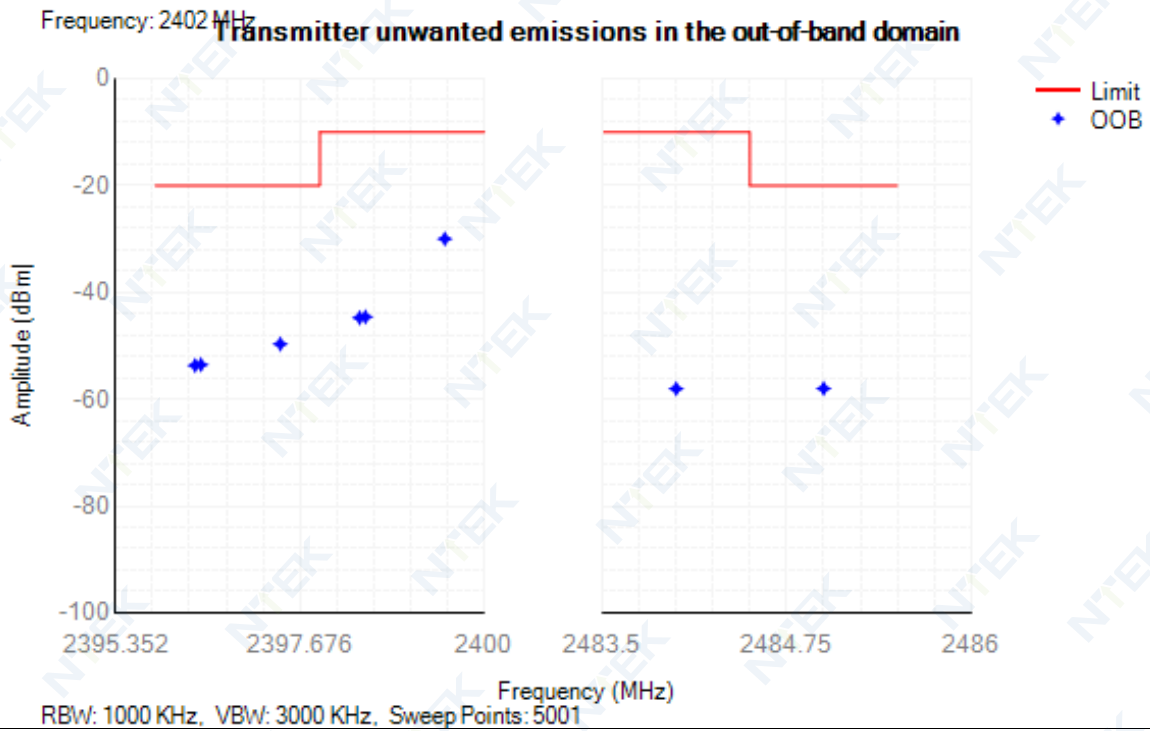


4.2.4 Transmitter unwanted emissions in the out-of-band domain

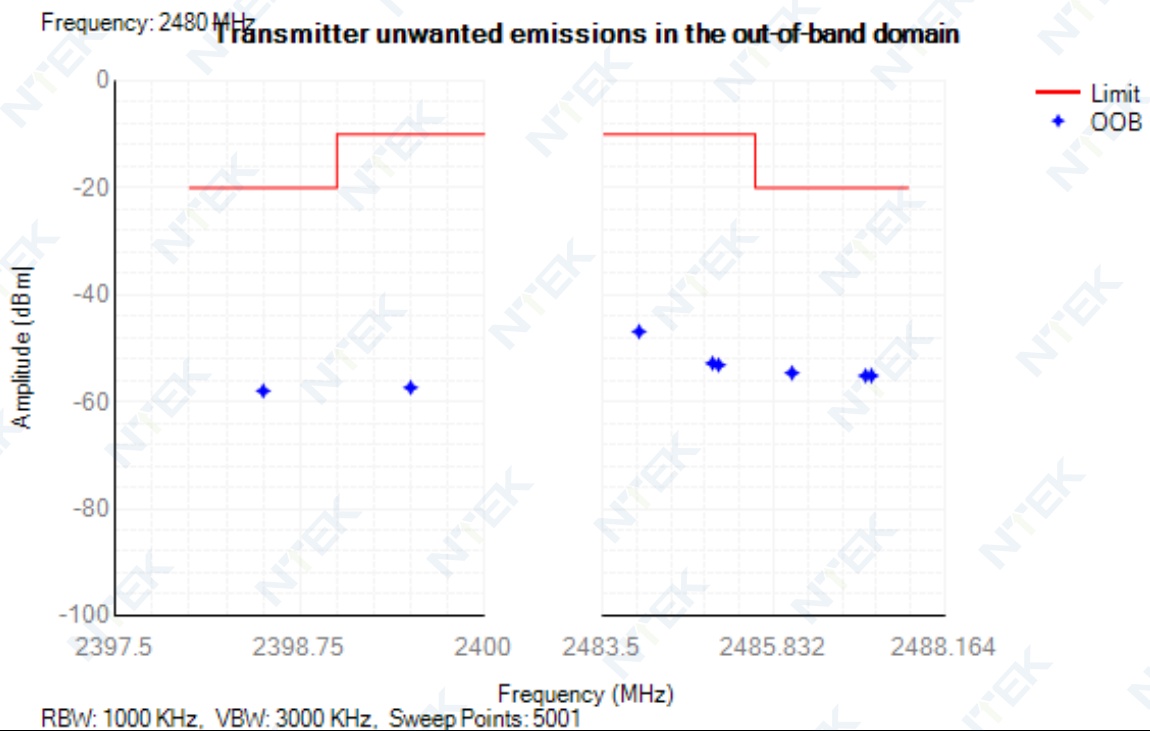
Condition	Mode	Frequency (MHz)	Antenna	OOB Frequency (MHz)	Level (dBm/MHz)	Limit (dBm/MHz)	Verdict
NVNT	BLE 2M	2402	Ant1	2399.5	-29.99	-10	Pass
NVNT	BLE 2M	2402	Ant1	2398.5	-44.6	-10	Pass
NVNT	BLE 2M	2402	Ant1	2398.426	-44.75	-10	Pass
NVNT	BLE 2M	2402	Ant1	2397.426	-49.67	-20	Pass
NVNT	BLE 2M	2402	Ant1	2396.426	-53.54	-20	Pass
NVNT	BLE 2M	2402	Ant1	2396.352	-53.67	-20	Pass
NVNT	BLE 2M	2402	Ant1	2484	-58.04	-10	Pass
NVNT	BLE 2M	2402	Ant1	2485	-58	-20	Pass
NVNT	BLE 2M	2480	Ant1	2399.5	-57.35	-10	Pass
NVNT	BLE 2M	2480	Ant1	2398.5	-57.98	-20	Pass
NVNT	BLE 2M	2480	Ant1	2484	-46.89	-10	Pass
NVNT	BLE 2M	2480	Ant1	2485	-52.81	-10	Pass
NVNT	BLE 2M	2480	Ant1	2485.082	-53.13	-10	Pass
NVNT	BLE 2M	2480	Ant1	2486.082	-54.61	-20	Pass
NVNT	BLE 2M	2480	Ant1	2487.082	-55.14	-20	Pass
NVNT	BLE 2M	2480	Ant1	2487.164	-55.13	-20	Pass

Test Graphs

Tx. Emissions OOB NVNT BLE 2M 2402MHz Ant1



Tx. Emissions OOB NVNT BLE 2M 2480MHz Ant1

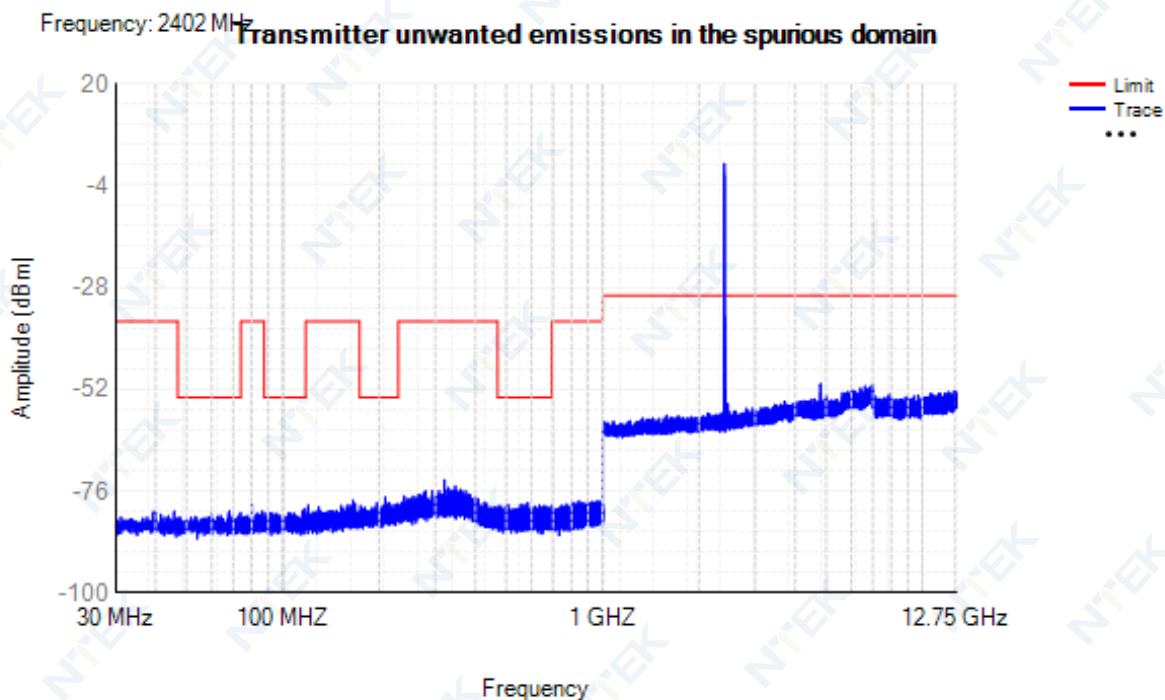


4.2.5 Transmitter unwanted emissions in the spurious domain

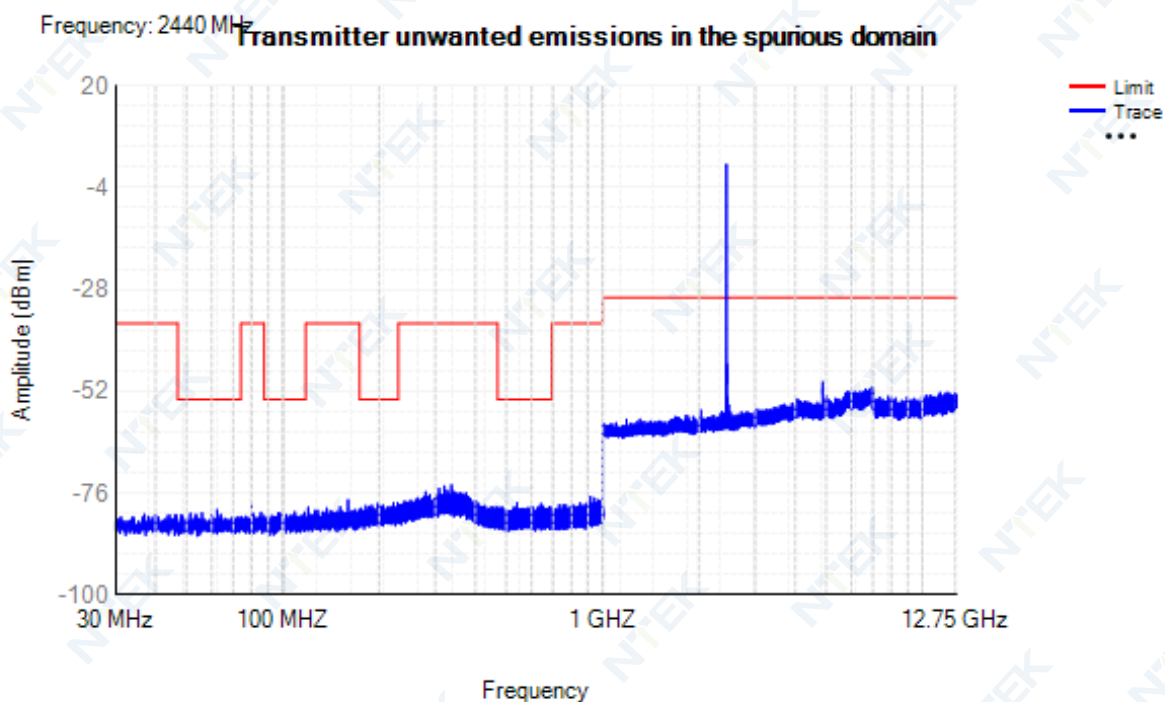
Condition	Mode	Frequency (MHz)	Antenna	Range (MHz)	Spur Freq (MHz)	Peak (dBm)	RMS (dBm)	Limit (dBm)	Verdict
NVNT	BLE 2M	2402	Ant1	30 -47	39.50	-80.80	NA	-36	Pass
NVNT	BLE 2M	2402	Ant1	47 -74	68.10	-80.72	NA	-54	Pass
NVNT	BLE 2M	2402	Ant1	74 -87.5	80.05	-79.26	NA	-36	Pass
NVNT	BLE 2M	2402	Ant1	87.5 -118	117.25	-80.17	NA	-54	Pass
NVNT	BLE 2M	2402	Ant1	118 -174	165.90	-78.12	NA	-36	Pass
NVNT	BLE 2M	2402	Ant1	174 -230	209.20	-77.47	NA	-54	Pass
NVNT	BLE 2M	2402	Ant1	230 -470	320.00	-73.35	NA	-36	Pass
NVNT	BLE 2M	2402	Ant1	470 -694	583.15	-78.71	NA	-54	Pass
NVNT	BLE 2M	2402	Ant1	694 -1000	842.65	-78.29	NA	-36	Pass
NVNT	BLE 2M	2402	Ant1	1000 -2396	2393.50	-52.85	NA	-30	Pass
NVNT	BLE 2M	2402	Ant1	2487.5 -12750	4803.00	-50.73	NA	-30	Pass
NVNT	BLE 2M	2440	Ant1	30 -47	36.95	-80.96	NA	-36	Pass
NVNT	BLE 2M	2440	Ant1	47 -74	62.30	-79.92	NA	-54	Pass
NVNT	BLE 2M	2440	Ant1	74 -87.5	80.00	-78.38	NA	-36	Pass
NVNT	BLE 2M	2440	Ant1	87.5 -118	109.05	-80.40	NA	-54	Pass
NVNT	BLE 2M	2440	Ant1	118 -174	160.00	-77.56	NA	-36	Pass
NVNT	BLE 2M	2440	Ant1	174 -230	228.40	-78.30	NA	-54	Pass
NVNT	BLE 2M	2440	Ant1	230 -470	336.80	-74.08	NA	-36	Pass
NVNT	BLE 2M	2440	Ant1	470 -694	540.85	-78.29	NA	-54	Pass
NVNT	BLE 2M	2440	Ant1	694 -1000	917.50	-76.81	NA	-36	Pass
NVNT	BLE 2M	2440	Ant1	1000 -2396	2025.50	-56.48	NA	-30	Pass
NVNT	BLE 2M	2440	Ant1	2487.5 -12750	4879.00	-49.83	NA	-30	Pass
NVNT	BLE 2M	2480	Ant1	30 -47	39.95	-81.36	NA	-36	Pass
NVNT	BLE 2M	2480	Ant1	47 -74	63.65	-81.56	NA	-54	Pass
NVNT	BLE 2M	2480	Ant1	74 -87.5	80.00	-80.16	NA	-36	Pass
NVNT	BLE 2M	2480	Ant1	87.5 -118	95.85	-80.31	NA	-54	Pass
NVNT	BLE 2M	2480	Ant1	118 -174	163.15	-78.98	NA	-36	Pass
NVNT	BLE 2M	2480	Ant1	174 -230	216.60	-79.32	NA	-54	Pass
NVNT	BLE 2M	2480	Ant1	230 -470	320.00	-74.53	NA	-36	Pass
NVNT	BLE 2M	2480	Ant1	470 -694	575.75	-78.73	NA	-54	Pass
NVNT	BLE 2M	2480	Ant1	694 -1000	897.45	-78.14	NA	-36	Pass
NVNT	BLE 2M	2480	Ant1	1000 -2396	2056.50	-57.70	NA	-30	Pass
NVNT	BLE 2M	2480	Ant1	2487.5 -12750	6784.50	-50.61	NA	-30	Pass

Test Graphs

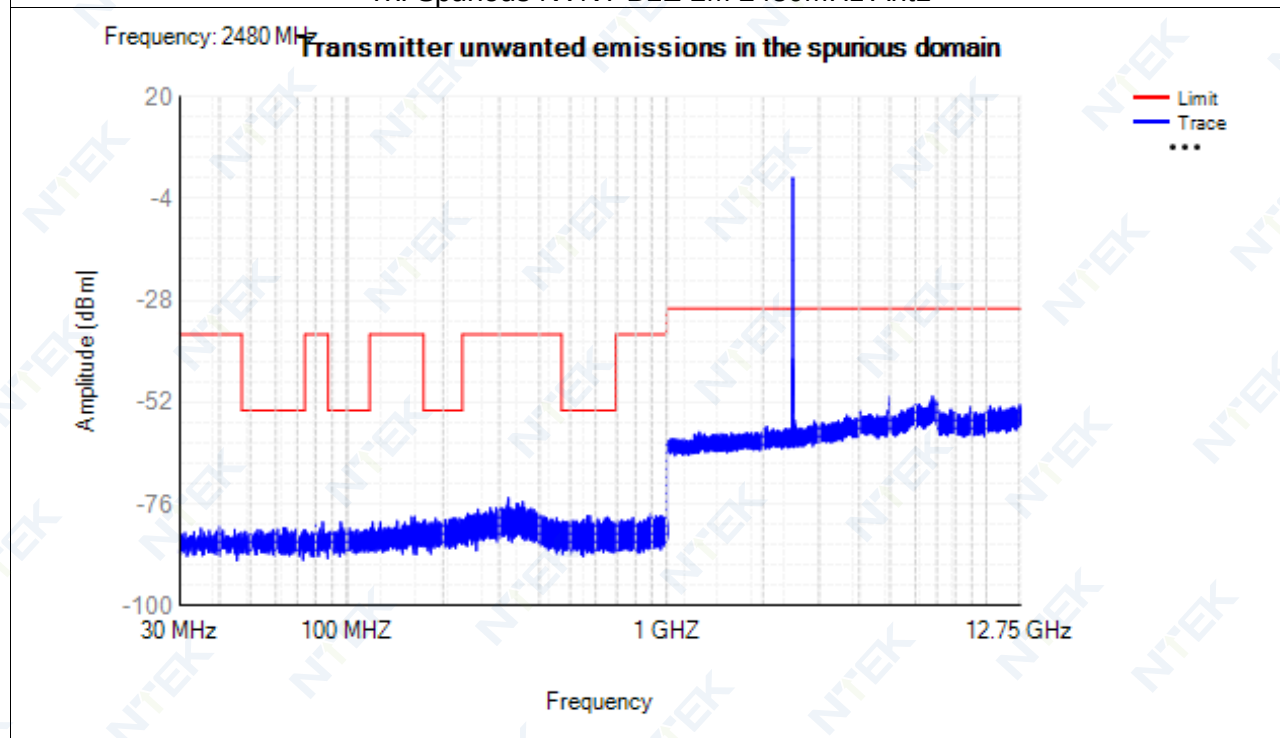
Tx. Spurious NVNT BLE 2M 2402MHz Ant1



Tx. Spurious NVNT BLE 2M 2440MHz Ant1



Tx. Spurious NVNT BLE 2M 2480MHz Ant1

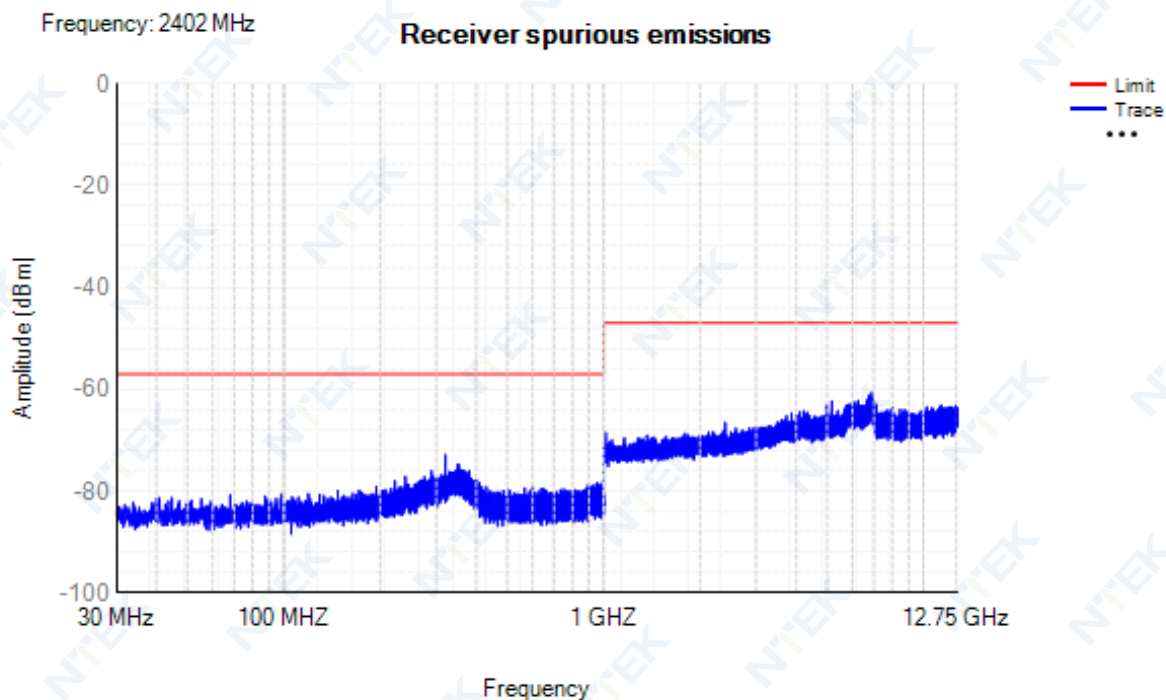


4.2.6 Receiver spurious emissions

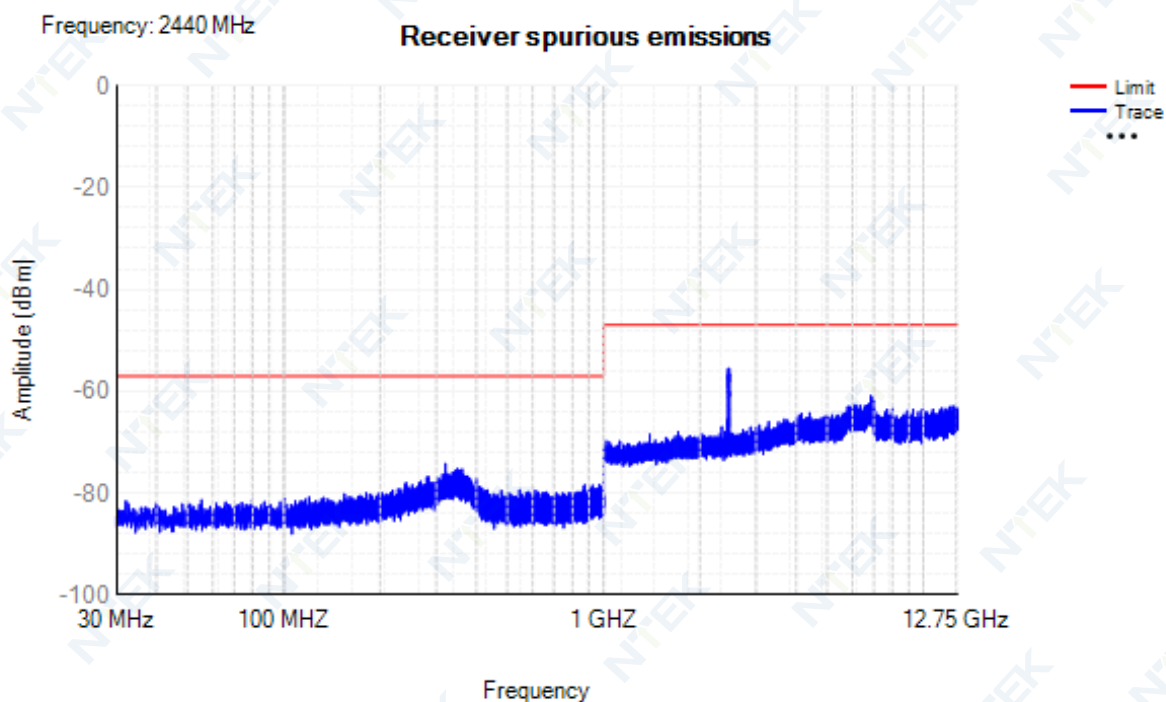
Condition	Mode	Frequency (MHz)	Antenna	Range (MHz)	Spur Freq (MHz)	Peak (dBm)	RMS (dBm)	Limit (dBm)	Verdict
NVNT	BLE 2M	2402	Ant1	30 -1000	320.05	-72.87	NA	-57	Pass
NVNT	BLE 2M	2402	Ant1	1000 -12750	6895	-60.61	NA	-47	Pass
NVNT	BLE 2M	2440	Ant1	30 -1000	320	-74.20	NA	-57	Pass
NVNT	BLE 2M	2440	Ant1	1000 -12750	2470	-55.49	NA	-47	Pass
NVNT	BLE 2M	2480	Ant1	30 -1000	320.05	-74.25	NA	-57	Pass
NVNT	BLE 2M	2480	Ant1	1000 -12750	6980.5	-61.15	NA	-47	Pass

Test Graphs

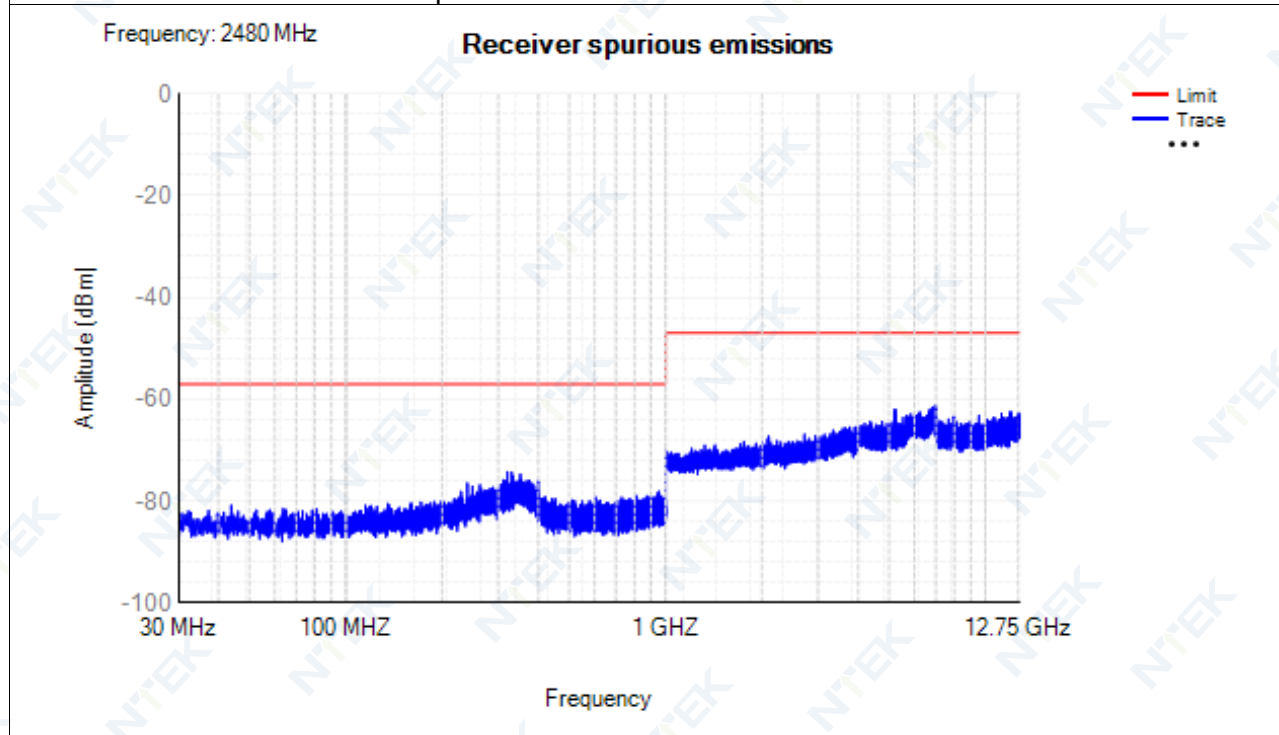
Rx. Spurious NVNT BLE 2M 2402MHz Ant1



Rx. Spurious NVNT BLE 2M 2440MHz Ant1

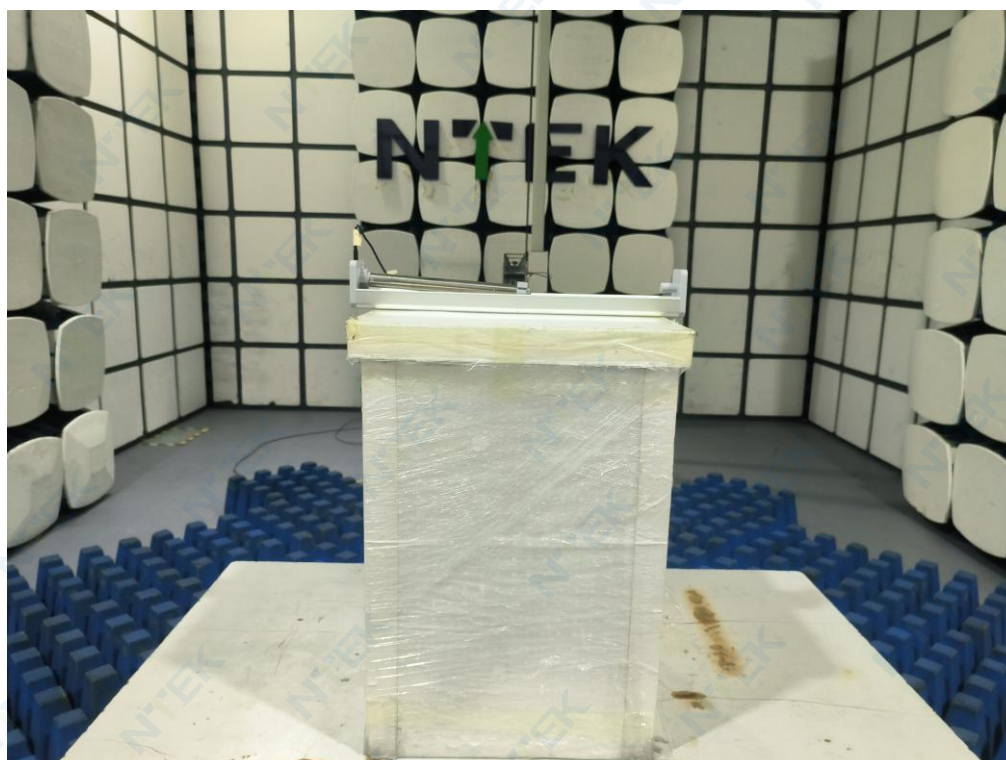
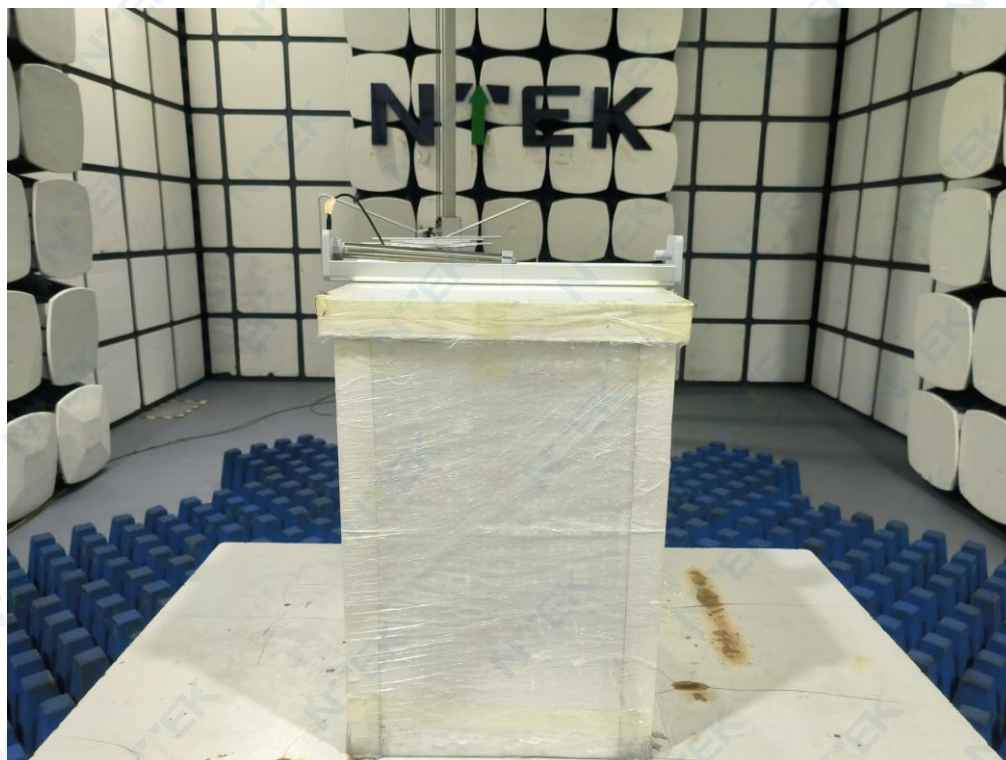


Rx. Spurious NVNT BLE 2M 2480MHz Ant1



5. EUT TEST PHOTO

SPURIOUS EMISSIONS MEASUREMENT PHOTOS



END OF REPORT



EN62479 TEST REPORT

Product : SwitchBot Roller Shade

Trade Mark : SwitchBot

Model Name : W5000000

Family Model : W5000001, W5000002, W5000003,
W5000004, W5000005, W5000006

Report No. : S24042502508002

Prepared for

Woan Technology (Shenzhen) Co., Ltd

Room 1101, Qiancheng Commercial Center, No. 5 Haicheng Road, Mabu
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Prepared by

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Tel:400-800-6106,0755-2320 0050 / 2320 0090

Website:<http://www.ntek.org.cn>

TEST RESULT CERTIFICATION

Applicant's name : Woan Technology (Shenzhen) Co., Ltd.
Address : Room 1101, Qiancheng Commercial Center, No. 5 Haicheng Road, Mabu Community, Xixiang Sub-district, Bao'an District, Shenzhen, Guangdong, P.R.China, 518100

Manufacturer's Name : Woan Technology (Shenzhen) Co., Ltd.
Address : Room 1101, Qiancheng Commercial Center, No. 5 Haicheng Road, Mabu Community, Xixiang Sub-district, Bao'an District, Shenzhen, Guangdong, P.R.China, 518100

Product description
Product name : SwitchBot Roller Shade
Trade Mark..... : SwitchBot
Model and/or type reference : W5000000
Family Model : W5000001, W5000002, W5000003, W5000004, W5000005, W5000006
Standards : EN 62479:2010

This device described above has been tested by Shenzhen NTEK, and the test results show that the equipment under test (EUT) is in compliance with the 2014/53/EU Directive Article.3.1(a) requirements. And it is applicable only to the tested sample identified in the report.

This report shall not be reproduced except in full, without the written approval of Shenzhen NTEK, this document may be altered or revised by Shenzhen NTEK, personnel only, and shall be noted in the revision of the document.

Test Sample Number : S240425025012

Date of Test :

Date (s) of performance of tests..... : Jun 05, 2024 ~ Jun 21, 2024

Date of Issue : Jun 21, 2024

Test Result..... : **Pass**

Prepared By : Gavan Zhang
Gavan Zhang
(Project Engineer)

Reviewed By : Aaron Cheng
Aaron Cheng
(Supervisor)

Approved By : Alex Li
BY  Alex Li
(Manager)

Table of Contents

Page

1 . GENERAL INFORMATION	5
1.1 GENERAL DESCRIPTION OF EUT	5
2 .EN 62479 REQUIREMENT	6
2.1 GENERAL INFORMATION	6
2.2 LIMIT	6
3. RESULT	7

[illegible]

1. GENERAL INFORMATION

1.1 GENERAL DESCRIPTION OF EUT

Equipment	SwitchBot Roller Shade	
Trade Mark	SwitchBot	
Model Name.	W5000000	
Family Model	W5000001, W5000002, W5000003, W5000004, W5000005, W5000006	
Model Difference	All models are the same except for the model names and appearance lengths	
Product Description	The EUT is SwitchBot Roller Shade	
	Operation Frequency:	Bluetooth: 2402 MHz - 2480 MHz
	Modulation Type:	☒ BLE(1Mbps/2Mbps): GFSK
	MAX EIRP Power:	BLE(1M): 6.26 dBm BLE(2M): 5.9 dBm
	Antenna Designation:	PIFA Antenna
	Antenna Gain(Peak)	2.81 dBi
	Based on the application, features, or specification exhibited in User's Manual, the EUT is considered as an ITE/Computing Device. More details of EUT technical specification, please refer to the User's Manual.	
Adapter	N/A	
Battery	DC 7.3V 2600mAh 18.98Wh	
Rating	DC 5V/1A from adapter;Max 24MHz or 7.3V from battery	
Hardware Version	N/A	
Software Version	N/A	

Note:

1.For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

2.EN 62479 REQUIREMENT

2.1 GENERAL INFORMATION

According to its specifications, the EUT must comply with the requirements of the following standards:

EN 62479: 2010 [Assessment of the compliance of low power electronic and electrical equipment with the basic restrictions related to human exposure to electromagnetic fields (10 MHz to 300 GHz)]

2.2 LIMIT

A. Typical usage, installation and the physical characteristics of equipment make it inherently compliant with the applicable EMF exposure levels such as those listed in the bibliography. This low-power equipment includes unintentional (or non-intentional) radiators, for example incandescent light bulbs and audio/visual (A/V) equipment, information technology equipment (ITE) and multimedia equipment (MME) that does not contain radio transmitters.

NOTE Equipment is described as A/V equipment, ITE or MME if its main use is playback/recording of music, voice or images, or processing of digital information.

B. The input power level to electrical or electronic components that are capable of radiating electromagnetic energy in the relevant frequency range is so low that the available antenna power and/or the average total radiated power cannot exceed the low-power exclusion level defined in 4.2.

C. The available antenna power and/or the average total radiated power are limited by product standards for transmitters to levels below the low-power exclusion level defined in 4.2.

D. Measurements or calculations show that the available antenna power and/or the average total radiated power are below the low-power exclusion level defined in 4.2.

3. RESULT

The available antenna power of this EUT is **BLE(1M): 4.23mW (6.26dBm)** ,
BLE(2M): 3.89mW (5.9dBm)the power are below the low-power exclusion level defined in
4.2(Pmax: 20mW).”

END OF REPORT