



CERTIFICATE *of* EXAMINATION

NOTIFIED BODY EU-TYPE EXAMINATION CERTIFICATE

BALU177-EU / 20 May 2021 / Rev A

Radio Equipment Directive (RED) 2014/53/EU

MiCOM Labs Inc., Notified Body Number 2280 declares, on the basis of the assessment of the tests and the technical documentation provided by the applicant that the following product complies with the essential requirements of the above noted Directive.

Product Name:

SwitchBot Contact Sensor

Approval Holder Name:

Woan Technology (Shenzhen) Co., Ltd.



Product Name:

SwitchBot Contact SensorProduct Model Numbers: **W1201500, W1201501, W1201502, W1201503, W1201504, W1201505**Brand Name: **SwitchBot**

Approval Holder: **Woan Technology (Shenzhen) Co., Ltd.**, Room 101-116, Building B4, Yintian Industrial Zone, Xixiang Street, Bao'an District, Shenzhen, Guangdong, 518102, P.R.China

Product Manufacturer: **Woan Technology (Shenzhen) Co., Ltd.**, Room 101-116, Building B4, Yintian Industrial Zone, Xixiang Street, Bao'an District, Shenzhen, Guangdong, 518102, P.R.China

Standards

Group	Name
Article 3.1(a) Health & Safety	EN 62479: 2010
	IEC 62368-1: 2014
	EN 62368-1: 2014+A11: 2017
Article 3.1(b) Electromagnetic Compatibility	EN 301 489-1 V2.2.3
	EN 301 489-17 V3.2.4
Article 3.2 Effective Use of Spectrum	EN 300 328 V2.2.2

Annex 1 to EU-Type Examination
**EU-Type examination on the essential requirements
Article 3**

Article 3.1 - a) Health and Safety	Assessed
Article 3.1 - b) Electromagnetic compatibility	Assessed
Article 3.2 - Effective use of radio spectrum	Assessed
Article 3.3 - a) interworks with Accessories/Chargers	Not Assessed
Article 3.3 - b) interworks with Radio Networks	Not Assessed
Article 3.3 - c) can connect to interfaces	Not Assessed
Article 3.3 - d) does not harm the network, misuse network resources	Not Assessed
Article 3.3 - e) privacy protections	Not Assessed
Article 3.3 - f) fraud protections	Not Assessed
Article 3.3 - g) emergency services access	Not Assessed
Article 3.3 - h) assist users with disabilities	Not Assessed
Article 3.3 - i) integrity of software	Not Assessed

Description of Apparatus

Company Name	Woan Technology (Shenzhen) Co., Ltd.
Certification No.	BALU177-EU
Issue Date / Rev	20 May 2021 / Rev A
Equipment Description	SwitchBot Contact Sensor
Hardware Version	V1.0
Firmware Version	V4.1.5

Emission Information

Technology	Frequency MHz		Emission Designator	RF Power		
	From	To		Max	Type	Field Strength
Bluetooth LE	2402	2480	F1D	0.2dBm	EIRP	--

Technical Construction File Details: (Documents Reviewed)

Technical Report(s):

Article 3.1(a) Health & Safety:

BL-SZ2140930-701

BL-SZ2140930-101

Article 3.1(b) Electromagnetic Compatibility:

BL-SZ2140930-401

Article 3.2 Effective Use of Spectrum:

BL-SZ2140930-601

Supporting Documentation:

Service Agreement

Agent Authorization

EU Application

EU Declaration of Conformity

Block Diagram

BOM or Parts List

External Photographs

Internal Photographs

Label and its Location

Operational Description

PCB Layout

Schematics

Test Setup - EU

User Manual

Risk assessment

Declaration of identity

Declaration of Operation in Member States and application for certification

Scope

This EU-Type Examination Certificate is given in respect of compliance of radio spectrum use Article 3 Paragraph 2 of the RED Directive 2014/53/EU. The scope of the evaluation and this certificate relates only to those items identified in 'Annex 1 to EU - Type Examination Certificate' for the specific product and Certificate number referenced above.

EU Type Examination was performed according to Module B: EU-type examination procedure per Annex III the Directive on the essential requirements in Article 3, for the specific product and Certificate Number referenced above.

This EU Type Examination Certificate is based upon the review of the Technical Documentation and supporting evidence for the adequacy of the technical design solution, it is only valid in conjunction with the attached Annexes. The scope of this statement relates to a single sample of the apparatus identified above and of the submitted documents only.

Annex 2 to EU-Type Examination Obligations of the Applicant

Ref RED 2014/53/EU Article 10 - Obligations of manufacturers

1. When placing their radio equipment on the market, manufacturers shall ensure that it has been designed and manufactured in accordance with the essential requirements set out in Article 3.
2. Manufacturers shall ensure that radio equipment shall be so constructed that it can be operated in at least one Member State without infringing applicable requirements on the use of radio spectrum.
3. Manufacturers shall draw up the technical documentation referred to in Article 21 and carry out the relevant conformity assessment procedure referred to in Article 17 or have it carried out. Where compliance of radio equipment with the applicable requirements has been demonstrated by that conformity assessment procedure, manufacturers shall draw up an EU declaration of conformity and affix the CE marking.
4. Manufacturers shall keep the technical documentation and the EU declaration of conformity for 10 years after the radio equipment has been placed on the market.
5. Manufacturers shall ensure that procedures are in place for series production to remain in conformity with this Directive. Changes in radio equipment design or characteristics and changes in the harmonised standards or in other technical specifications by reference to which conformity of radio equipment is declared shall be adequately taken into account.

When deemed appropriate with regard to the risks presented by radio equipment, manufacturers shall, to protect the health and safety of end-users, carry out sample testing of radio equipment made available on the market, investigate, and, if necessary, keep a register of complaints, of non-conforming radio equipment and radio equipment recalls, and shall keep distributors informed of any such monitoring.

6. Manufacturers shall ensure that radio equipment which they have placed on the market bears a type, batch or serial number or other element allowing its identification, or, where the size or nature of the radio equipment does not allow it, that the required information is provided on the packaging, or in a document accompanying the radio equipment.
7. Manufacturers shall indicate on the radio equipment their name, registered trade name or registered trade mark and the postal address at which they can be contacted or, where the size or nature of radio equipment does not allow it, on its packaging, or in a document accompanying the radio equipment. The address shall indicate a single point at which the manufacturer can be contacted. The contact details shall be in a language easily understood by end-users and market surveillance authorities.
8. Manufacturers shall ensure that the radio equipment is accompanied by instructions and safety information in a language which can be easily understood by consumers and other end-users, as determined by the Member State concerned. Instructions shall include the information required to use radio equipment in accordance with its intended use. Such information shall include, where applicable, a description of accessories and components, including software, which allow the radio equipment to operate as intended. Such instructions and safety information, as well as any labelling, shall be clear, understandable and intelligible.

The following information shall also be included in the case of radio equipment intentionally emitting radio waves:

- (a) frequency band(s) in which the radio equipment operates;
- (b) maximum radio-frequency power transmitted in the frequency band(s) in which the radio equipment operates.

9. Manufacturers shall ensure that each item of radio equipment is accompanied by a copy of the EU declaration of conformity or by a simplified EU declaration of conformity. Where a simplified EU declaration of conformity is provided, it shall contain the exact internet address where the full text of the EU declaration of conformity can be obtained.
10. In cases of restrictions on putting into service or of requirements for authorisation of use, information available on the packaging shall allow the identification of the Member States or the geographical area within a Member State where restrictions on putting into service or requirements for authorisation of use exist. Such information shall be completed in the instructions accompanying the radio equipment. The Commission may adopt implementing acts specifying how to present that information. Those implementing acts shall be adopted in accordance with the advisory procedure referred to in Article 45(2).

11. Manufacturers who consider or have reason to believe that radio equipment which they have placed on the market is not in conformity with this Directive shall immediately take the corrective measures necessary to bring that radio equipment into conformity, to withdraw it or recall it, if appropriate. Furthermore, where the radio equipment presents a risk, manufacturers shall immediately inform the competent national authorities of the Member States in which they made the radio equipment available on the market to that effect, giving details, in particular, of the noncompliance, of any corrective measures taken and of the results thereof.

12. Manufacturers shall, further to a reasoned request from a competent national authority, provide it with all the information and documentation in paper or electronic form necessary to demonstrate the conformity of the radio equipment with this Directive, in a language which can be easily understood by that authority. They shall cooperate with that authority, at its request, on any action taken to eliminate the risks posed by radio equipment which they have placed on the market.

Ref RED 2014/53/EU Article 11 - Authorised representatives

1. A manufacturer may, by a written mandate, appoint an authorised representative.

The obligations laid down in Article 10(1) and the obligation to draw up technical documentation laid down in Article 10(3) shall not form part of the authorised representative's mandate.

2. An authorised representative shall perform the tasks specified in the mandate received from the manufacturer. The mandate shall allow the authorised representative to do at least the following:

(a) keep the EU declaration of conformity and the technical documentation at the disposal of national market surveillance authorities for 10 years after the radio equipment has been placed on the market;

(b) further to a reasoned request from a competent national authority, provide that authority with all the information and documentation necessary to demonstrate the conformity of radio equipment;

(c) co-operate with the competent national authorities, at their request, on any action taken to eliminate the risks posed

Article 19 General principles of the CE marking

1. The CE marking shall be subject to the general principles set out in Article 30 of Regulation (EC) No 765/2008.

2. On account of the nature of radio equipment, the height of the CE marking affixed to radio equipment may be lower than 5 mm, provided that it remains visible and legible.

Article 20 Rules and conditions for affixing the CE marking and the identification number of the notified body

1. The CE marking shall be affixed visibly, legibly and indelibly to the radio equipment or to its data plate, unless that is not possible or not warranted on account of the nature of radio equipment. The CE marking shall also be affixed visibly and legibly to the packaging.

2. The CE marking shall be affixed before the radio equipment is placed on the market.

3. Member States shall build upon existing mechanisms to ensure correct application of the regime governing the CE marking and shall take appropriate action in the event of improper use of that marking.



UK TYPE EXAMINATION CERTIFICATE

APPROVED BODY UK-TYPE EXAMINATION CERTIFICATE

BALU177-UK / 21 May 2021 / Rev A

UK Radio Equipment Regulations (S.I. 2017 No. 1206)

MiCOM Labs Inc., Approved Body Number 2280 declares, on the basis of the assessment of the tests and the technical documentation provided by the applicant that the following product complies with the essential requirements of the above noted Regulations.

Product Name:

SwitchBot Contact Sensor

Approval Holder Name:

Woan Technology (Shenzhen) Co., Ltd.



**UK
CA**


Gordon Hurst, Product Certifier

This Certificate is Issued under the Authority of:

MiCOM Labs Inc., 575 Boulder Court, Pleasanton, California 94566, USA

Approved Body Number: 2280

Product Name:

SwitchBot Contact SensorProduct Model Numbers: **W1201500, W1201501, W1201502, W1201503, W1201504, W1201505**Brand Name: **SwitchBot**

Approval Holder: **Woan Technology (Shenzhen) Co., Ltd.**, Room 101-116, Building B4, Yintian Industrial Zone, Xixiang Street, Bao'an District, Shenzhen, Guangdong, 518102, P.R.China

Product Manufacturer: **Woan Technology (Shenzhen) Co., Ltd.**, Room 101-116, Building B4, Yintian Industrial Zone, Xixiang Street, Bao'an District, Shenzhen, Guangdong, 518102, P.R.China

Standards

Group	Name
Section 6(1)(a) Health & Safety	IEC 62368-1: 2014
	EN 62368-1: 2014+A11: 2017
	EN 62479: 2010
Section 6(1)(b) Electromagnetic Compatibility	EN 301 489-1 V2.2.3
	EN 301 489-17 V3.2.4
Section 6(2) Effective Use of Spectrum	EN 300 328 V2.2.2

Annex 1 to UK-Type Examination

UK-Type examination on the essential requirements
Section 6

Section 6(1) - a) Health and Safety	Assessed
-------------------------------------	----------

Section 6(1) - b) Electromagnetic compatibility	Assessed
---	----------

Section 6(2) - Effective use of radio spectrum	Assessed
--	----------

Description of Apparatus

Company Name	Woan Technology (Shenzhen) Co., Ltd.
--------------	--------------------------------------

Certification No.	BALU177-UK
-------------------	------------

Issue Date / Rev	21 May 2021 / Rev A
------------------	---------------------

Equipment Description	SwitchBot Contact Sensor
-----------------------	--------------------------

Hardware Version	V1.0
------------------	------

Firmware Version	V4.1.5
------------------	--------

Emission Information

Technology	Frequency MHz		Emission Designator	RF Power		
	From	To		Max	Type	Field Strength
Bluetooth LE	2402	2480	F1D	0.2dBm	EIRP	--

Technical Construction File Details: (Documents Reviewed)**Technical Report(s):**

Section 6(1)(a) Health & Safety:

BL-SZ2140930-701

BL-SZ2140930-101

Section 6(1)(b) Electromagnetic Compatibility:

BL-SZ2140930-401

Section 6(2) Effective Use of Spectrum:

BL-SZ2140930-601

Supporting Documentation:

Service Agreement

Agent Authorization

UK Application

UK Declaration of Conformity

Block Diagram

BOM or Parts List

External Photographs

Internal Photographs

Label and its Location

Operational Description

PCB Layout

Schematics

Test Setup - UK

User Manual

Declaration of identity

UK Radio Equipment Regulations Risk Assessment

Scope

This UK-Type Examination Certificate is given in respect of compliance of the noted Radio Equipment per Section 6 Essential Requirements of UK Radio Equipment Regulations (SI 2017 No. 1206). The scope of the evaluation and this certificate relates only to those items identified in 'Annex 1 to UK-Type Examination Certificate' for the specific product and Certificate number referenced above.

UK Type Examination was performed according to Module B: UK-type examination procedure per Schedule 3 of the Regulation on the essential requirements in Section 6, for the specific product and Certificate Number referenced above.

This UK-Type Examination Certificate is based upon the review of the Technical Documentation and supporting evidence for the adequacy of the technical design solution, it is only valid in conjunction with the attached Annexes. The scope of this statement relates to a single sample of the apparatus identified above and of the submitted documents only.

The obligations of the following parties; Manufacturers, Importers, Distributors; are as defined in the UK Radio Equipment Regulations(SI 2017 / 1206) in conjunction with amendments in UK Statutory Instruments 2019 No. 696 Schedule 29.

<https://www.legislation.gov.uk/uksi/2017/1206/contents>

<https://www.legislation.gov.uk/uksi/2019/696/schedule/29>

RF TEST REPORT

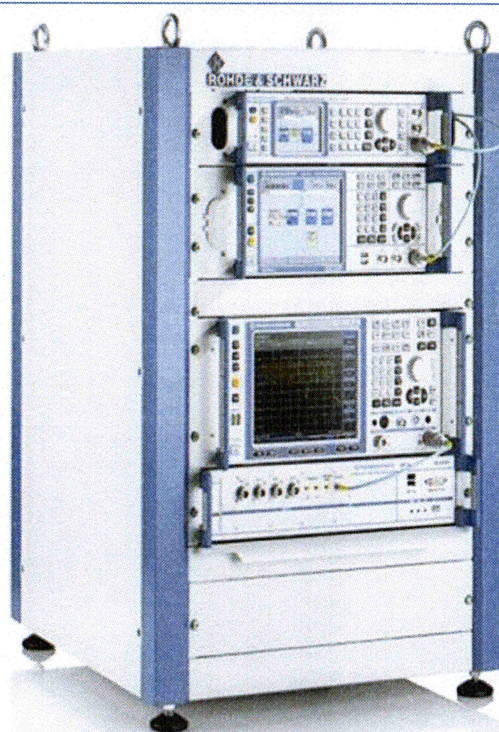
ISSUED BY
Shenzhen BALUN Technology Co., Ltd.



FOR
SwitchBot Contact Sensor

ISSUED TO
Woan Technology (Shenzhen) Co., Ltd.

Room 101-116, Building B4, Yintian Industrial Zone, Xixiang Street,
Bao'an District, Shenzhen, Guangdong, P.R. China, 518102



Tested by: Ye Hongji
Ye Hongji

Date: May 18, 2021

Approved by: Wei Yanquan
(Chief Engineer)

Date: May 18, 2021

Report No.: BL-SZ2140930-601
EUT Name: SwitchBot Contact Sensor
Model Name: W1201500 (refer section 2.4)
Brand Name: SwitchBot
Test Standard: ETSI EN 300 328 V2.2.2 (2019-07)

Test Conclusion: Pass
Test Date: Apr. 27, 2021 ~ May 10, 2021
Date of Issue: May 18, 2021

NOTE: This test report of test results only related to testing samples, which can be duplicated completely for the legal use with the approval of the applicant; it shall not be reproduced except in full, without the written approval of Shenzhen BALUN Technology Co., Ltd. Any objections should be raised within thirty days from the date of issue. To validate the report, please contact us.

Revision History

Version	Issue Date	Revisions Content
<u>Rev. 01</u>	<u>May 18, 2021</u>	<u>Initial Issue</u>

TABLE OF CONTENTS

1	ADMINISTRATIVE DATA (GENERAL INFORMATION)	4
1.1	Identification of the Testing Laboratory	4
1.2	Identification of the Responsible Testing Location	4
1.3	Laboratory Condition	4
1.4	Announce	4
2	PRODUCT INFORMATION	5
2.1	Applicant Information	5
2.2	Manufacturer Information	5
2.3	Factory Information	5
2.4	General Description for Equipment under Test (EUT)	5
2.5	Technical Information	6
2.6	Additional Instructions	7
3	SUMMARY OF TEST RESULTS	8
4	GENERAL TEST CONFIGURATIONS	11
4.1	Test Environments	11
4.2	Test Equipment List	11
4.3	Test Software List	12
4.4	Measurement Uncertainty	12
4.5	Description of Test Setup	13
5	Test Type and Test Results	16
5.1	Transmitter Parameters	16
5.2	Receiver Parameters	28
5.3	Other Parameters	33
ANNEX A	TEST RESULT	34
A.1	RF output power	34
A.2	Power spectral density	38
A.3	Duty Cycle, Tx-sequence, Tx-gap	39

A.4	Accumulated Transmit Time, Frequency Occupation and Hopping Sequence.....	39
A.5	Hopping Frequency Separation.....	39
A.6	Medium Utilization (MU) factor	39
A.7	Adaptivity.....	39
A.8	Occupied Channel Bandwidth	40
A.9	Transmitter unwanted emissions in the out-of-band domain.....	41
A.10	Transmitter Spurious Emissions.....	42
A.11	Receiver Spurious Emissions.....	46
A.12	Receiver Blocking.....	50
ANNEX B	TEST SETUP PHOTOS	51
ANNEX C	EUT EXTERNAL PHOTOS	51
ANNEX D	EUT INTERNAL PHOTOS	51
ANNEX E	INFORMATIVE.....	51

1 ADMINISTRATIVE DATA (GENERAL INFORMATION)

1.1 Identification of the Testing Laboratory

Company Name	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Phone Number	+86 755 6685 0100

1.2 Identification of the Responsible Testing Location

Test Location	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Description	All measurement facilities used to collect the measurement data are located at Block B, FL 1, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China 518055

1.3 Laboratory Condition

Ambient Temperature	20°C to 35°C
Ambient Relative Humidity	30% to 75%
Ambient Pressure	98 kPa to 102 kPa

1.4 Announce

- (1) The test report reference to the report template version v1.1.
- (2) The test report is invalid if not marked with the signatures of the persons responsible for preparing and approving the test report.
- (3) The test report is invalid if there is any evidence and/or falsification.
- (4) The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein.
- (5) This document may not be altered or revised in any way unless done so by BALUN and all revisions are duly noted in the revisions section.
- (6) Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory.
- (7) The laboratory is only responsible for the data released by the laboratory, except for the part provided by the applicant.

2 PRODUCT INFORMATION

2.1 Applicant Information

Applicant	Woan Technology (Shenzhen) Co., Ltd.
Address	Room 101-116, Building B4, Yintian Industrial Zone, Xixiang Street, Bao'an District, Shenzhen, Guangdong, P.R. China, 518102

2.2 Manufacturer Information

Manufacturer	Woan Technology (Shenzhen) Co., Ltd.
Address	Room 101-116, Building B4, Yintian Industrial Zone, Xixiang Street, Bao'an District, Shenzhen, Guangdong, P.R. China, 518102

2.3 Factory Information

Factory	Woan Technology (Shenzhen) Co., Ltd.
Address	Room 101-116, Building B4, Yintian Industrial Zone, Xixiang Street, Bao'an District, Shenzhen, Guangdong, P.R. China, 518102

2.4 General Description for Equipment under Test (EUT)

EUT Name	SwitchBot Contact Sensor
Model Name Under Test	W1201500
Series Model Name	W1201501, W1201502, W1201503, W1201504, W1201505
Description of Model name differentiation	only differences are model names for trading purpose
Hardware Version	V1.0
Software Version	V4.1.5
Dimensions (Approx.)	N/A
Weight (Approx.)	N/A

2.5 Technical Information

EUT Type	Stand-alone equipment
Network and Wireless connectivity	Bluetooth (BLE)

The requirement for the following technical information of the EUT was tested in this report:

Modulation Technology	Bluetooth Low Energy: Wide band modulations other than FHSS
Modulation Type	Bluetooth Low Energy: GFSK
Transfer Rate	BLE: 1 Mbps
Frequency Range	The frequency range used is 2402 MHz – 2480 MHz; The frequency block is 2400 MHz to 2483.5 MHz.
Number of channel	Bluetooth Low Energy: 40 (at intervals of 2 MHz)
Tested Channel	Bluetooth Low Energy: 0 (2402 MHz), 19 (2440 MHz), 39 (2480 MHz)
Nominal Channel Bandwidth	1 MHz
Antenna Type	Ceramic Antenna
Antenna Gain	-1.78 dBi (In test items related to antenna gain, the final results reflect this figure. This value is provided by the applicant.)
Beamforming Gain	N/A
Adaptive or non-adaptive	Adaptive
LBT Based	Yes (Load Based)
The Max RF Output power	Bluetooth Low Energy: 0.2 dBm
Receiver Category	Bluetooth Low Energy: 2

2.6 Additional Instructions

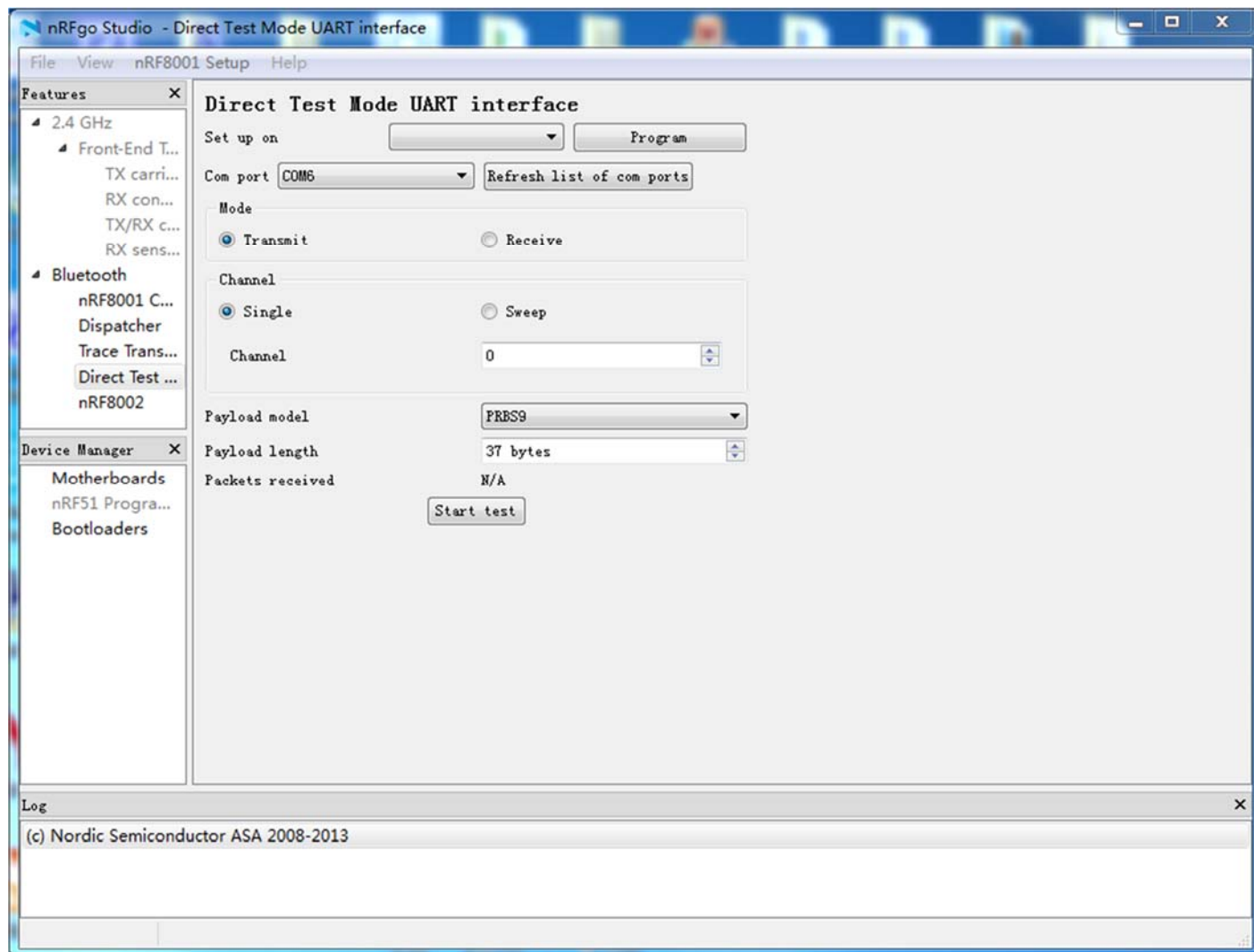
Bluetooth Low Energy

EUT Software Settings:

Mode	☒ Special software is used. The software provided by client to enable the EUT under transmission condition continuously at specific channel frequencies individually.
------	--

Power level setup in software			
Test Software Version	nRFgo Studio		
Support Units (Software installation media)	Description	Manufacturer	Model
	Notebook	Lenovo	X220
Mode	Channel	Frequency (MHz)	Soft Set
GFSK	CH0	2402	TX LEVEL is built-in set parameters and cannot be changed and selected.
	CH19	2440	
	CH39	2480	

Run Software



3 SUMMARY OF TEST RESULTS

The EUT has been tested according to ETSI EN 300 328 V2.2.2 (2019-07).

No.	Identity	Document Title
1	ETSI EN 300 328 V2.2.2 (2019-07)	Wideband transmission systems; Data transmission equipment operating in the 2,4 GHz band; Harmonised Standard for access to radio spectrum

Test items and the results are as follows:

Report Section	Standard Rule	Description	Channel (BLE)	Test Result	Verdict	Remark
Transmitter Parameters						
5.1.1	4.3.1.2 4.3.2.2	RF output power	Low/Middle/High	ANNEX A.1	Pass	--
5.1.2	4.3.2.3	Power Spectral Density	Low/Middle/High	ANNEX A.2	Pass	Note ⁴
5.1.3	4.3.1.3 4.3.2.4	Duty Cycle, Tx-sequence, Tx-gap	N/A	ANNEX A.3	N/A	Note ² , Note ⁷
5.1.4	4.3.1.4	Accumulated Transmit Time, Frequency Occupation and Hopping Sequence	--	ANNEX A.4	Pass	Note ⁵
5.1.5	4.3.1.5	Hopping Frequency Separation	--	ANNEX A.5	Pass	Note ⁵
5.1.6	4.3.1.6 4.3.2.5	Medium Utilization (MU) factor	N/A	ANNEX A.6	N/A	Note ² , Note ⁷
5.1.7	4.3.1.7 4.3.2.6	Adaptivity	N/A	ANNEX A.7	N/A	Note ² , Note ³
5.1.8	4.3.1.8 4.3.2.7	Occupied Channel Bandwidth	Low/High	ANNEX A.8	Pass	--
5.1.9	4.3.1.9 4.3.2.8	Transmitter unwanted emissions in the out-of-band domain	Low/High	ANNEX A.9	Pass	--
5.1.10	4.3.1.10 4.3.2.9	Transmitter unwanted emissions in the spurious domain	Low/High	ANNEX A.10	Pass	--
Receiver Parameters						
5.2.1	4.2.3.2	Receiver categories	--	--	--	--
5.2.2	4.3.1.11 4.3.2.10	Receiver spurious emissions	Low/High	ANNEX A.11	Pass	--
5.2.3	4.3.1.12 4.3.2.11	Receiver Blocking	Low/High	ANNEX A.12	Pass	--
Other Parameters						
5.3.1	4.3.1.13 4.3.2.12	Geo-location capability	--	--	--	Note ⁶

Note ¹: This requirement does not apply to adaptive equipment unless operating in a non-adaptive mode.

Note ²: This test doesn't apply for the EUT which has the RF Output power is less than 10 dBm e.i.r.p.

Note ³: This requirement does not apply to non-adaptive equipment or adaptive equipment operating in a non-adaptive mode.

Note ⁴: This requirement apply to the equipment is using wide band modulations other than FHSS.

Note ⁵: This requirement apply to the equipment is using FHSS.

Note ⁶: The function of Geo-location capability is declared by manufacture, for a more detailed description, please refer to the manufacture declaration.

Note ⁷: These requirements apply to non-adaptive frequency hopping equipment or to adaptive frequency hopping equipment operating in a non-adaptive mode.

Description	Modulation Type (BLE)	Transfer Rate (BLE)
Transmitter Parameters		
RF output power	GFSK	1 Mbps
Power Spectral Density	GFSK	1 Mbps
Duty Cycle, Tx-sequence, Tx-gap	N/A	N/A
Accumulated Transmit Time, Frequency Occupation and Hopping Sequence	--	--
Hopping Frequency Separation	--	--
Medium Utilization (MU) factor	N/A	N/A
Adaptivity	N/A	N/A
Occupied Channel Bandwidth	GFSK	1 Mbps
Transmitter unwanted emissions in the out-of-band domain	GFSK	1 Mbps
Transmitter unwanted emissions in the spurious domain	GFSK	1 Mbps
Receiver Parameters		
Receiver spurious emissions	GFSK	1 Mbps
Receiver Blocking	GFSK	1 Mbps
Other Parameters		
Geo-location capability	--	--

4 GENERAL TEST CONFIGURATIONS

4.1 Test Environments

During the measurement, the normal environmental conditions were within the listed ranges:

Relative Humidity	30% to 75%	
Atmospheric Pressure	98 kPa to 102 kPa	
Temperature	NT (Normal Temperature)	+22°C to +25°C
	LT (Low Temperature)	-10°C
	HT (High Temperature)	+60°C
Working Voltage of the EUT	NV (Normal Voltage)	3 V

4.2 Test Equipment List

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Spectrum Analyzer	ROHDE&SCHWARZ	FSV-30	103118	2020.06.08	2021.06.07
Spectrum Analyzer	KEYSIGHT	N9020A	MY56060183	2020.09.25	2021.09.24
Vector Signal Generator	ROHDE&SCHWARZ	SMBV100A	260592	2020.06.08	2021.06.07
Signal Generator	ROHDE&SCHWARZ	SMB100A	177746	2020.06.08	2021.06.07
Switch Unit with OSP-B157	ROHDE&SCHWARZ	OSP120	101270	2020.06.08	2021.06.07
Bluetooth Signaling Unit	ROHDE&SCHWARZ	CMW270	100607	2020.06.08	2021.06.07
Bluetooth Signaling Unit	ROHDE&SCHWARZ	CMW500	142028	2020.06.08	2021.06.07
Bluetooth Signaling Unit	ROHDE&SCHWARZ	CBT	101005	2020.06.08	2021.06.07
EMI Receiver	KEYSIGHT	N9038A	MY53220118	2020.06.09	2021.06.08
Test Antenna-Loop(9 kHz-30 MHz)	SCHWARZBECK	FMZB 1519	1519-037	2019.10.29	2021.10.28
Test Antenna-Bi-Log(30 MHz-3 GHz)	SCHWARZBECK	VULB 9163	9163-624	2019.07.02	2021.07.01
Test Antenna-Horn(1-18 GHz)	SCHWARZBECK	BBHA 9120D	9120D-1917	2019.07.02	2021.07.01
Test Antenna-Horn (18-40 GHz)	A-INFO	LB-180400KF	J211060273	2021.01.05	2023.01.04
Anechoic Chamber	RAINFORD	9m*6m*6m	N/A	2017.02.21	2022.02.20

4.3 Test Software List

Description	Manufacturer	Software Version	Serial No.
TS8997 EMC32	ROHDE&SCHWARZ	V10.00.00	N/A

4.4 Measurement Uncertainty

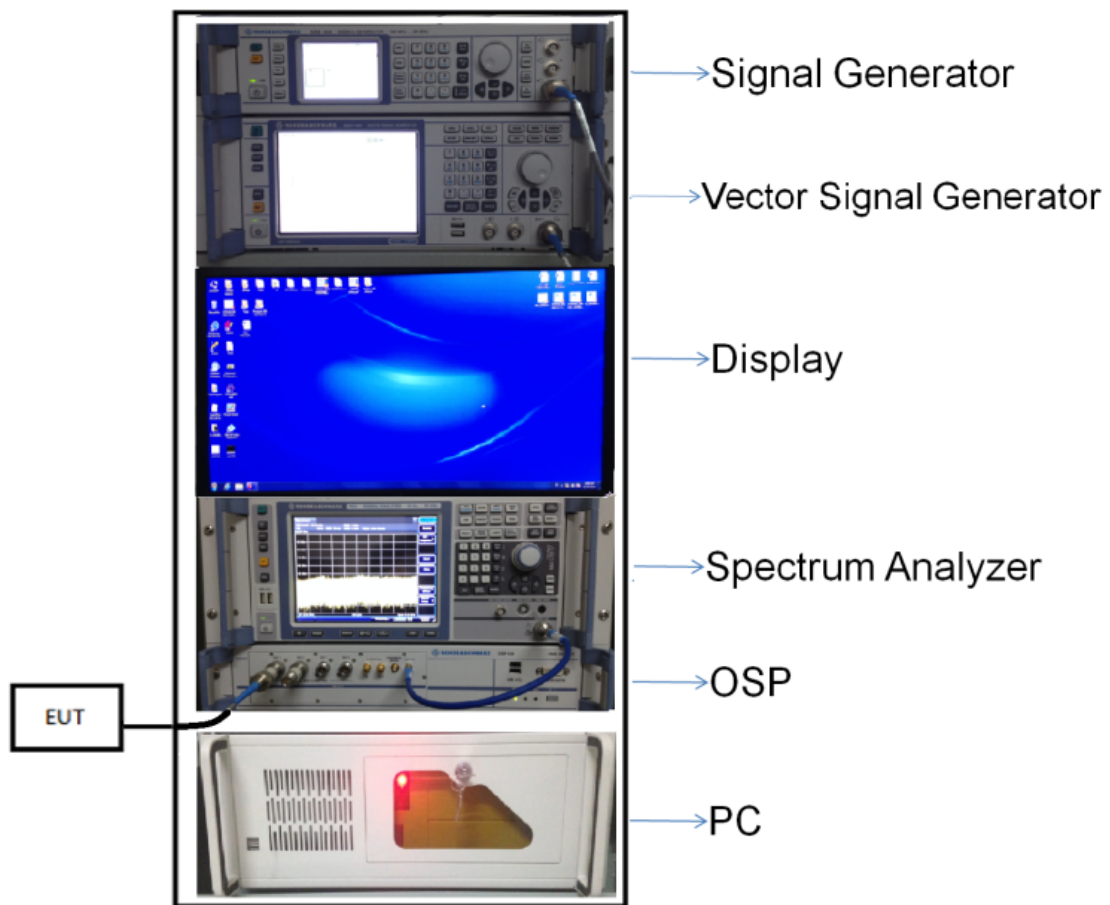
The following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2.

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Measurement	Value
Occupied Channel Bandwidth	$\pm 4 \%$
RF output power, conducted	$\pm 1.21 \text{ dB}$
Power Spectral Density, conducted	$\pm 1.25 \text{ dB}$
Unwanted Emissions, conducted	$\pm 1.26 \text{ dB}$
All emissions, radiated	$\pm 3.86 \text{ dB}$
Temperature	$\pm 1 \text{ }^{\circ}\text{C}$
Humidity	$\pm 4 \%$

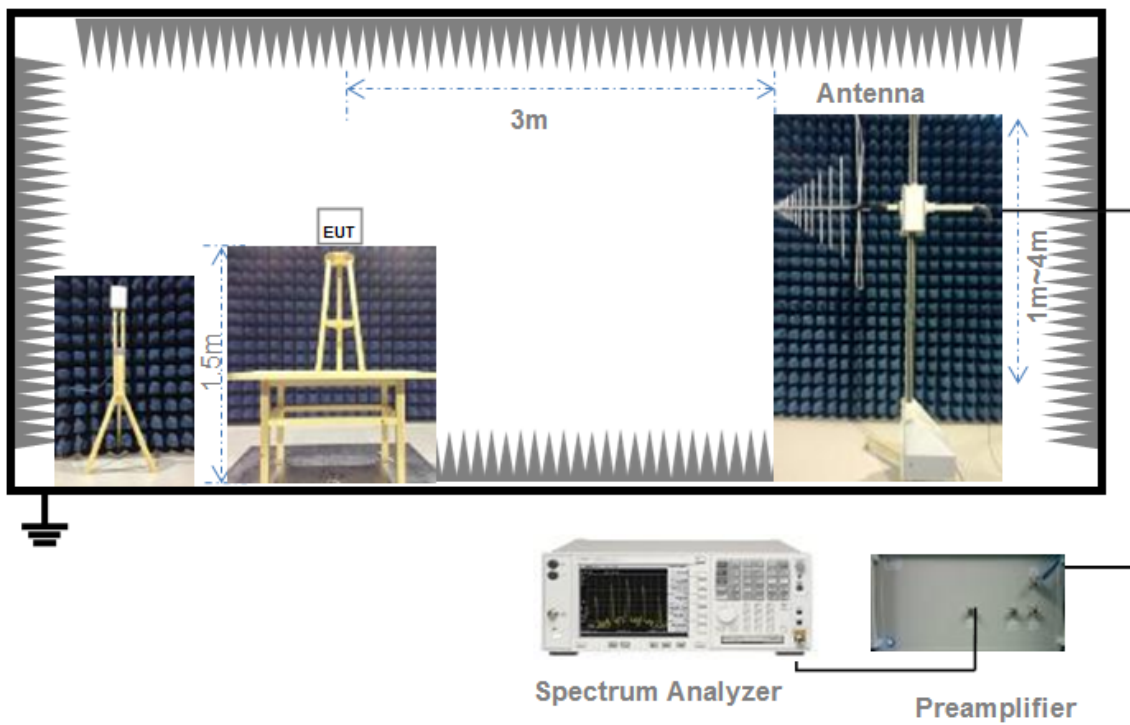
4.5 Description of Test Setup

4.5.1 For Conducted Test

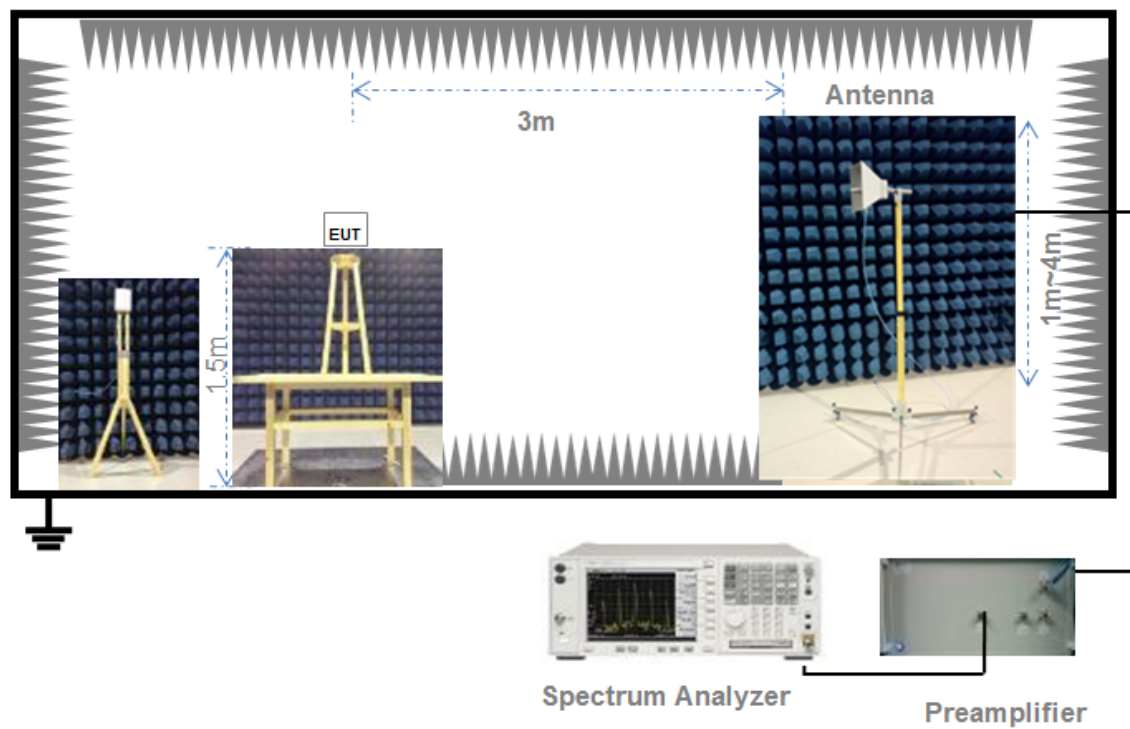


(Diagram 1)

4.5.2 For Radiated Test

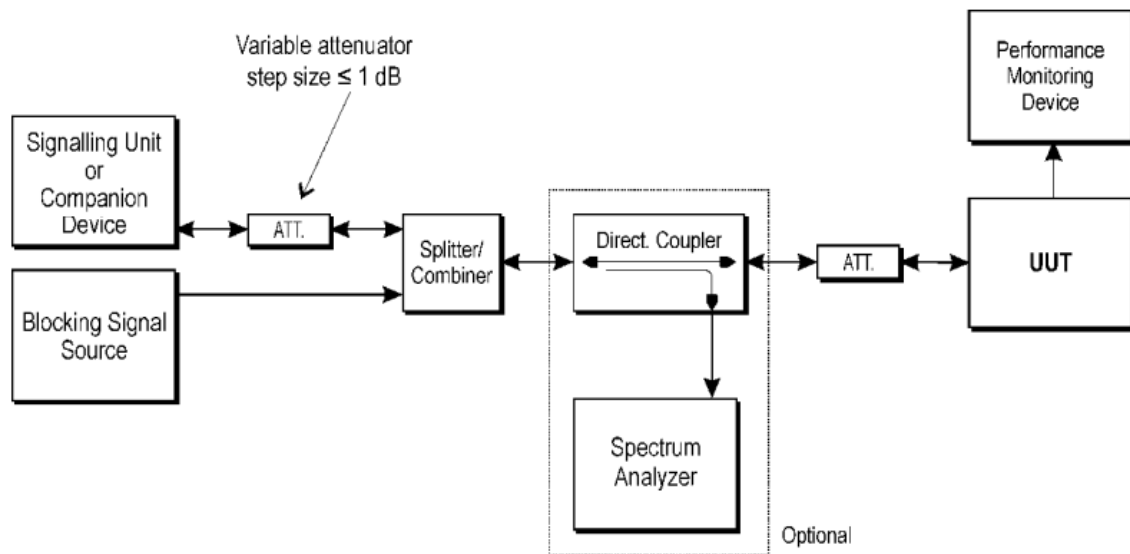


(Diagram 2)



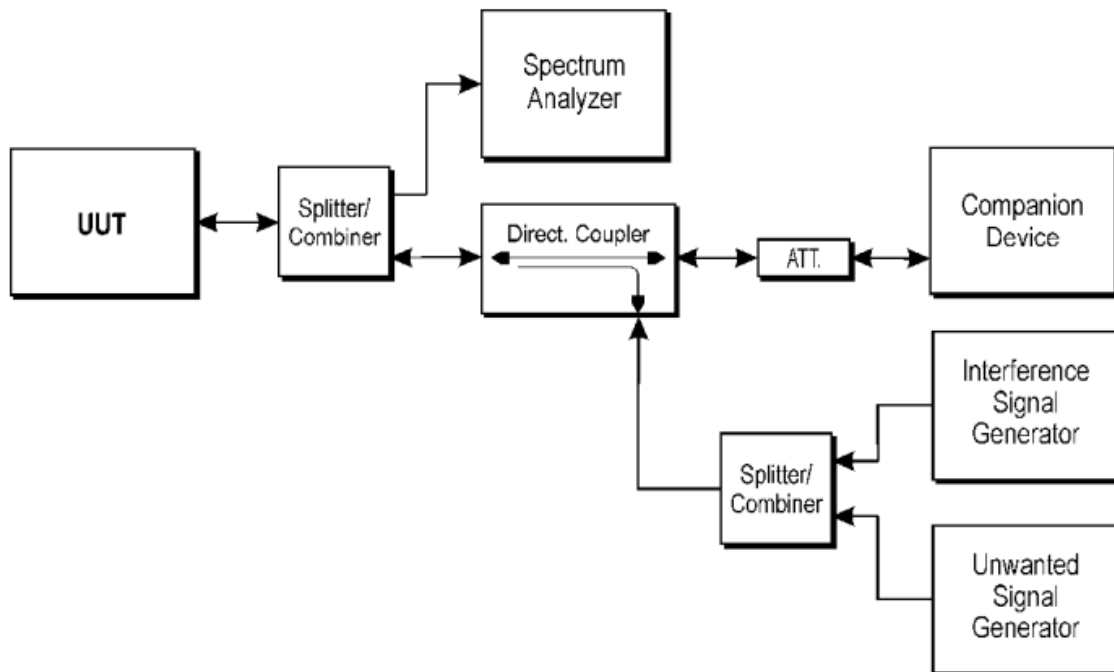
(Diagram 3)

4.5.3 For Receiver Blocking Test



(Diagram 4)

4.5.4 For Adaptivity Test



(Diagram 5)

5 Test Type and Test Results

5.1 Transmitter Parameters

5.1.1 RF output power

5.1.1.1 Limit

The maximum RF output power shall be equal to or less than 20 dBm.

5.1.1.2 Test Setup

The section 4.5.1 (Diagram 1) test setup description was used for this test. The photo of test setup please refer to ANNEX B.

5.1.1.3 Test Procedure

Reference to ETSI EN 300 328 V2.2.2 clause 5.4.2.2.

5.1.1.4 Test Result

Please refer to ANNEX A.1.

5.1.2 Power Spectral Density

5.1.2.1 Limit

The maximum Power Spectral Density for non-FHSS equipment is 10 dBm per MHz.

5.1.2.2 Test Setup

The section 4.5.1 (Diagram 1) test setup description was used for this test. The photo of test setup please refer to ANNEX B.

5.1.2.3 Test Procedure

Reference to ETSI EN 300 328 V2.2.2 clause 5.4.3.2.

5.1.2.4 Test Result

Please refer to ANNEX A.2.

5.1.3 Duty Cycle, Tx-sequence, Tx-gap

5.1.3.1 Limit

The Duty Cycle shall be equal to or less than the maximum value declared by the manufacturer.

The Tx-sequence time shall be equal to or less than 10 ms.

The minimum Tx-gap time following a Tx-sequence shall be equal to the duration of that proceeding Txsequence with a minimum of 3,5 ms.

5.1.3.2 Test Setup

The section 4.5.1 (Diagram 1) test setup description was used for this test. The photo of test setup please refer to ANNEX B.

5.1.3.3 Test Procedure

Reference to ETSI EN 300 328 V2.2.2 clause 5.4.2.2.

5.1.3.4 Test Result

Please refer to ANNEX A.3.

5.1.4 Accumulated Transmit Time, Frequency Occupation and Hopping Sequence

5.1.4.1 Limit

The Accumulated Transmit Time on any hopping frequency shall not be greater than 400 ms within any observation period of 400 ms multiplied by the minimum number of hopping frequencies (N) that have to be used.

The hopping sequence(s) shall contain at least N hopping frequencies where N is 15 or 15 divided by the minimum Hopping Frequency Separation in MHz, whichever is the greater.

In order for the equipment to comply with the Frequency Occupation requirement, it shall meet either of the following two options:

Option 1: Each hopping frequency of the hopping sequence shall be occupied at least once within a period not exceeding four times the product of the dwell time and the number of hopping frequencies in use.

Option 2: The occupation probability for each frequency shall be between $((1 / U) \times 25 \%)$ and 77 % where U is the number of hopping frequencies in use.

5.1.4.2 Test Setup

The section 4.5.1 (Diagram 1) test setup description was used for this test. The photo of test setup please refer to ANNEX B.

5.1.4.3 Test Procedure

Reference to ETSI EN 300 328 V2.2.2 clause 5.4.4.2.

5.1.4.4 Test Result

Please refer to ANNEX A.4.

5.1.5 Hopping Frequency Separation

5.1.5.1 Limit

For adaptive frequency hopping systems, the minimum Hopping Frequency Separation shall be 100 kHz.

5.1.5.2 Test Setup

The section 4.5.1 (Diagram 1) test setup description was used for this test. The photo of test setup please refer to ANNEX B.

5.1.5.3 Test Procedure

Reference to ETSI EN 300 328 V2.2.2 clause 5.4.5.2.

5.1.5.4 Test Result

Please refer to ANNEX A.5.

5.1.6 Medium Utilization (MU) factor

5.1.6.1 Limit

The maximum Medium Utilization factor for non-adaptive equipment shall be 10 %.

5.1.6.2 Test Setup

The section 4.5.1 (Diagram 1) test setup description was used for this test. The photo of test setup please refer to ANNEX B.

5.1.6.3 Test Procedure

Reference to ETSI EN 300 328 V2.2.2 clause 5.4.2.2.

5.1.6.4 Test Result

Please refer to ANNEX A.6.

5.1.7 Adaptivity

5.1.7.1 Limit

Adaptive Frequency Hopping

Requirement	Operational Mode	
	Non-LBT based Detect and Avoid	LBT based Detect and Avoid
Minimum Clear Channel Assessment (CCA) Time	NA	18 us (see Note ¹)
Maximum Channel Occupancy (COT) Time	40 ms	60 ms
Minimum Idle Period	5% of COT	5% of COT
Extended CCA check	NA	NA
Short Control Signalling Transmissions	Maximum duty cycle of 10 % within an observation period of 50 ms (see Note ²)	

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

Note ²: Adaptive equipment may or may not have Short Control Signalling Transmissions.

Note ³: The Idle Period is considered to be equal to the CCA or Extended CCA time defined in clause 4.3.2.6.3.2.3, step 1 and step 2.

Note ⁴: The Idle Period in between transmissions is considered to be the CCA or the Extended CCA check as there are no transmissions during this period.

Interference threshold level:

Maximum transmit power (P _H) EIRP dBm	Threshold level (TL) (see notes 1 and 2)
20	-70 dBm / MHz
Note ¹: $TL = -70 \text{ dBm/MHz} + 10 \times \log_{10} (100 \text{ mW} / P_{out})$ (P_{out} in mW e.i.r.p.). Note ²: transmitter the CCA threshold level (TL) shall be equal or lower than -70 dBm/MHz at the input to the receiver (assuming a 0 dBi receive antenna).	

Unwanted Signal parameters

Wanted signal mean power from companion device	Unwanted signal frequency (MHz)	Unwanted CW signal power (dBm)
sufficient to maintain the link (see Note ²)	2 395 or 2 488,5 (see Note ¹)	-35 (see Note ³)
Note ¹: The highest frequency shall be used for testing operating channels within the range 2400 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.		

Adaptive equipment using modulations other than FHSS

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	18 us (see Note ¹)	(see Note ²)	18 us (see Note ¹)
Maximum Channel Occupancy (COT) Time	40 ms	1 ms to 10 ms	(see Note ²)	13 ms
Minimum Idle Period	5% of COT	5% of COT	(see Note ²)	NA
Extended CCA check	NA	NA	(see Note ²)	a random duration in the range between 18 μs and at least 160 μs
Short Control Signalling Transmissions	Maximum duty cycle of 10 % within an observation period of 50 ms (see Note ³)			
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				
Note ³ : Adaptive equipment may or may not have Short Control Signalling Transmissions.				
Note ⁴ : The Idle Period is considered to be equal to the CCA or Extended CCA time defined in clause 4.3.2.6.3.2.3, step 1 and step 2.				
Note ⁵ : The Idle Period in between transmissions is considered to be the CCA or the Extended CCA check as there are no transmissions during this period.				

Interference threshold level:

Maximum transmit power (P _H) EIRP dBm	Threshold level (TL) (see notes 1 and 2)
20	-70 dBm / MHz
Note 1: $TL = -70 \text{ dBm/MHz} + 10 \times \log_{10} (100 \text{ mW} / P_{out})$ (P_{out} in mW e.i.r.p.). Note 2: transmitter the CCA threshold level (TL) shall be equal or lower than -70 dBm/MHz at the input to the receiver (assuming a 0 dBi receive antenna).	

Unwanted Signal parameters

Wanted signal mean power from companion device	Unwanted signal frequency (MHz)	Unwanted CW signal power (dBm)
sufficient to maintain the link (see note 2)	2 395 or 2 488,5 (see note 1)	-35 (see note 3)
Note ¹: The highest frequency shall be used for testing operating channels within the range 2400 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.		

5.1.7.2 Test Setup

The section 4.5.1 (Diagram 1) test setup description was used for this test. The photo of test setup please refer to ANNEX B.

5.1.7.3 Test Procedure

Reference to ETSI EN 300 328 V2.2.2 clause 5.4.6.2.

5.1.7.4 Test Result

Please refer to ANNEX A.7.

5.1.8 Occupied Channel Bandwidth

5.1.8.1 Limit

The Occupied Channel Bandwidth for each hopping frequency shall fall completely within the band 2400 MHz to 2483.5 MHz.

In addition, for non-adaptive FHSS equipment with e.i.r.p. greater than 10 dBm, the Occupied Channel Bandwidth for every occupied hopping frequency shall be equal to or less than 5 MHz..

In addition, for non-adaptive non-FHSS equipment with e.i.r.p. greater than 10 dBm, the Occupied Channel Bandwidth shall be equal to or less than 20 MHz.

5.1.8.2 Test Setup

The section 4.5.1 (Diagram 1) test setup description was used for this test. The photo of test setup please refer to ANNEX B.

5.1.8.3 Test Procedure

Reference to ETSI EN 300 328 V2.2.2 clause 5.4.7.2.

5.1.8.4 Test Result

Please refer to ANNEX A.8.

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

5.1.9.1 Limit

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 figure 1.

NOTE: Within the 2400 MHz to 2483,5 MHz band, the Out-of-band emissions are fulfilled by compliance with the Occupied Channel Bandwidth requirement in clause 4.3.1.8.

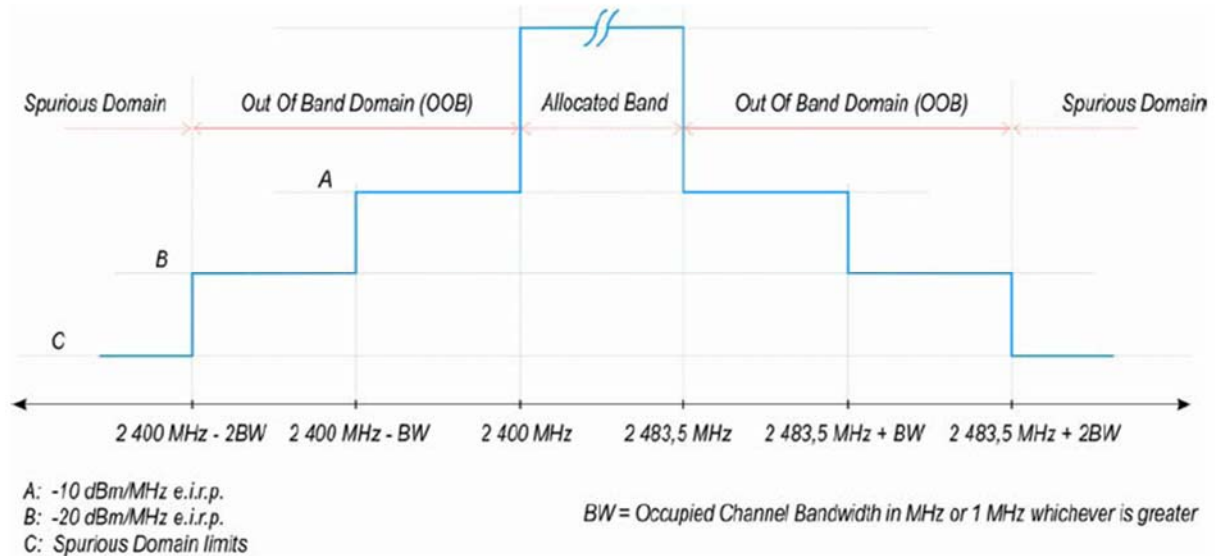


Figure 1: Transmit mask

5.1.9.2 Test Setup

The section 4.5.1 (Diagram 1) test setup description was used for this test. The photo of test setup please refer to ANNEX B.

5.1.9.3 Test Procedure

Reference to ETSI EN 300 328 V2.2.2 clause 5.4.8.2.

5.1.9.4 Test Result

Please refer to ANNEX A.9.

5.1.10 Transmitter unwanted emissions in the spurious domain

5.1.10.1 Limit

The transmitter unwanted emissions in the spurious domain shall not exceed the values in following tables:

Frequency range	Maximum power (dBm)	Bandwidth
30 MHz to 47 MHz	-36	100 kHz
47 MHz to 74 MHz	-54	100 kHz
74 MHz to 87.5 MHz	-36	100 kHz
87.5 MHz to 118 MHz	-54	100 kHz
118 MHz to 174 MHz	-36	100 kHz
174 MHz to 230 MHz	-54	100 kHz
230 MHz to 470 MHz	-36	100 kHz
470 MHz to 694 MHz	-54	100 kHz
694 MHz to 1 GHz	-36	100 kHz
1 GHz to 12.75 GHz	-30	1 MHz

5.1.10.2 Test Setup

The section 4.5.1 and 4.5.2 (Diagram 1, 2, 3) for test setup description. The photo of test setup please refer to ANNEX B.

5.1.10.3 Test Procedure

Reference to ETSI EN 300 328 V2.2.2 clause 5.4.9.2.

5.1.10.4 Test Result

Please refer to ANNEX A.10.

5.2 Receiver Parameters

5.2.1 Receiver categories

There have three different receiver categories for which different receiver requirements and/or corresponding limits apply.

Receiver Category

Receiver Category	Definition
Category 1	Adaptive equipment with a maximum RF output power greater than 10 dBm e.i.r.p.
Category 2	Non-adaptive equipment with a Medium Utilization (MU) factor greater than 1 % and less than or equal to 10 % or adaptive equipment and non-adaptive with a maximum RF output power of 10 dBm e.i.r.p.
Category 3	Non-adaptive equipment with a maximum Medium Utilization (MU) factor of 1 % or adaptive equipment and non-adaptive with a maximum RF output power of 0 dBm e.i.r.p.

5.2.2 Receiver Spurious Emissions

5.2.2.1 Limit

Receiver spurious emissions are emissions at any frequency when the equipment is in receive mode.

The spurious emissions of the transmitter shall not exceed the values in following tables for the EUT in this report.

Frequency range	Maximum power (dBm)	Bandwidth
30 MHz to 1 GHz	-57	100 KHz
1 GHz to 12.75 GHz	-47	1 MHz

5.2.2.2 Test Setup

The section 4.5.1 (Diagram 1) for test setup description. The photo of test setup please refer to ANNEX B.

5.2.2.3 Test Procedure

Reference to ETSI EN 300 328 V2.2.2 clause 5.4.10.2.

5.2.2.4 Test Result

Please refer to ANNEX A.11.

5.2.3 Receiver Blocking

5.2.3.1 Limit

While maintaining the minimum performance criteria as defined in clause 4.3.1.12.3, the blocking levels at specified frequency offsets shall be equal to or greater than the limits defined for the applicable receiver category provided in next table.

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 dBm + $10 \times \log_{10}(\text{OCBW})$) or -68 dBm whichever is less (see note 2)	2 380	-34	CW
	2 504	-34	CW
(-139 dBm + $10 \times \log_{10}(\text{OCBW})$) or -74 dBm whichever is less (see note 3)	2 300	-34	CW
	2 330	-34	CW
	2 360	-34	CW
	2 524	-34	CW
	2 584	-34	CW
	2 674	-34	CW

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 $P_{\min} + 26$ 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. $P_{\min}$ is the minimum level of wanted signal (in dBm) 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 $P_{\min} + 20$ 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.

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 dBm + $10 \times \log_{10}(\text{OCBW}) + 10$ dB) or (-74 dBm + 10 dB) whichever is less (see note 2)	2 380	-34	CW
	2 504	-34	CW
	2 300	-34	CW
	2 584	-34	CW
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 $P_{\min} + 26$ 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.			

Receiver Category 3 equipment

Wanted signal mean power from companion device (dBm) (see notes 1 and 3)	Blocking signal frequency(MHz)	Blocking signal power (dBm) (see note 2)	Type of blocking signal
(-139 dBm + $10 \times \log_{10}(\text{OCBW}) + 20$ dB) or (-74 dBm + 20 dB) whichever is less (see note 2)	2 380	-34	CW
	2 504	-34	CW
	2 300	-34	CW
	2 584	-34	CW
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 $P_{\min} + 30$ 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.			

Categorization

Receiver category	Definition
1	Adaptive equipment with a maximum RF output power greater than 10 dBm e.i.r.p. shall be considered as receiver category 1 equipment.
2	Non-adaptive equipment with a Medium Utilization (MU) factor greater than 1 % and less than or equal to 10 % or adaptive equipment with a maximum RF output power of 10 dBm e.i.r.p. shall be considered as receiver category 2 equipment.
3	Non-adaptive equipment with a maximum Medium Utilization (MU) factor of 1 % or adaptive equipment with a maximum RF output power of 0 dBm e.i.r.p. shall be considered as receiver category 3 equipment

5.2.3.2 Test Setup

See the section 4.5.3 (Diagram 4) for test setup description. The photo of test setup please refer to ANNEX B.

5.2.3.3 Test Procedure

Reference to ETSI EN 300 328 V2.2.2 clause 5.4.11.2.

5.2.3.4 Test Result

Please refer to ANNEX A.12.

5.3 Other Parameters

5.3.1 Geo-location capability

5.3.1.1 Requirements

The geographical location determined by the equipment as defined in following section (5.3.1.2) shall not be accessible to the user.

5.3.1.2 Definition

Geo-location capability is a feature of the equipment to determine its geographical location with the purpose to configure itself according to the regulatory requirements applicable at the geographical location where it operates.

The geo-location capability may be present in the equipment or in an external device (temporary) associated with the equipment operating at the same geographical location during the initial power up of the equipment. The geographical location may also be available in equipment already installed and operating at the same geographical location.

5.3.1.3 Test Result

Please refer to section 3.

ANNEX A TEST RESULT

A.1 RF output power

Test Data

Note: EIRP Power = Conducted Power + Antenna Gain

Modulation Mode			GFSK(BLE)		
Limit			20 dBm		
Test Result					
Test Method	Test Conditions		Transmitter Power Level (dBm)		
☐ Radiated ☒ Conducted	Voltage	Temperature	Low Channel	Middle Channel	High Channel
			EIRP	EIRP	EIRP
	NV	NT	-1.2	-0.3	0.1
		LT	-1.6	-0.6	0.2
		HT	-1.2	-0.4	-0.1
Test Verdict			Pass		

Bursts Power List

GFSK (BLE): Low Channel

Burst RMS Power	Start Time	Stop Time	Tx_on	Tx_off
dBm	ms	ms	ms	ms
-1.2	0.000	0.395	0.395	0.230
-1.2	0.625	1.020	0.395	0.230
-1.2	1.250	1.645	0.395	0.230
-1.2	1.875	2.270	0.395	0.230
-1.2	2.500	2.895	0.395	0.230
-1.2	3.125	3.520	0.395	0.230
-1.2	3.750	4.145	0.395	0.230
-1.2	4.375	4.770	0.395	0.230
-1.2	5.000	5.395	0.395	0.230
-1.2	5.625	6.020	0.395	0.230
-1.2	6.250	6.645	0.395	0.230
-1.2	6.875	7.270	0.395	0.230
-1.2	7.500	7.895	0.395	0.230
-1.2	8.125	8.520	0.395	0.230
-1.2	8.750	9.145	0.395	0.230
-1.2	9.375	9.770	0.395	0.230
-1.2	10.000	10.395	0.395	0.230
-1.2	10.625	11.020	0.395	0.230
-1.2	11.250	11.645	0.395	0.230
-1.2	11.875	12.270	0.395	0.230
-1.2	12.500	12.895	0.395	0.230
-1.2	13.125	13.520	0.395	0.230
-1.2	13.750	14.145	0.395	0.230
-1.2	14.375	14.770	0.395	0.230
-1.2	15.000	15.395	0.395	0.230
-1.2	15.625	16.020	0.395	0.230
-1.2	16.250	16.645	0.395	0.230
-1.2	16.875	17.270	0.395	0.230
-1.2	17.500	17.895	0.395	0.230
-1.2	18.125	18.520	0.395	0.230
-1.2	18.750	19.145	0.395	0.230
-1.2	19.375	19.770	0.395	0.230
-1.2	20.000	20.395	0.395	0.230
-1.2	20.625	21.020	0.395	0.230

GFSK (BLE): Middle Channel

Burst RMS Power	Start Time	Stop Time	Tx_on	Tx_off
dBm	ms	ms	ms	ms
-0.4	0.000	0.395	0.395	0.230
-0.3	0.625	1.020	0.395	0.230
-0.3	1.250	1.645	0.395	0.230
-0.3	1.875	2.270	0.395	0.230
-0.4	2.500	2.895	0.395	0.230
-0.4	3.125	3.520	0.395	0.230
-0.4	3.750	4.145	0.395	0.230
-0.4	4.375	4.770	0.395	0.230
-0.4	5.000	5.395	0.395	0.230
-0.4	5.625	6.020	0.395	0.230
-0.4	6.250	6.645	0.395	0.230
-0.3	6.875	7.270	0.395	0.230
-0.3	7.500	7.895	0.395	0.230
-0.4	8.125	8.520	0.395	0.230
-0.4	8.750	9.145	0.395	0.230
-0.4	9.375	9.770	0.395	0.230
-0.4	10.000	10.395	0.395	0.230
-0.4	10.625	11.020	0.395	0.230
-0.4	11.250	11.645	0.395	0.230
-0.4	11.875	12.270	0.395	0.230
-0.4	12.500	12.895	0.395	0.230
-0.4	13.125	13.520	0.395	0.230
-0.4	13.750	14.145	0.395	0.230
-0.4	14.375	14.770	0.395	0.230
-0.3	15.000	15.395	0.395	0.230
-0.4	15.625	16.020	0.395	0.230
-0.4	16.250	16.645	0.395	0.230
-0.4	16.875	17.270	0.395	0.230
-0.4	17.500	17.895	0.395	0.230
-0.3	18.125	18.520	0.395	0.230
-0.3	18.750	19.145	0.395	0.230
-0.3	19.375	19.770	0.395	0.230
-0.4	20.000	20.395	0.395	0.230
-0.3	20.625	21.020	0.395	0.230

GFSK (BLE): High Channel

Burst RMS Power	Start Time	Stop Time	Tx_on	Tx_off
dBm	ms	ms	ms	ms
0.1	0.000	0.395	0.395	0.230
0.1	0.625	1.020	0.395	0.230
0.2	1.250	1.645	0.395	0.230
0.2	1.875	2.270	0.395	0.230
0.2	2.500	2.895	0.395	0.230
0.1	3.125	3.520	0.395	0.230
0.1	3.750	4.145	0.395	0.230
0.1	4.375	4.770	0.395	0.230
0.2	5.000	5.395	0.395	0.230
0.2	5.625	6.020	0.395	0.230
0.2	6.250	6.645	0.395	0.230
0.2	6.875	7.270	0.395	0.230
0.2	7.500	7.895	0.395	0.230
0.2	8.125	8.520	0.395	0.230
0.2	8.750	9.145	0.395	0.230
0.2	9.375	9.770	0.395	0.230
0.1	10.000	10.395	0.395	0.230
0.1	10.625	11.020	0.395	0.230
0.1	11.250	11.645	0.395	0.230
0.1	11.875	12.270	0.395	0.230
0.2	12.500	12.895	0.395	0.230
0.2	13.125	13.520	0.395	0.230
0.2	13.750	14.145	0.395	0.230
0.2	14.375	14.770	0.395	0.230
0.2	15.000	15.395	0.395	0.230
0.1	15.625	16.020	0.395	0.230
0.1	16.250	16.645	0.395	0.230
0.1	16.875	17.270	0.395	0.230
0.2	17.500	17.895	0.395	0.230
0.2	18.125	18.519	0.394	0.231
0.2	18.750	19.144	0.394	0.231
0.1	19.375	19.770	0.395	0.230
0.1	20.000	20.395	0.395	0.230
0.1	20.625	21.020	0.395	0.229

A.2 Power spectral density

Measuring Parameter

Frequency Range		
2400 MHz to 2483.5 MHz	RBW (MHz)	10 kHz
	VBW (MHz)	30 kHz
	Sweep points	8351
	Detector mode	RMS
	Trace mode	Max Hold
	Sweep time	Auto

Test Data

Note: The Power density is ERIP Power density, which is contain antenna gain.

Modulation Mode			GFSK (BLE)		
Limit			10 dBm/MHz		
Test Result					
Test Method	Test Conditions		Power density (dBm/MHz)		
☐ Radiated ☒ Conducted	Temperature	Voltage	Low Channel	Middle Channel	High Channel
			Power Spectral density	Power Spectral density	Power Spectral density
	NT	NV	-1.3	-0.4	0.0
Test Verdict			Pass		

A.3 Duty Cycle, Tx-sequence, Tx-gap

Note ¹: The maximum value of Duty Cycle declared by the supplier.

Test Data

Duty Cycle (%)	Limit Duty Cycle (%) ^{Note1}	Number of Bursts	Minimum Tx-On (ms)	Maximum Tx-On (ms)	Minimum Tx-Off (ms)	Maximum Tx-Off (ms)	Measurement Time (ms)	Comment
--	--	--	--	--	--	--	--	--

Note ²: Not applicable.

A.4 Accumulated Transmit Time, Frequency Occupation and Hopping Sequence

Note: Not applicable.

A.5 Hopping Frequency Separation

Note: Not applicable.

A.6 Medium Utilization (MU) factor

Medium Utilization (MU) (%)	Limit Medium Utilization (MU) (%)	Verdict
--	10	--

Note: Not applicable.

A.7 Adaptivity

Note: Not applicable.

A.8 Occupied Channel Bandwidth

Measuring Parameter

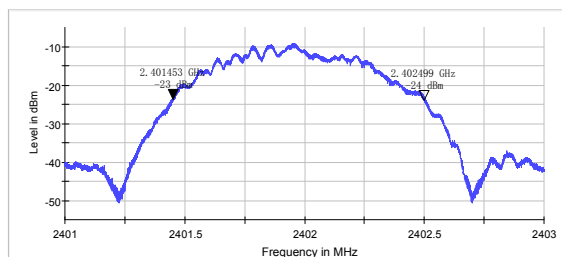
Centre Frequency	The centre frequency of the channel under test
RBW	~ 1 % of the span without going below 1 %
VBW	3 × RBW
Span	2 × Nominal Channel Bandwidth
Detector mode	RMS
Trace mode	Max Hold
Sweep time	Auto
Test Method	☐ Radiated ☒ Conducted

Test Data

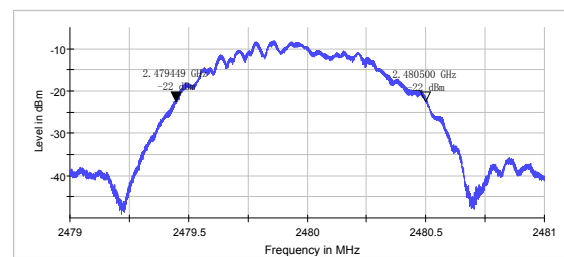
Test Conditions		Test Mode	DUT Frequency (MHz)	Channel Centre Frequency (MHz)	Occupied Channel Bandwidth (MHz)	Lower Band Edge (MHz)	Upper Band Edge (MHz)	Limit (MHz)
Temperature	Voltage							
NT	NV	GFSK (BLE)	2402	2401.975878	1.046619	2401.452568	2402.499188	Within The Band 2400 MHz to 2483.5 MHz
			2480	2479.974753	1.051369	2479.449069	2480.500438	
Test Verdict		Pass						

Test Plots

GFSK (BLE): Low Channel



GFSK (BLE): High Channel



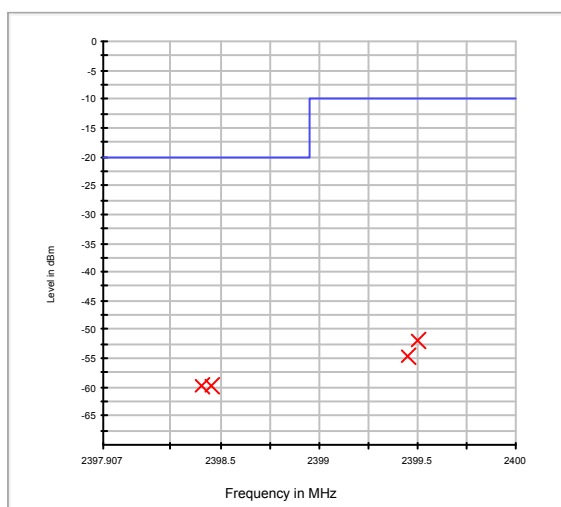
A.9 Transmitter unwanted emissions in the out-of-band domain

Test Data

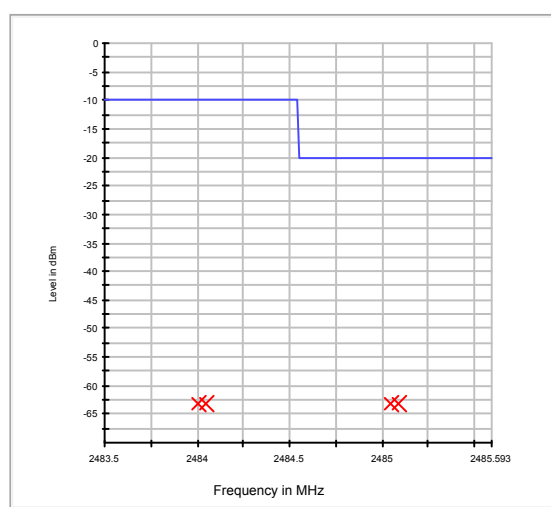
Test Method	Test Conditions		Test Mode	Frequency (MHz)	OOB Emission Worst level(dBm/MHz)	Limit(dBm/ MHz)
	Temperature	Voltage				
☐ Radiated	NT	NV	GFSK (BLE)	2402	-51.9	-10,-20
☒ Conducted				2480	-59.1	-10,-20
Test Verdict			Pass			

Test Plots

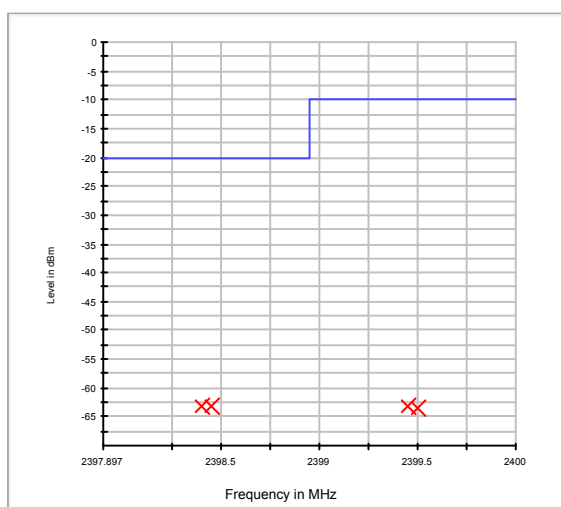
GFSK (BLE): Low frequency (Part 1)



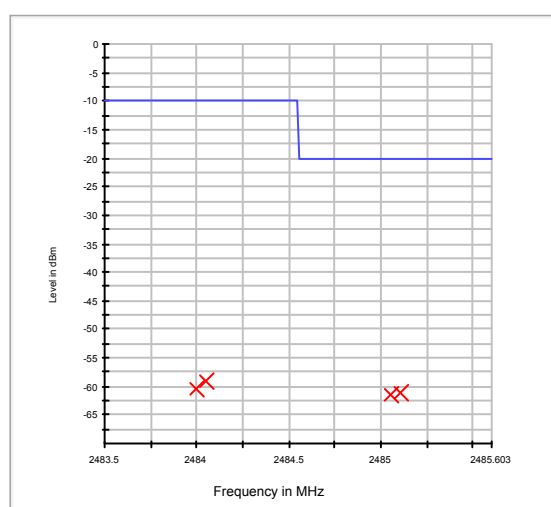
GFSK (BLE): Low frequency (Part 2)



GFSK (BLE): High frequency (Part 1)



GFSK (BLE): High frequency (Part 2)



A.10 Transmitter Spurious Emissions

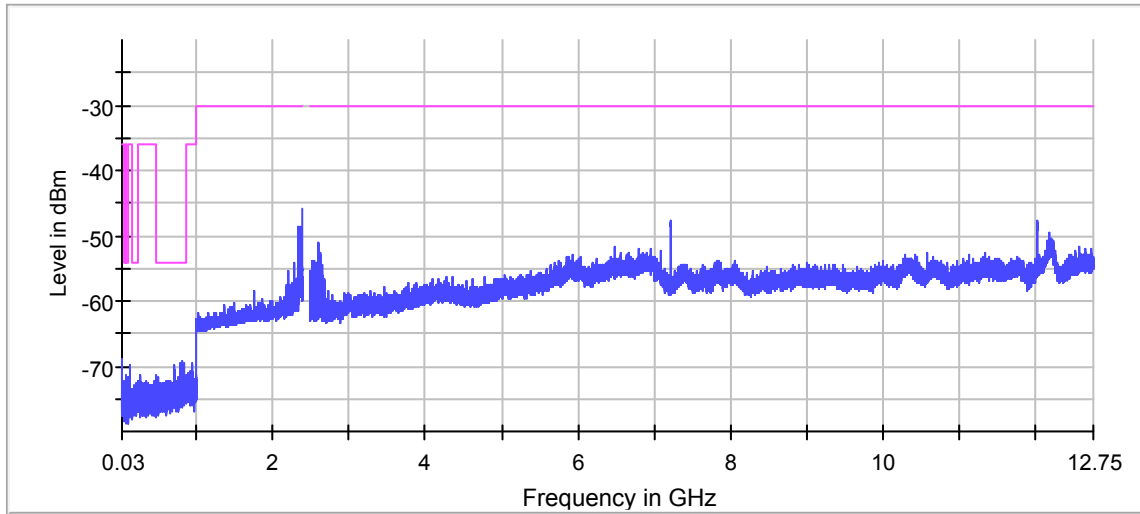
Note: The Frequency band was pre-scanned, the harmonic and other spurious which worst frequency are recorded in the report.

Measuring Parameter

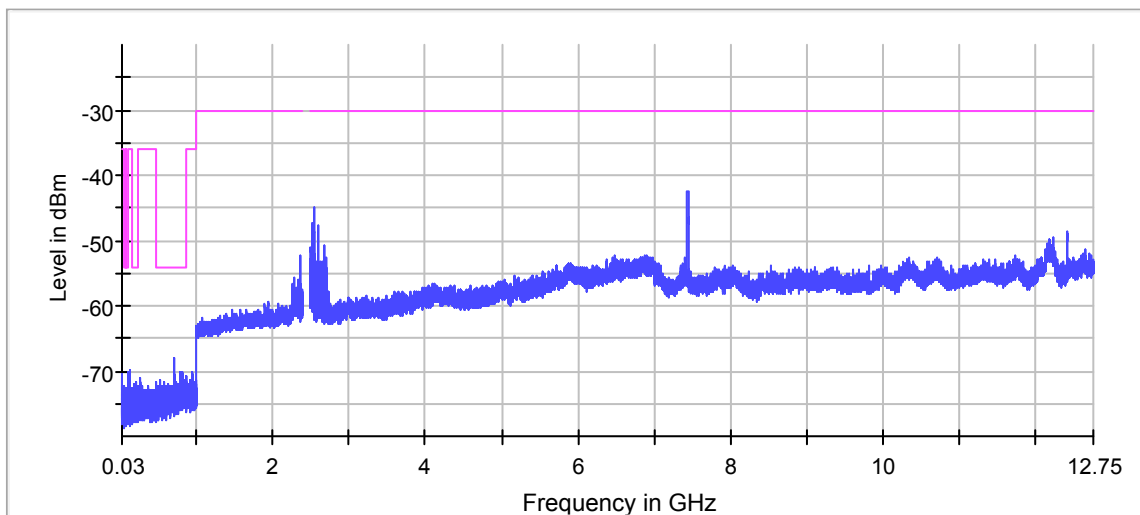
Frequency Range		
30 MHz to 1 000 MHz	RBW (MHz)	100 kHz
	VBW (MHz)	300 kHz
	Sweep points	19400
	Detector mode	Peak
	Trace mode	Max Hold
1 GHz to 12,75 GHz	RBW (MHz)	1 MHz
	VBW (MHz)	3 MHz
	Sweep points	23500
	Detector mode	Peak
	Trace mode	Max Hold

Conducted Test Data

GFSK (BLE) Low Frequency



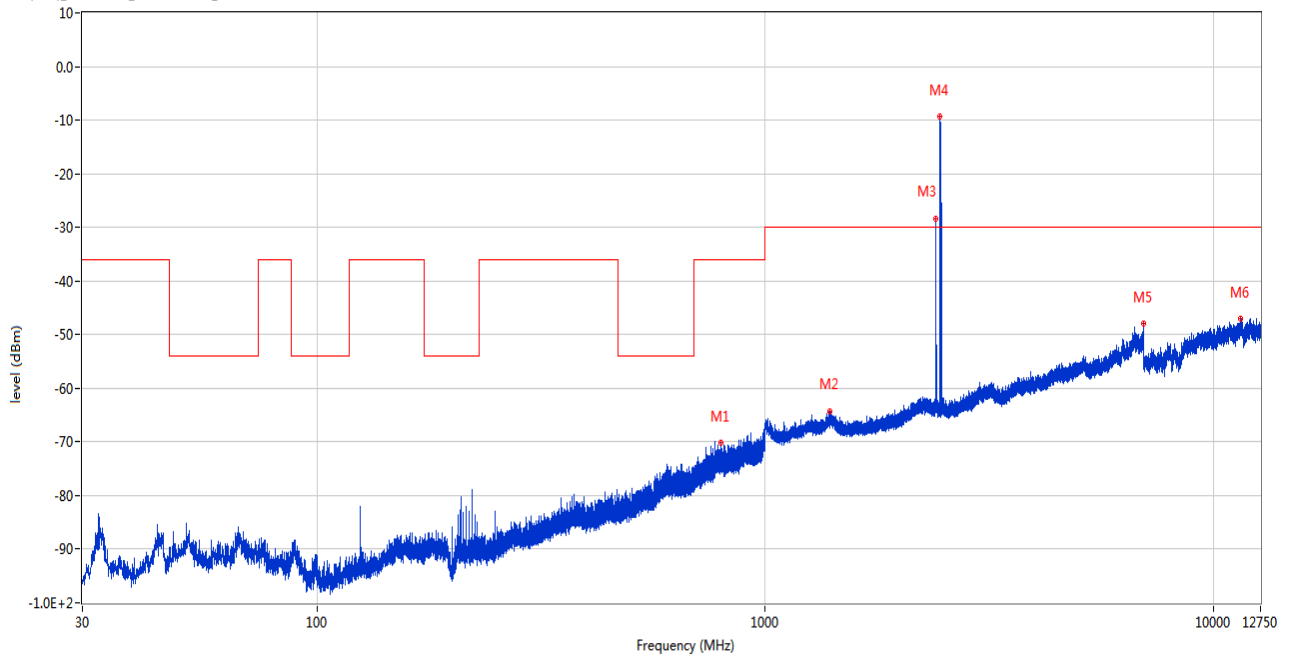
GFSK (BLE) High Frequency



Cabinet Radiated Test Data

30 MHz to 12.75 GHz, ANT H

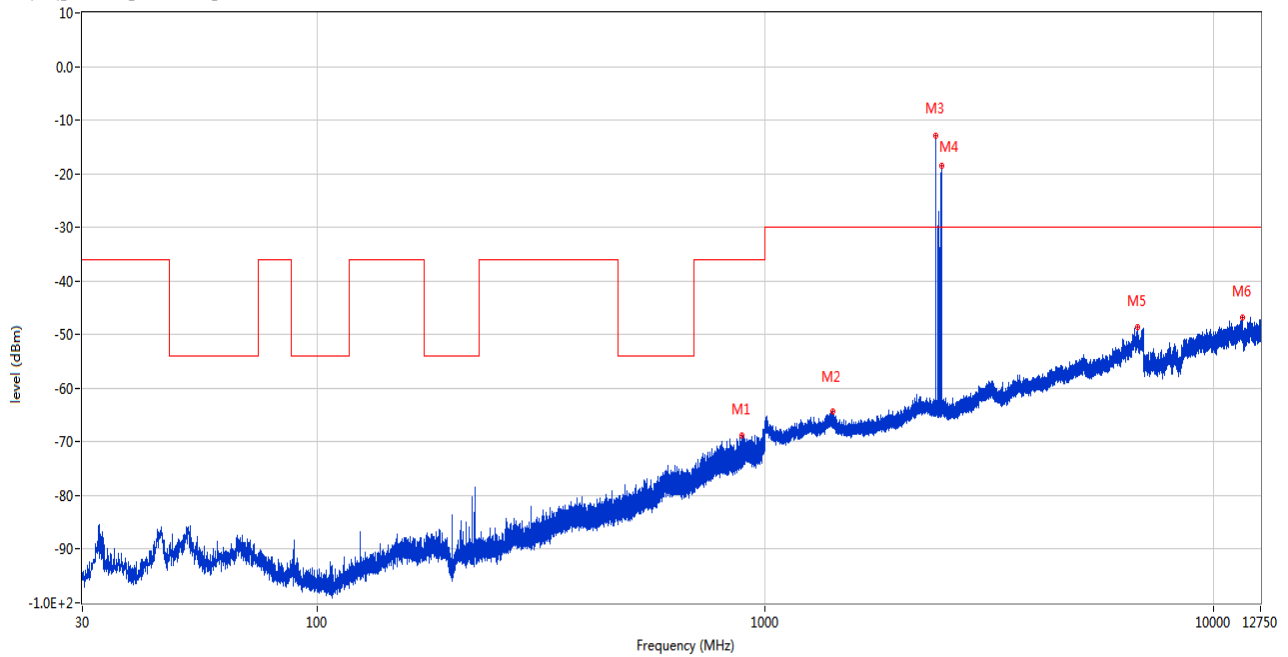
RSE (SRD)_EN 300328_EN300328 TX_30M-12.75GHz



Frequency (MHz)	Result (dBm)	Factor (dB)	PK Limit (dBm)	Over Limit (dB)	Table (o)	ANT	EUT	Verdict
798.968	-70.21	1.45	-36.0	-34.21	123.00	Horizontal	Horizontal	Pass
1392.200	-64.27	-4.37	-30.0	-34.27	360.00	Horizontal	Horizontal	Pass
2402.000	-28.39	-1.45	-30.0	1.61	217.00	Horizontal	Horizontal	N/A
2456.200	-9.26	-2.05	-30.0	20.74	45.00	Horizontal	Horizontal	N/A
6981.800	-48.01	13.85	-30.0	-18.01	342.00	Horizontal	Horizontal	Pass
11503.974	-46.96	17.74	-30.0	-16.96	46.00	Horizontal	Horizontal	Pass

30 MHz to 12.75 GHz, ANT V

RSE (SRD)_EN 300328_EN300328 TX_30M-12.75GHz



Frequency (MHz)	Result (dBm)	Factor (dB)	PK Limit (dBm)	Over Limit (dB)	Table (o)	ANT	EUT	Verdict
889.760	-68.74	2.76	-36.0	-32.74	286.00	Vertical	Horizontal	Pass
1415.800	-64.23	-4.72	-30.0	-34.23	45.00	Vertical	Horizontal	Pass
2406.300	-12.96	-1.49	-30.0	17.04	280.00	Vertical	Horizontal	N/A
2474.000	-18.48	-1.80	-30.0	11.52	0.00	Vertical	Horizontal	N/A
6792.400	-48.64	12.32	-30.0	-18.64	355.00	Vertical	Horizontal	Pass
11615.237	-46.70	17.71	-30.0	-16.70	15.00	Vertical	Horizontal	Pass

A.11 Receiver Spurious Emissions

Note¹: The test method choose the conducted method. Which power in a specified load (conducted spurious emissions) and their effective radiated power when radiated by the cabinet or structure of the equipment (cabinet radiation).

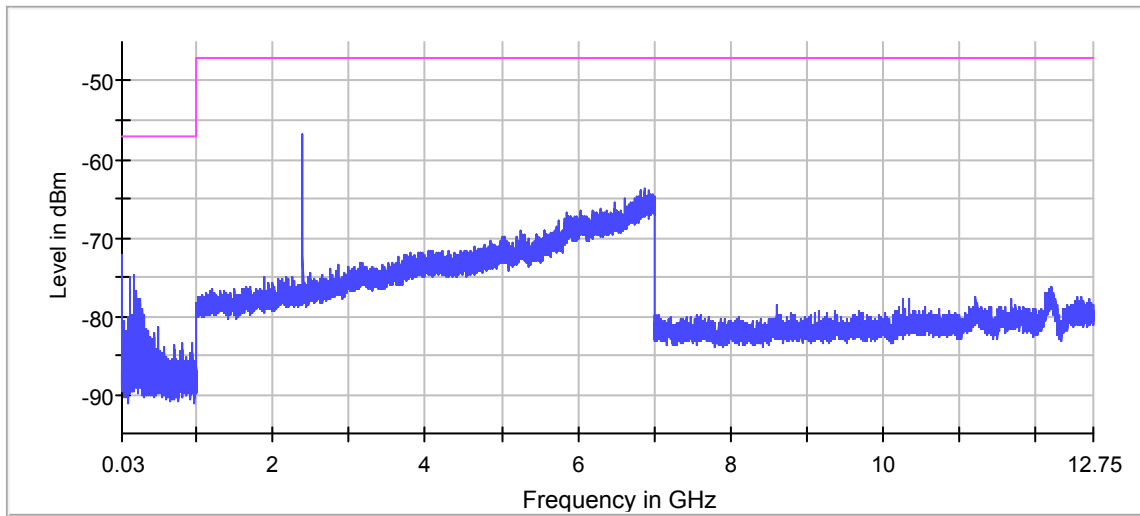
Note²: The Frequency band was pre-scanned, the harmonic and other spurious which worst frequency are recorded in the report.

Measuring Parameter

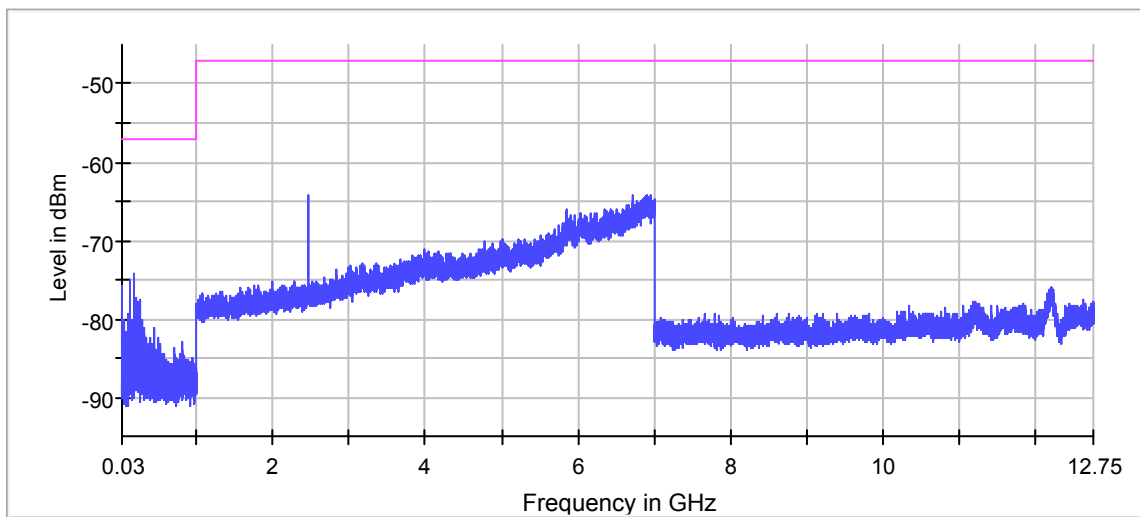
Frequency Range		
30 MHz to 1 000 MHz	RBW (MHz)	100 kHz
	VBW (MHz)	300 kHz
	Sweep points	19400
	Detector mode	Peak
	Trace mode	Max Hold
1 GHz to 12,75 GHz	RBW (MHz)	1 MHz
	VBW (MHz)	3 MHz
	Sweep points	23500
	Detector mode	Peak
	Trace mode	Max Hold

Conducted Test Data

GFSK (BLE) Low Frequency



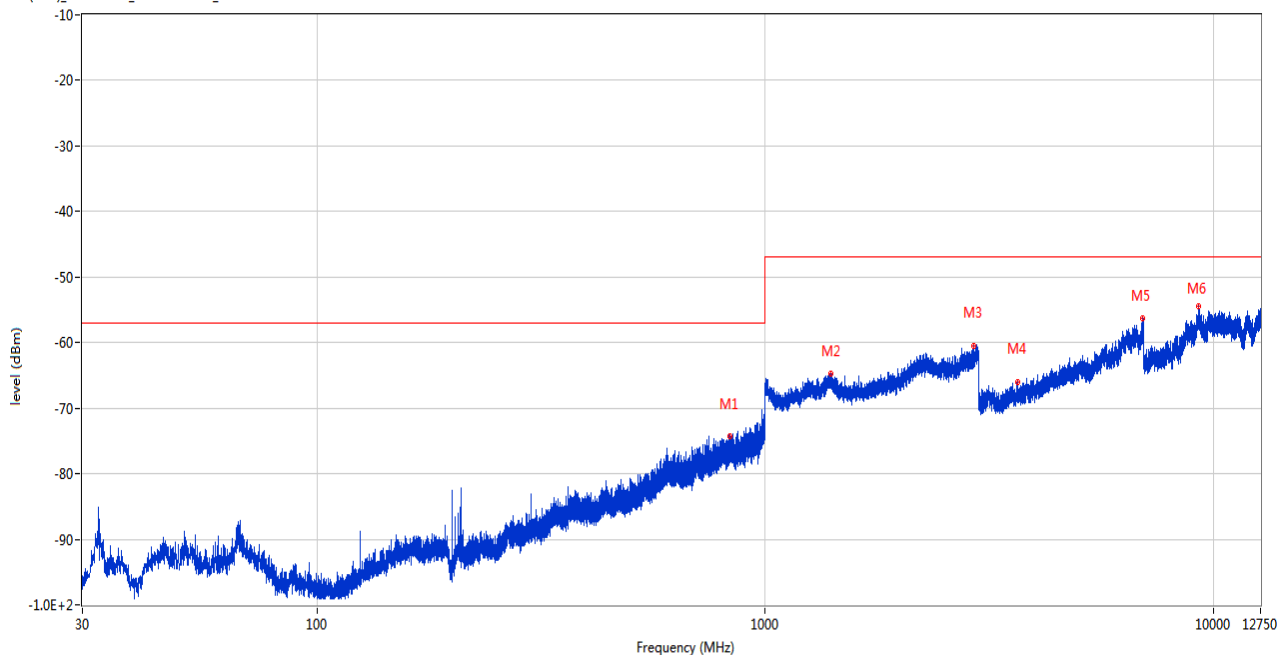
GFSK (BLE) High Frequency



Cabinet Radiated Test Data

30 MHz to 12.75 GHz, ANT H

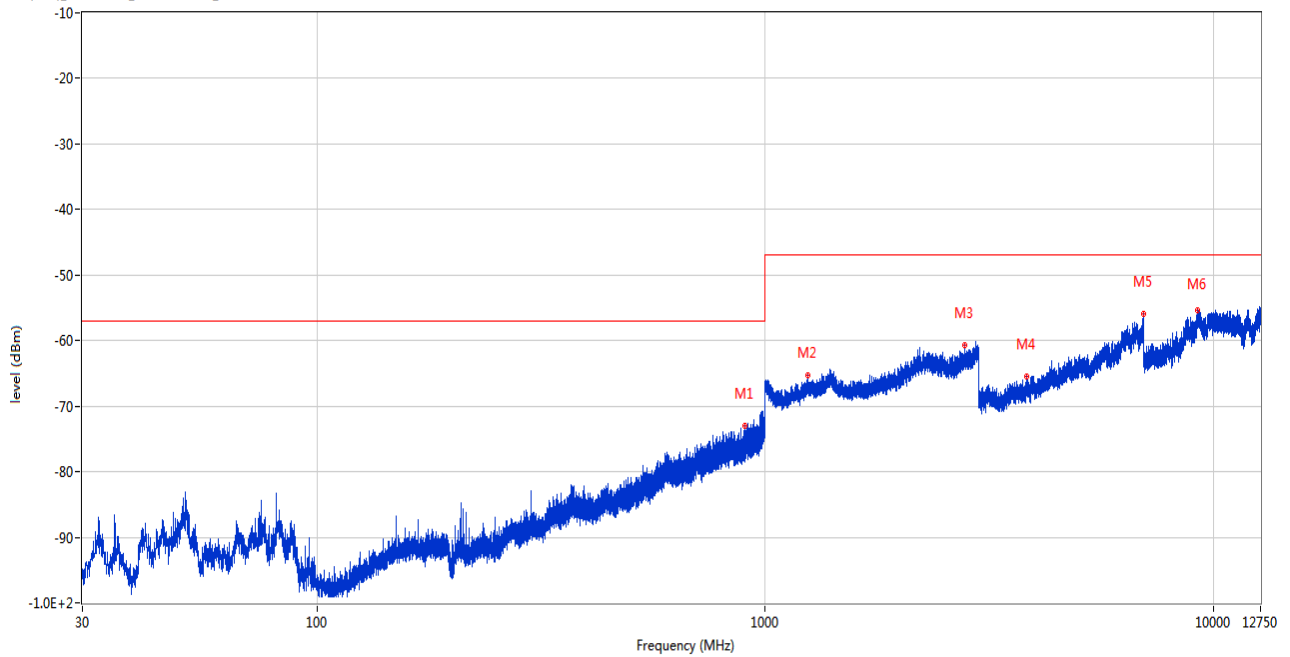
RSE (SRD)_EN 300328_EN300328 RX_30M-12.75GHz



Frequency (MHz)	Result (dBm)	Factor (dB)	PK Limit (dBm)	Over Limit (dB)	Table (o)	ANT	EUT	Verdict
836.652	-74.36	1.42	-57.0	-17.36	266.00	Horizontal	Horizontal	Pass
1402.900	-64.82	-4.11	-47.0	-17.82	291.00	Horizontal	Horizontal	Pass
2925.800	-60.42	0.96	-47.0	-13.42	93.00	Horizontal	Horizontal	Pass
3654.000	-65.96	-3.91	-47.0	-18.96	262.00	Horizontal	Horizontal	Pass
6973.800	-56.21	6.04	-47.0	-9.21	198.00	Horizontal	Horizontal	Pass
9289.075	-54.40	9.83	-47.0	-7.40	306.00	Horizontal	Horizontal	Pass

30 MHz to 12.75 GHz, ANT V

RSE (SRD)_EN 300328_EN300328 RX_30M-12.75GHz



Frequency (MHz)	Result (dBm)	Factor (dB)	PK Limit (dBm)	Over Limit (dB)	Table (o)	ANT	EUT	Verdict
901.739	-73.05	3.20	-57.0	-16.05	301.00	Vertical	Horizontal	Pass
1247.000	-65.26	-5.60	-47.0	-18.26	296.00	Vertical	Horizontal	Pass
2787.300	-60.76	-0.24	-47.0	-13.76	245.00	Vertical	Horizontal	Pass
3837.800	-65.51	-1.98	-47.0	-18.51	267.00	Vertical	Horizontal	Pass
6985.400	-55.89	6.02	-47.0	-8.89	281.00	Vertical	Horizontal	Pass
9216.912	-55.40	9.24	-47.0	-8.40	193.00	Vertical	Horizontal	Pass

A.12 Receiver Blocking

For Bluetooth Low Energy

Note¹: The combination of the smallest channel bandwidth and the lowest data rate was reported.

Note²: Blocking signal levels specified are levels in front of the UUT antenna. In case of conducted measurements, the levels corrected by the actual antenna assembly gain.

Test Data

Receiver Category 2 equipment

Wanted signal mean power from companion device (dBm)	Blocking signal Frequency (MHz)	Blocking signal power (dBm)	PER Result		Limit	Verdict
			Low channel	High channel		
(-139 dBm + 10 × log ₁₀ (OCBW) + 10 dB) or (-74 dBm + 10 dB) whichever is less	2 380	-34	0.13%	0.13%	≤10%	Pass
	2 504	-34	0.20%	0.13%		
	2 300	-34	0.13%	0.20%		
	2 584	-34	0.13%	0.13%		

Test Plot (PER)

Note: All the configuration were tested, but only the worst PER Plot were reported in this report.

For Bluetooth Low Energy

Low Channel		High Channel	
Packets received	1497	Packets received	1497

ANNEX B TEST SETUP PHOTOS

Please refer the document “BL-SZ2140930-AR.pdf”.

ANNEX C EUT EXTERNAL PHOTOS

Please refer the document “BL-SZ2140930-AW.pdf”.

ANNEX D EUT INTERNAL PHOTOS

Please refer the document “BL-SZ2140930-AI.pdf”.

ANNEX E INFORMATIVE

Application form for testing please refer to the document “BL-SZ2140930-AM.pdf”.

--END OF REPORT--

EMF

TEST REPORT

ISSUED BY
Shenzhen BALUN Technology Co., Ltd.

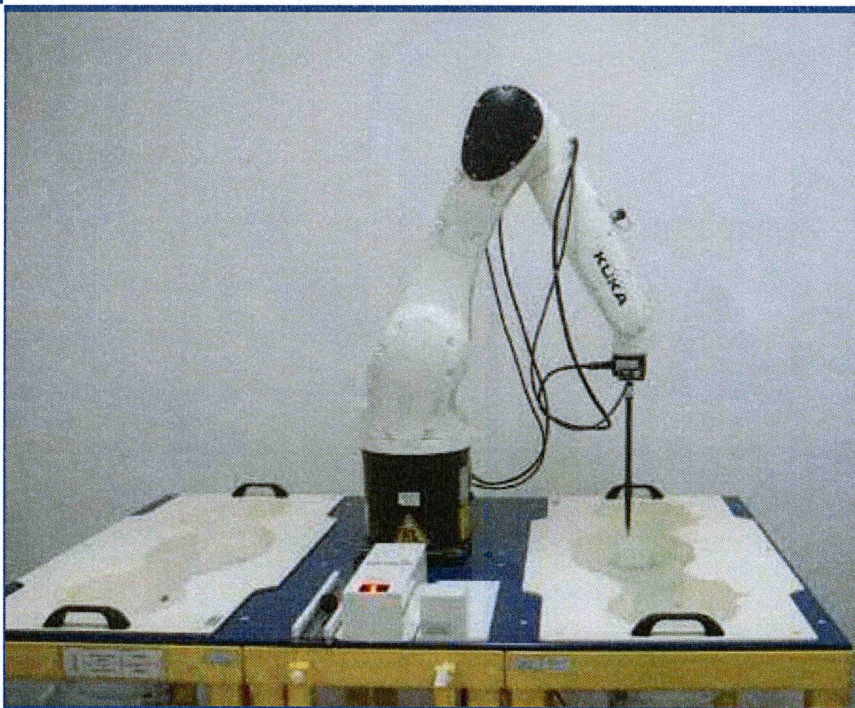


FOR

SwitchBot Contact Sensor

ISSUED TO
Woan Technology (Shenzhen) Co., Ltd.

Room 101-116, Building B4, Yintian Industrial Zone, Xixiang Street,
Bao'an District, Shenzhen, Guangdong, P.R. China, 518102



Tested by: 
Zong Liyao

Date: May 18, 2021

Approved by: 

Wei Yanquan
(Chief Engineer)

Date: May 18, 2021



Report No.: BL-SZ2140930-701
EUT Name: SwitchBot Contact Sensor
Model Name: W1201500 (refer section 2.4)
Brand Name: SwitchBot
Test Standard: EN 62479: 2010

Test Conclusion: Pass
Test Date: Apr. 27, 2021 ~ May 10, 2021
Date of Issue: May 18, 2021

NOTE: This test report of test results only related to testing samples, which can be duplicated completely for the legal use with the approval of the applicant; it shall not be reproduced except in full, without the written approval of Shenzhen BALUN Technology Co., Ltd. Any objections should be raised within thirty days from the date of issue. To validate the report, please contact us.

Revision History

<u>Version</u>	<u>Issue Date</u>	<u>Revisions Content</u>
<u>Rev. 01</u>	<u>May 18, 2021</u>	<u>Initial Issue</u>

TABLE OF CONTENTS

1	GENERAL INFORMATION	3
1.1	Identification of the Testing Laboratory	3
1.2	Identification of the Responsible Testing Location	3
1.3	Test Environment Condition	3
1.4	Announce	3
2	PRODUCT INFORMATION	4
2.1	Applicant Information	4
2.2	Manufacturer Information	4
2.3	Factory Information	4
2.4	General Description for Equipment under Test (EUT)	4
2.5	Ancillary Equipment	4
2.6	Technical Information	5
3	STANDARD INFORMATION	6
3.1	Test Standard	6
4	DEVICE CATEGORY AND LEVELS LIMITS	7
5	ASSESSMENT RESULT	8
5.1	Output Power	8
5.2	Conclusion	8

1 GENERAL INFORMATION

1.1 Identification of the Testing Laboratory

Company Name	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China.
Phone Number	+86 755 6685 0100
Fax Number	+86 755 6182 4271

1.2 Identification of the Responsible Testing Location

Test Location	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China.
Description	All measurement facilities used to collect the measurement data are located at Block B, FL 1, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China 518055

1.3 Test Environment Condition

Ambient Temperature	21°C to 23°C
Ambient Relative Humidity	40% to 50%
Ambient Pressure	100 KPa to 102 KPa

1.4 Announce

- (1) The test report reference to the report template version v2.0.
- (2) The test report is invalid if not marked with the signatures of the persons responsible for preparing and approving the test report.
- (3) The test report is invalid if there is any evidence and/or falsification.
- (4) The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein.
- (5) This document may not be altered or revised in any way unless done so by BALUN and all revisions are duly noted in the revisions section.
- (6) Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory.
- (7) The laboratory is only responsible for the data released by the laboratory, except for the part provided by the applicant.

2 PRODUCT INFORMATION

2.1 Applicant Information

Applicant	Woan Technology (Shenzhen) Co., Ltd.
Address	Room 101-116, Building B4, Yintian Industrial Zone, Xixiang Street, Bao'an District, Shenzhen, Guangdong, P.R. China, 518102

2.2 Manufacturer Information

Manufacturer	Woan Technology (Shenzhen) Co., Ltd.
Address	Room 101-116, Building B4, Yintian Industrial Zone, Xixiang Street, Bao'an District, Shenzhen, Guangdong, P.R. China, 518102

2.3 Factory Information

Factory	Woan Technology (Shenzhen) Co., Ltd.
Address	Room 101-116, Building B4, Yintian Industrial Zone, Xixiang Street, Bao'an District, Shenzhen, Guangdong, P.R. China, 518102

2.4 General Description for Equipment under Test (EUT)

EUT Name	SwitchBot Contact Sensor
Model Name Under Test	W1201500
Series Model Name	W1201501, W1201502, W1201503, W1201504, W1201505
Description of Model name differentiation	only differences are model names for trading purpose
Hardware Version	V1.0
Software Version	V4.1.5
Dimensions (Approx.)	N/A
Weight (Approx.)	N/A

2.5 Ancillary Equipment

Note: Not applicable.

2.6 Technical Information

Network and Wireless connectivity	Bluetooth (BLE)
-----------------------------------	-----------------

The requirement for the following technical information of the EUT was tested in this report:

Operating Mode	Bluetooth (BLE)
Frequency Range	2400 MHz ~ 2483.5 MHz
Antenna Type	Ceramic Antenna
Exposure Category	General Population/Uncontrolled Exposure
EUT Stage	Portable Device

3 STANDARD INFORMATION

3.1 Test Standard

No.	Identity	Document Title
1	EN 62479:2010	Assesment 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)

4 DEVICE CATEGORY AND LEVELS LIMITS

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the following limits.

For frequency range 10 MHz to 10 GHz

The basic restriction at frequencies between 10 MHz and 100 GHz is on localized SAR in the head. Any device with output power below 20 mW cannot produce an exposure exceeding this restriction under the most pessimistic exposure conditions. The basic restriction is 2 W/kg so any unit which supplies less than 20 mW ($=2/100W$) from its antenna port, averaged over 6 minutes, will meet the basic restriction.

For frequency range 10 GHz to 300 GHz

The most conservative assumption is that all the transmitted power is absorbed within the specified area, therefore any device which supplies less than 20 mW will meet the basic restriction. The average time is equal to $68/f-1.05$ minutes (where f is in GHz) In the frequency range 10 GHz to 300 GHz, the basic restriction is 10 Wm^{-2} averaged over any 20 cm^2 of exposed area with a spatial maximum of 200 Wm^{-2} averaged over 1 cm^2

Criteria A: All electromagnetic fields

If the average power emitted by apparatus operating in the frequency range 10 MHz – 300GHz is less than or equal to 20 mW and the transmitting peak power is less than 20W then the apparatus is deemed to comply with the basic restrictions without testing. Averaging time is 6 minutes in the frequency range 10 MHz to 10 GHz. The average time is equal to $68/f-1.05$ minutes (where f is in GHz) in the frequency range 10 GHz to 300 GHz. If the total supply power or the input power to the circuitry producing the greatest emissions in the device is less than or equal to 20 mW then it is assumed that the emitted power is less than 20 mW.

Criteria B: Pulse modulated electromagnetic fields with pulse duration less than 30 microseconds

For pulses of duration less than 30 microseconds at frequencies between 300 MHz and 10 GHz, there is also a basic restriction on Specific energy absorption (SA). This is 2 mJ kg^{-1} in any 10g of tissue in the head. For most pulses, the SAR restriction will be more stringent, but for pulses with a repetition frequency of less than 100 Hz, the SA restriction will predominate. For devices producing pulses with repetition rates below 100 Hz, the average power should be less than $20 \times \text{prf mW}$ (pulse repetition frequency, prf in Hz).

5 ASSESSMENT RESULT

5.1 Output Power

Bluetooth			
Mode	BLE		
	Low	Middle	High
EIRP (dBm)	-1.2	-0.3	0.2
Note: This report listed the maximal case EIRP power value, please refer to RF test report for more details.			

5.2 Conclusion

Note: The EIRP power of SwitchBot Contact Sensor at maximal case is: 0.2 dBm (1.05 mW) which is below the exempt condition, 20mW specified in EN62479: 2010. RF exposure assessment has been performed below to prove that this unit will not generate the harmful EM emission above the reference level as specified in EC Council Recommendation (1999/519/EC).

This EUT is deemed to comply with the reference level limits by Council Recommendation 1999/519/EC, therefore the basic restrictions are compliant with human exposure limits.

--END OF REPORT--



BLE

In accordance with ETSI EN 300 328, clause 5.4.1, the following information is provided by the manufacturer.

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: _____ ms

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.): _____ dBm

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:

The worst case	
Test item	operational mode
RF Output Power	GFSK
Power Spectral Density	GFSK
Duty cycle, Tx-Sequence, Tx-gap	N/A
Adaptivity & 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 beamforming
- ☐ 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 beamforming, the maximum (additional) beamforming 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: _____ MHz to _____ 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 MHz

Nominal Channel Bandwidth 2: N/A MHz

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: 15~35 ° C

Other (please specify if applicable): N/A

Extreme operating conditions:

Operating temperature range: Minimum: -10 ° C Maximum +60 ° C

Other (please specify if applicable): N/A Minimum: N/A Maximum N/A

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:

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

Antenna Gain: -1.78 dBi

If applicable, additional beamforming gain (excluding basic antenna gain): N/A 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
1			
2			
3			
4			

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			
4			

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			
4			

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 3 V



In case of DC, indicate the type of power source

- ☐ Internal Power Supply
- ☐ External Power Supply or AC/DC adapter
- ☒ Battery
- ☐ Other: _____

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

Please refer to Test Report Section 2.7 Additional Instructions.

p) The equipment type (e.g. Bluetooth®, WIFI: 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):

The minimum performance criterion shall be a PER less than or equal to 10 %.

EMC

TEST REPORT

ISSUED BY
Shenzhen BALUN Technology Co., Ltd.

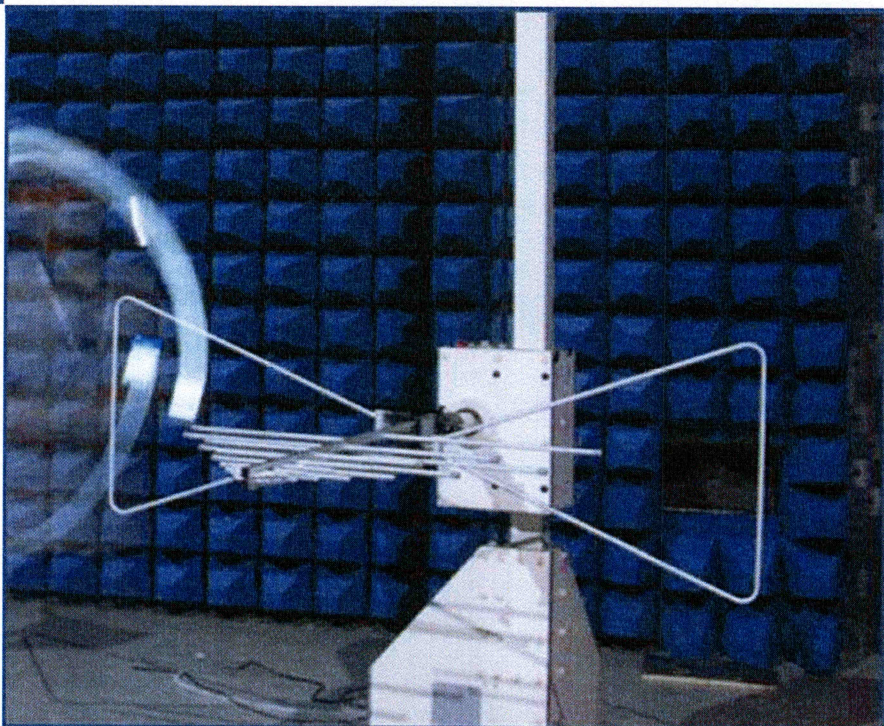


FOR

SwitchBot Contact Sensor

ISSUED TO
Woan Technology (Shenzhen) Co., Ltd.

Room 101-116, Building B4, Yintian Industrial Zone, Xixiang Street,
Bao'an District, Shenzhen, Guangdong, P.R. China, 518102



Tested by: Hu Qingshan

Hu Qingshan

Date: May 18, 2021

Approved by: Wei Yanquan

Wei Yanquan
(Chief Engineer)

Date: May 18, 2021

Report No.: BL-SZ2140930-401

EUT Name: SwitchBot Contact Sensor

Model Name: W1201500 (refer section 2.4)

Brand Name: SwitchBot

Test Standard: ETSI EN 301 489-1 V2.2.3(2019-11)
ETSI EN 301 489-17 V3.2.4 (2020-09)

Test Conclusion: Pass

Test Date: Apr. 29, 2021 ~ May 02, 2021

Date of Issue: May 18, 2021

NOTE: This test report of test results only related to testing samples, which can be duplicated completely for the legal use with the approval of the applicant; it shall not be reproduced except in full, without the written approval of Shenzhen BALUN Technology Co., Ltd. Any objections should be raised within thirty days from the date of issue. To validate the report, please contact us.

Revision History

Version	Issue Date	Revisions Content
<u>Rev. 01</u>	<u>May 18, 2021</u>	<u>Initial Issue</u>

TABLE OF CONTENTS

1	GENERAL INFORMATION	4
1.1	Identification of the Testing Laboratory	4
1.2	Identification of the Responsible Testing Location	4
1.3	Laboratory Condition	4
1.4	Announce	4
2	PRODUCT INFORMATION	5
2.1	Applicant Information	5
2.2	Manufacturer Information	5
2.3	Factory Information	5
2.4	General Description for Equipment under Test (EUT)	5
2.5	Ancillary Equipment	5
2.6	Technical Information	5
3	SUMMARY OF TEST RESULTS	6
3.1	Test Standards	6
3.2	Referenced Standards	7
3.3	Verdict	8
3.4	Test Uncertainty	9
4	GENERAL TEST CONFIGURATIONS	10
4.1	Test Environments	10
4.2	Test Equipment List	10
4.3	Test Enclosure list	13
4.4	Test Configurations	13
4.5	Test Setups	14
4.6	Test Conditions	20
5	TEST ITEMS	21
5.1	Emission Tests	21

5.2 Immunity Tests.....	26
ANNEX A TEST RESULTS.....	37
A.1 Radiated Emission	37
A.2 Conducted Emissions	41
A.3 Harmonic Current Emissions	41
A.4 Voltage Fluctuations and Flicker Measurement	41
A.5 Electrostatic Discharge Immunity	41
A.6 Radio Frequency Electromagnetic Field Immunity.....	41
A.7 Electrical Fast Transient / Burst Immunity.....	42
A.8 Transients and Surges	42
A.9 Surge Immunity	42
A.10 Immunity to Conducted Disturbances Induced by RF Fields	42
A.11 Voltage Dips and Short Interruptions Immunity	42
ANNEX B TEST SETUP PHOTOS	43
ANNEX C EUT EXTERNAL PHOTOS	43
ANNEX D EUT INTERNAL PHOTOS	43

1 GENERAL INFORMATION

1.1 Identification of the Testing Laboratory

Company Name	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Phone Number	+86 755 6685 0100
Fax Number	+86 755 6182 4271

1.2 Identification of the Responsible Testing Location

Test Location	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Description	All measurement facilities used to collect the measurement data are located at Block B, FL 1, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China 518055

1.3 Laboratory Condition

Ambient Temperature	20°C to 25°C
Ambient Relative Humidity	45% to 55%
Ambient Pressure	100 kPa to 102 kPa

1.4 Announce

- (1) The test report reference to the report template version V3.8.
- (2) The test report is invalid if not marked with the signatures of the persons responsible for preparing and approving the test report.
- (3) The test report is invalid if there is any evidence and/or falsification.
- (4) The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein.
- (5) This document may not be altered or revised in any way unless done so by BALUN and all revisions are duly noted in the revisions section.
- (6) Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory.
- (7) The laboratory is only responsible for the data released by the laboratory, except for the part provided by the applicant.

2 PRODUCT INFORMATION

2.1 Applicant Information

Applicant	Woan Technology (Shenzhen) Co., Ltd.
Address	Room 101-116, Building B4, Yintian Industrial Zone, Xixiang Street, Bao'an District, Shenzhen, Guangdong, P.R. China, 518102

2.2 Manufacturer Information

Manufacturer	Woan Technology (Shenzhen) Co., Ltd.
Address	Room 101-116, Building B4, Yintian Industrial Zone, Xixiang Street, Bao'an District, Shenzhen, Guangdong, P.R. China, 518102

2.3 Factory Information

Factory	Woan Technology (Shenzhen) Co., Ltd.
Address	Room 101-116, Building B4, Yintian Industrial Zone, Xixiang Street, Bao'an District, Shenzhen, Guangdong, P.R. China, 518102

2.4 General Description for Equipment under Test (EUT)

EUT Name	SwitchBot Contact Sensor
Model Name Under Test	W1201500
Series Model Name	W1201501, W1201502, W1201503, W1201504, W1201505
Description of Model name differentiation	only differences are model names for trading purpose
Hardware Version	V1.0
Software Version	V4.1.5
Dimensions (Approx.)	N/A
Weight (Approx.)	N/A

2.5 Ancillary Equipment

Note: Not applicable.

2.6 Technical Information

Network and Wireless connectivity		Bluetooth (BLE)
Interfaces present on the EUT	AC Ports	No AC ports.
	DC Ports	From power supply to EUT, the DC port cable length is less than 3m.
	I/O Ports	No I/O Ports.
	Wired Network Ports	No Wired Network ports.

3 SUMMARY OF TEST RESULTS

3.1 Test Standards

The objective of the report is to perform testing according to following standards for CE marking:

No.	Identity	Document Title
1	ETSI EN 301 489-1 V2.2.3 (2019-11)	ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements
2	ETSI EN 301 489-17 V3.2.4 (2020-09)	ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for Broadband Data Transmission Systems; Harmonised Standard for ElectroMagnetic Compatibility

3.2 Referenced Standards

The following referenced standards are necessary for the report. For undated references in this report, the cited version applies.

No.	Identity	Document Title
1	CENELEC EN 55032 (2015)	Electromagnetic compatibility of multimedia equipment - Emission Requirements.
2	CENELEC EN 61000-3-2 (2014)	Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)
3	CENELEC EN 61000-3-3 (2013)	Electromagnetic compatibility (EMC) - Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection.
4	CENELEC EN 61000-4-2 (2009)	Electromagnetic compatibility (EMC) - Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test.
5	CENELEC EN 61000-4-3 (2006), A1 (2008) and A2 (2010)	Electromagnetic compatibility (EMC) - Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test.
6	CENELEC EN 61000-4-4 (2012)	Electromagnetic compatibility (EMC) - Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test.
7	CENELEC EN 61000-4-5 (2014): + A1 (2017)	Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test.
8	CENELEC EN 61000-4-6 (2014)	Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields.
9	CENELEC EN 61000-4-11 (2004)	Electromagnetic compatibility (EMC) - Part 4-11: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests.
10	ISO 7637-2 (2004)	Road vehicles - Electrical disturbances from conduction and coupling - Part 2: Electrical transient conduction along supply lines only.

3.3 Verdict

No.	Base Standard	Description		Verdict	Test Result	Remark
Emission						
1	EN 55032	Radiated Emission	Below 1 GHz	Pass	ANNEX A.1	--
			Above 1 GHz	Pass		--
2	EN 55032	Conducted Emission	AC Mains Port	N/A	ANNEX A.2	--
			DC Power Port	N/A		--
			Wired Network Port	N/A		--
3	EN 61000-3-2	Harmonic Current Emissions		N/A	ANNEX A.3	Note 1
4	EN 61000-3-3	Voltage Fluctuations & Flicker		N/A	ANNEX A.4	--
Immunity						
5	EN 61000-4-2	Electrostatic Discharge Immunity		Pass	ANNEX A.5	--
6	EN 61000-4-3	Radiated RF Electromagnetic Field Immunity		Pass	ANNEX A.6	--
7	EN 61000-4-4	Electrical Fast Transient/Burst Immunity	AC Ports	N/A	ANNEX A.7	--
			DC Ports	N/A		--
			Wired Network Port	N/A		--
8	ISO 7637-2	Transients and Surges		N/A	ANNEX A.8	--
9	EN 61000-4-5	Surge Immunity	AC Ports	N/A	ANNEX A.9	--
			Wired Network Port	N/A		--
10	EN 61000-4-6	Immunity to Conducted Disturbances Induced by RF Fields	AC Ports	N/A	ANNEX A.10	--
			DC Ports	N/A		--
			Wired Network Port	N/A		--
11	EN 61000-4-11	Voltage Dips and Short Interruptions Immunity		N/A	ANNEX A.11	--
Note 1: There is no need for Harmonics test to be performed on this product (rated power is less than 75 W) in accordance with EN 61000-3-2: 2014.						
For further details, please refer to Clause 7 of EN 61000-3-2: 2014 which states:						
“For the following categories of equipment, limits are not specified in this edition of the standard:						
- equipment with a rated power of 75 W or less, other than lighting equipment.”						

3.4 Test Uncertainty

The following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

Measurement	Value
Conducted emissions (9 kHz-30 MHz)	2.96 dB
Radiated emissions (9 kHz-30 MHz)	3.76 dB
Radiated emissions (30 MHz-1 GHz)	3.67 dB
Radiated emissions (1 GHz-18 GHz)	3.57 dB
Radiated emissions (18 GHz-26.5 GHz)	5.16 dB

4 GENERAL TEST CONFIGURATIONS

4.1 Test Environments

Environment Parameter	Selected Values During Tests			
	Temperature	Voltage	Relative Humidity	Ambient Pressure
Normal Temperature, Normal Voltage (NTNV)	23°C to 25°C	DC 3 V from Battery	50% to 55%	100 kPa to 102 kPa

4.2 Test Equipment List

Radiated Emission Test For Frequency Below 1 GHz (10 m)						
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due	Use
EMI Receiver	ROHDE&SCHWARZ	ESRP	101036	2020.06.09	2021.06.08	☐
Test Antenna-Bi-Log	SCHWARZBECK	VULB 9168	9168-0883	2020.05.11	2022.05.10	☐
Anechoic Chamber	EMC Electronic Co., Ltd	20.10*11.60 *7.35m	N/A	2018.08.08	2021.08.07	☐

Radiated Emission Test For Frequency Below 1 GHz (3 m)						
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due	Use
EMI Receiver	KEYSIGHT	N9038A	MY53220118	2020.09.18	2021.09.17	☒
Test Antenna-Bi-Log	SCHWARZBECK	VULB 9163	9163-624	2019.07.02	2021.07.01	☒
Anechoic Chamber	RAINFORD	9m*6m*6m	N/A	2020.03.16	2023.03.15	☒

Radiated Emission Test For Frequency Above 1 GHz						
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due	Use
EMI Receiver	KEYSIGHT	N9038A	MY53220118	2020.09.18	2021.09.17	☒
Test Antenna-Horn	SCHWARZBECK	BBHA 9120D	9120D-1148	2019.07.02	2021.07.01	☒
Anechoic Chamber	RAINFORD	9m*6m*6m	N/A	2020.03.16	2023.03.15	☒

Conducted disturbance Test						
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due	Use
EMI Receiver	KEYSIGHT	N9010B	MY57110309	2020.06.08	2021.06.07	☐
LISN	SCHWARZBECK	NSLK 8127	8127-687	2020.06.09	2021.06.08	☐
ISN	TESEQ	ISN T800	34449	2020.09.18	2021.09.17	☐
ISN	TESEQ	ISN T8-CAT6	53561	2020.06.09	2021.06.08	☐
Shielded	YiHeng Electronic	3.4m*3.1m*2	N/A	2018.08.16	2021.08.15	☐

Conducted disturbance Test						
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due	Use
Enclosure	Co., Ltd	.8m				

Voltage Fluctuations & Flicker and Harmonic Current Emissions Test						
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due	Use
HARMONICS,FLICKER&POWER ANALYSER	LAPLACE INSTRUMENTS	AC2000A	377954	2020.10.16	2021.10.15	☐
AC TESTING POWER SOURCE	EVERFINE	DPS1030	Y120984CJ7 331115	2021.01.14	2022.01.13	☐

Electrostatic Discharge Immunity Test						
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due	Use
ESD Test System	SCHLODER	SESD 30000	206253	2021.03.16	2022.03.15	☒

Radiated RF Electromagnetic Field Immunity Test						
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due	Use
Anechoic Chamber	RAINFORD	7m*4m*3m	N/A	2019.11.24	2022.11.23	☒
Signal Generator	Agilent	N5181A	MY50141919	2020.06.08	2021.06.07	☒
Power Amplifier	OPHIR RF	5225F	1037	2021.02.18	2022.02.17	☒
Power Amplifier	OPHIR RF	5273F	1016	2021.02.18	2022.02.17	☒
Power Amplifier	RFLIGHT	NTWPAS	2560025	2021.02.18	2022.02.17	☒
Power Meter	R&S	NRVD-B2	7250BJ-0112/2011	2020.09.25	2021.09.24	☒
Directional Coupler	Werlantone	C5982-10	109275	N/A	N/A	☒
Directional Coupler	Werlantone	CHP-273E	S00801z-01	N/A	N/A	☒
Feld Strength Meter	Narda	EP602	511WX51129	2020.09.22	2021.09.21	☒
Test Antenna-Bi-Log	SCHWARZBECK	VULB 9163	9163-624	2019.07.02	2021.07.01	☒
Test Antenna-Horn	SCHWARZBECK	BBHA 9120D	9120D-1917	2019.07.02	2021.07.01	☒
Mouth Simulator	B&K	4227	2423931	2020.10.23	2021.10.22	☐
Sound Calibrator	B&K	4231	2430337	2020.10.23	2021.10.22	☐
Sound Level Meter	B&K	NL-20	00844023	2020.10.23	2021.10.22	☐
Ear Simulator	B&K	4192 -L-001	3038758	2021.01.15	2022.01.14	☐
Audio analyzer	R&S	UPL 16	100129	2021.02.26	2022.02.25	☐

Electrical Fast Transient/Burst Immunity & Transients and Surges & Voltage Dips and Short Interruptions Immunity Test						
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due	Use
(EFT/ SURGE/ DIPS)Three-in-one Test System	HTEC	HCOMPACT 7	190801	2020.06.09	2021.06.08	☐
DIPS coupling	HTEC	HV1P16T	190303	2020.06.09	2021.06.08	☐
EFT Clamp (Telecom Ports)	HTEC	H3C	N/A	2020.06.09	2021.06.08	☐
SURGE coupling (Telecom Ports)	HTEC	TCOMB-4	143807	2020.06.09	2021.06.08	☐

Immunity to Conducted Disturbances Induced by RF Fields						
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due	Use
CONDUCTED DISTURBANCES TEST SYSTEM	Schloder GmbH	CDG 6000	126B1286	2020.06.09	2021.06.08	☐
CDN-M2+3	Schloder GmbH	CDN M2+M3-16	A2210276	2020.06.09	2021.06.08	☐
Injection Probe	FCC	F-120-8M	190119	2021.01.14	2022.01.13	☐

4.3 Test Enclosure list

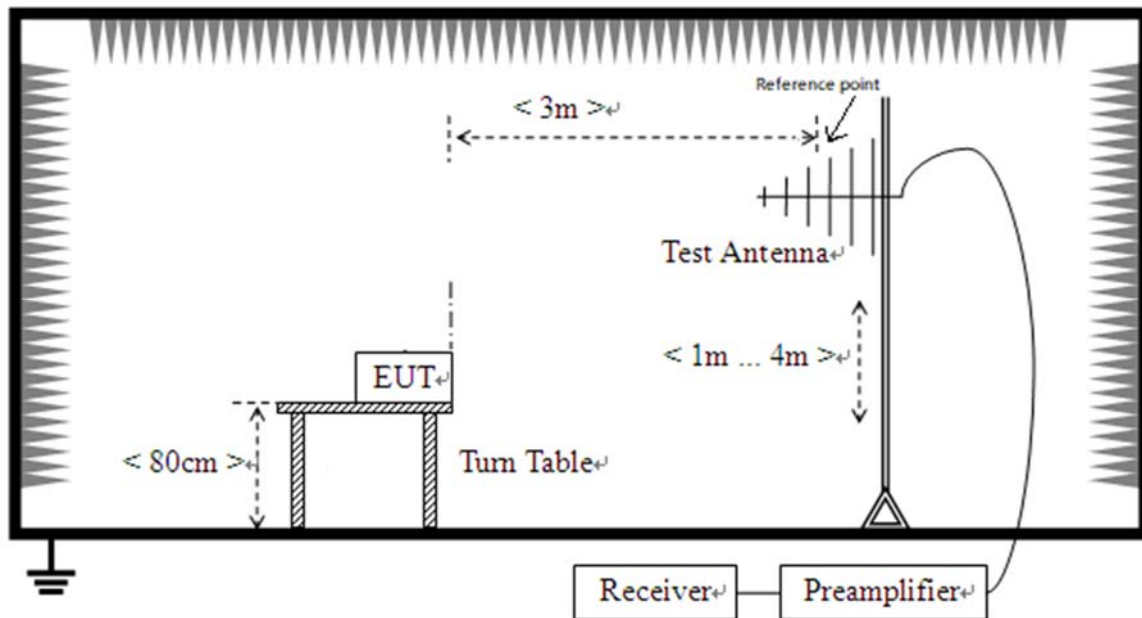
Description	Manufacturer	Model	Serial No.	Length	Description	Use
iPhone	Apple	A1586	N/A	N/A	N/A	☒
Battery	Nanfu	N/A	N/A	N/A	N/A	☒

4.4 Test Configurations

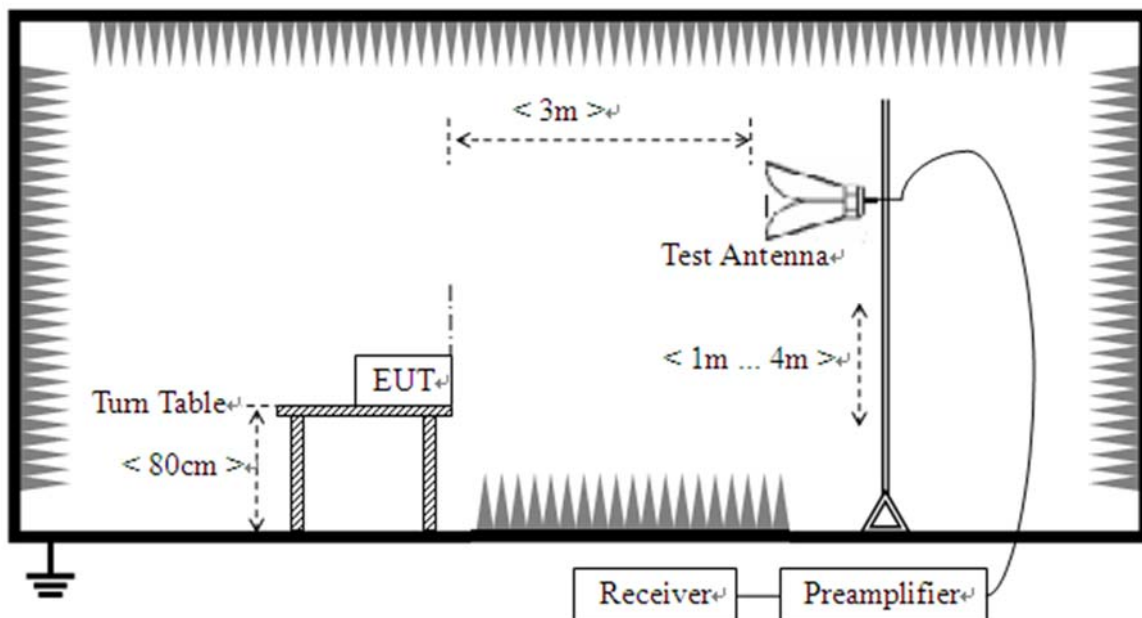
Test Configurations (TC) No.	Description
TC01	<u>The Working Test Mode</u> EUT + Battery + iPhone

4.5 Test Setups

Test Setup 1

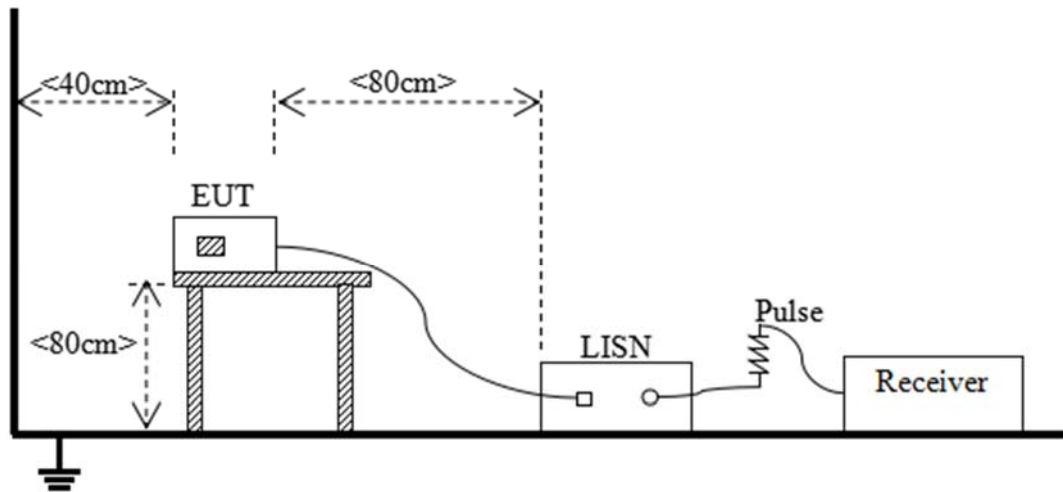


(For Radiated Emission Test (30 MHz-1 GHz))



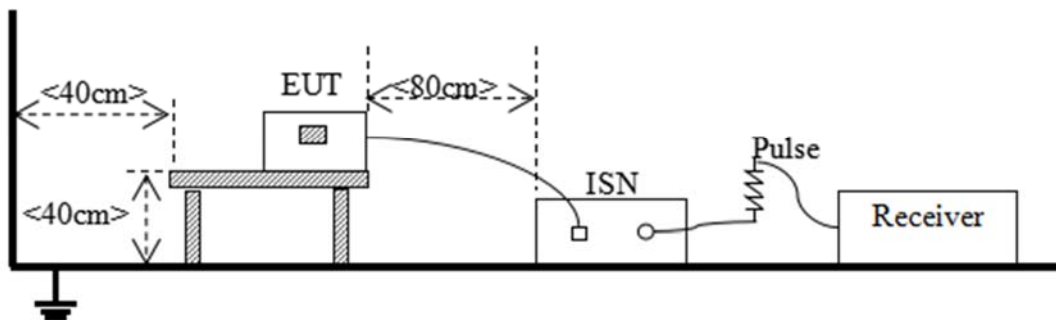
(For Radiated Emission Test (above 1 GHz))

Test Setup 2



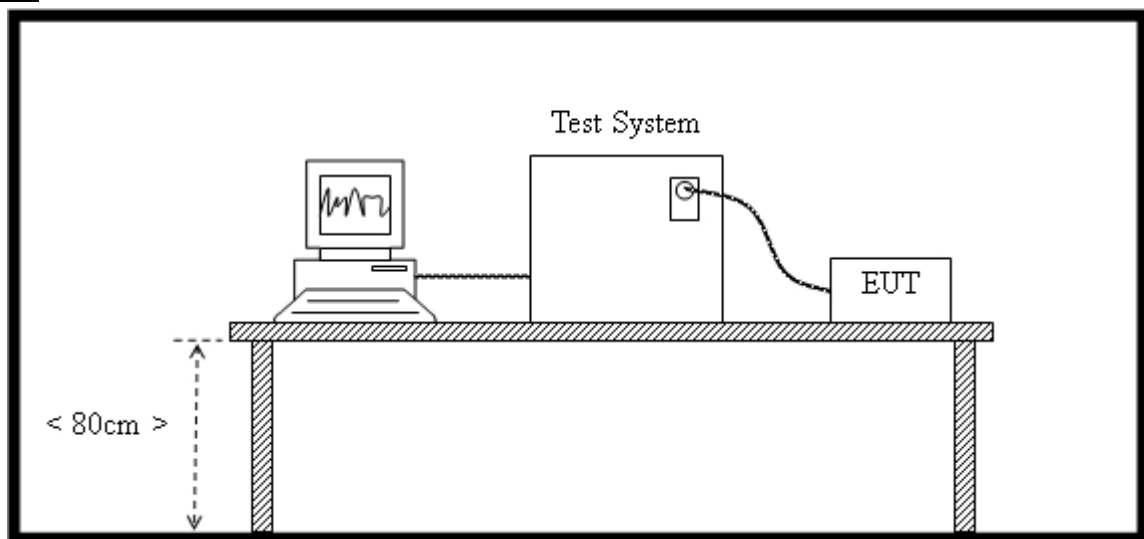
(For Conducted Emission at AC/DC Ports Test)

Test Setup 3



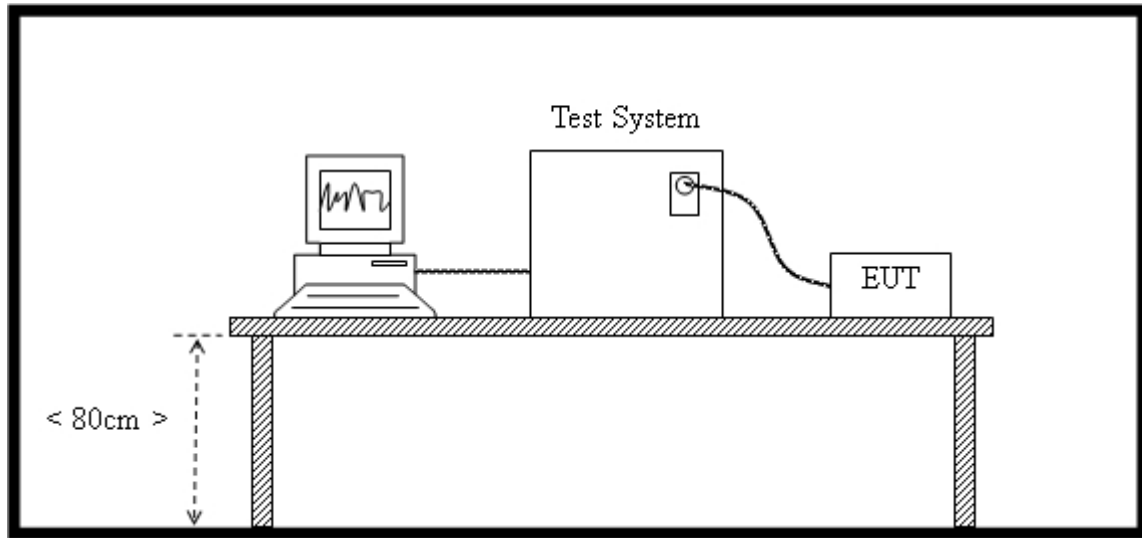
(For Conducted Emission for Wired Network Ports Test)

Test Setup 4



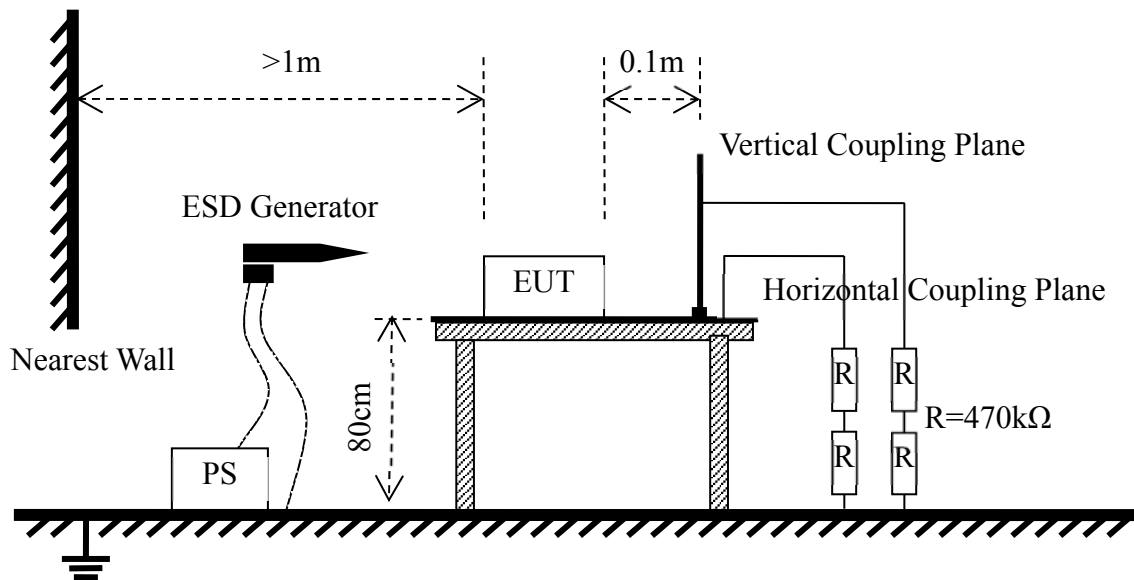
(For Harmonic Current Emissions Measurement Test)

Test Setup 5



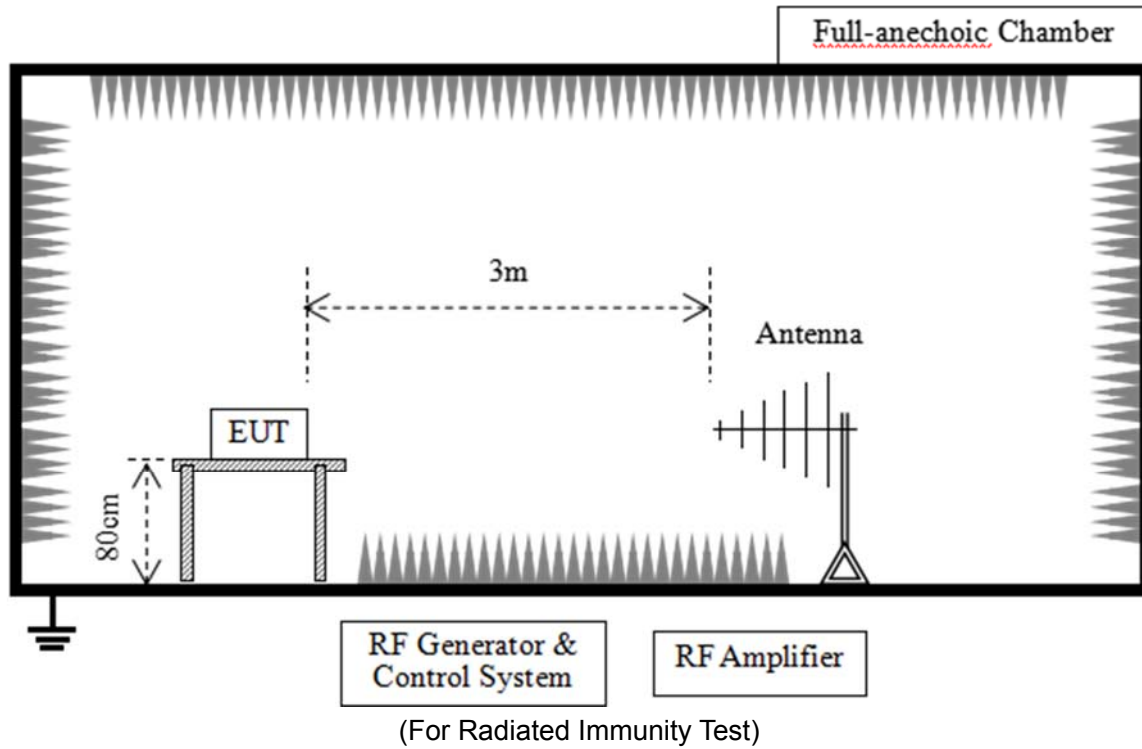
(For Voltage Fluctuations and Flicker Measurement Test)

Test Setup 6

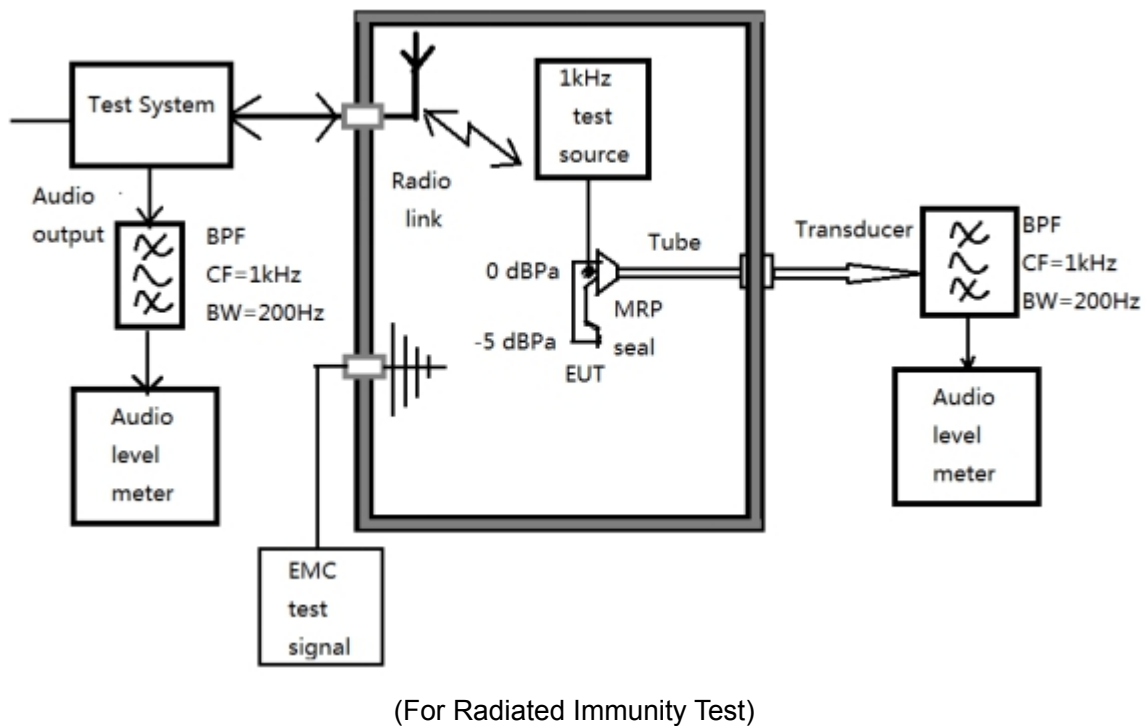


(For Electrostatic Discharge Immunity Test)

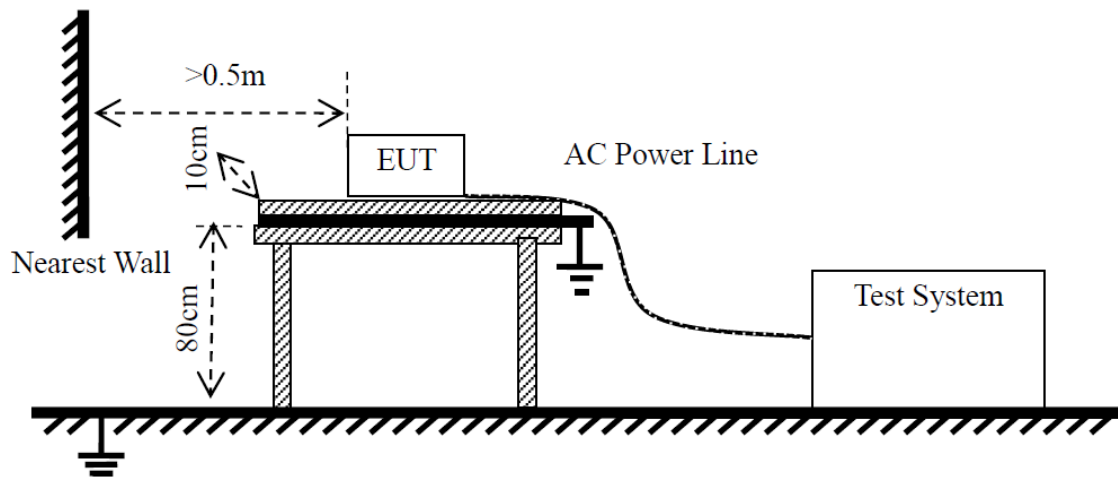
Test Setup 7



Downlink and Uplink Testing Set-up

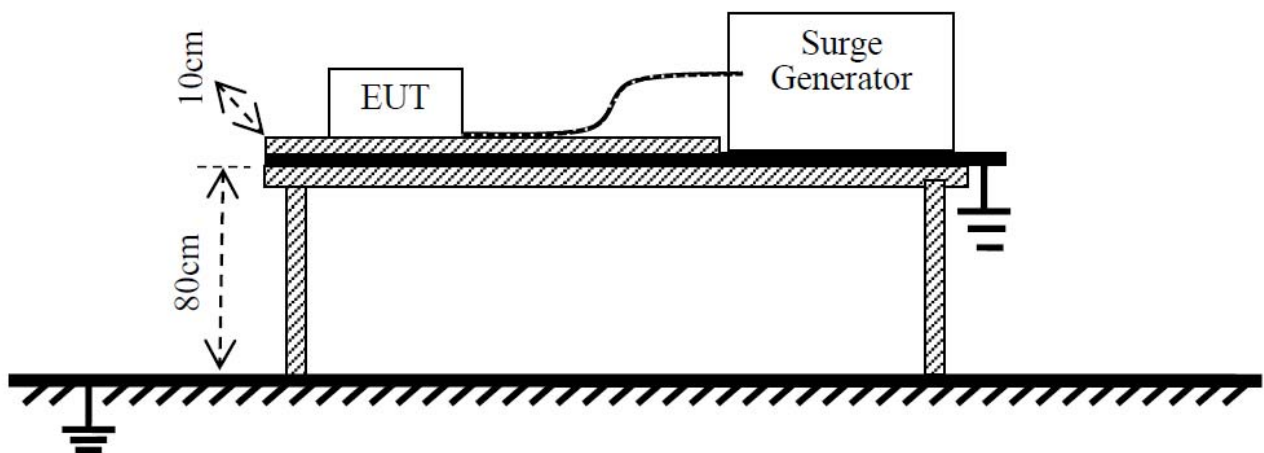


Test Setup 8



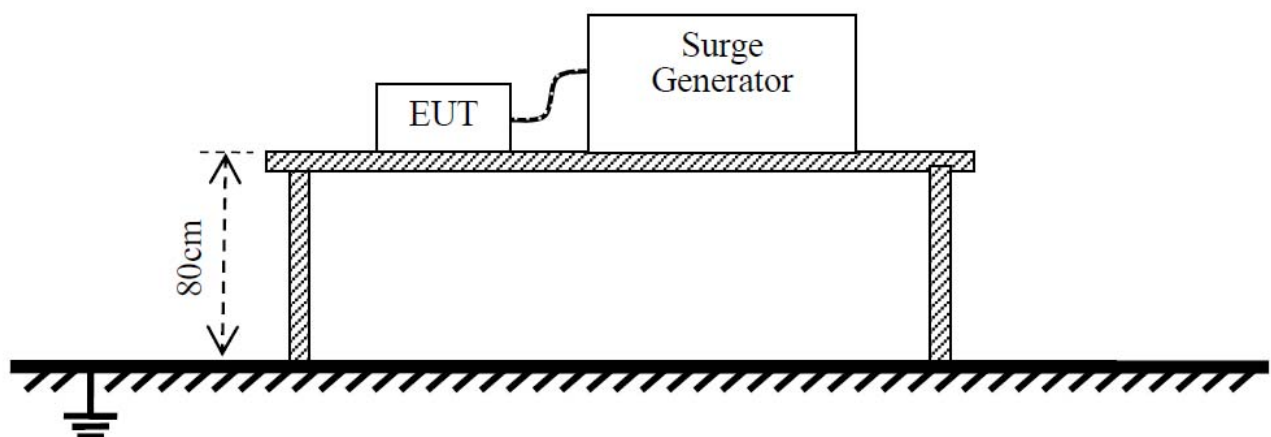
(For Electrical Fast Transient / Burst Immunity Test)

Test Setup 9



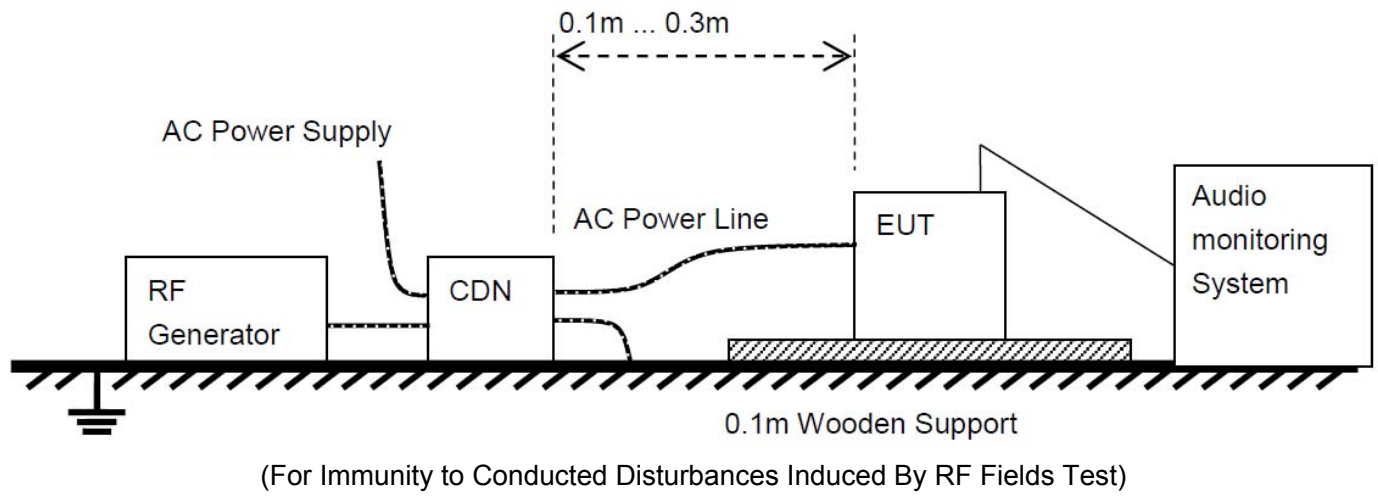
(Transients and Surges)

Test Setup 10

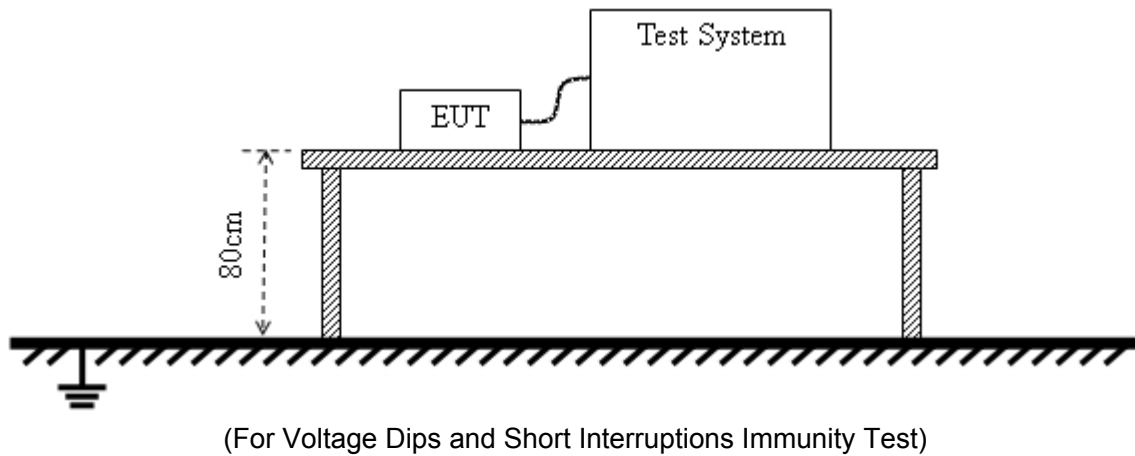


(For Surge Immunity Test)

Test Setup 11



Test Setup 12



4.6 Test Conditions

Test Case	Test Conditions	
Radiated Emission	Test Env.	NTNV
	Test Setup	Test Setup 1
	Test Configuration	TC01 ^{Note}
Electrostatic Discharge Immunity	Test Env.	NTNV
	Test Setup	Test Setup 6
	Test Configuration	TC01 ^{Note}
Radiated RF Electromagnetic Field Immunity	Test Env.	NTNV
	Test Setup	Test Setup 7
	Test Configuration	TC01 ^{Note}
Note: Based on client request, all normal using modes of the normal function were tested but only the worst test data of the worst mode is reported by this report. The Working Test Mode the worst mode in this report.		

5 TEST ITEMS

5.1 Emission Tests

5.1.1 Radiated Emission

5.1.1.1 Limit

Frequency range (MHz)	Class A (at 3 m)	Class B (at 3 m)
	Quasi-Peak Limit (dB μ V/m)	Quasi-Peak Limit (dB μ V/m)
30 - 230	50	40
230 - 1000	57	47

Frequency range (MHz)	Class A (at 3 m)		Class B (at 3 m)	
	Peak Limit (dB μ V/m)	Average Limit (dB μ V/m)	Peak Limit (dB μ V/m)	Average Limit (dB μ V/m)
1000-3000	76	56	70	50
3000-6000	80	60	74	54

Requirements for radiated emissions from FM receivers

Frequency range (MHz)	Measurement		Quasi-Peak Limit (dB μ V/m) Fundamental	Quasi-Peak Limit (dB μ V/m) Harmonics	Quasi-Peak Limit (dB μ V/m) Other
	Facility	Distance m			
30-230	OATS/S AC	10	50	42	30
230-300				42	37
300-1000				46	37
30-230	OATS/S AC	3	60	52	40
230-300				52	47
300-1000				56	47

NOTE:

- 1) The lower limit shall apply at the transition frequency.
- 2) Additional provisions may be required for cases where interference occurs.

5.1.1.2 Test Setup

Please refer to 4.5 section description of test setup of test setup 1. The photo of test setup please refer to ANNEX B.

5.1.1.3 Test Procedure

All Radiated Emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

An initial pre-scan was performed in the chamber using the EMI Receiver in peak detection mode. Quasi-peak measurements were conducted based on the peak sweep graph. The EUT was measured by Bi-Log antenna with 2 orthogonal polarities.

5.1.1.4 Test Result

Please refer to ANNEX A.1.

5.1.2 Conducted Emission

5.1.2.1 Test Limit

AC Port

Frequency range (MHz)	Class A		Class B	
	Quasi-peak (dB μ V)	Average (dB μ V)	Quasi-peak (dB μ V)	Average (dB μ V)
0.15 - 0.50	79	66	66-56	56-46
0.50 - 5	73	60	56	46
5 - 30	73	60	60	50

DC Port

Frequency range (MHz)	Quasi-peak (dB μ V)	Average (dB μ V)
0.15 - 0.50	79	66
0.50 - 30	73	60

NOTE:

- 1) The lower limit shall apply at the band edges.
- 2) The limit decreases linearly with the logarithm of the frequency in the range 0.15 - 0.50 MHz.

Wired Network Port

Frequency range (MHz)	Class A		Class B	
	Quasi-peak (dB μ V)	Average (dB μ V)	Quasi-peak (dB μ V)	Average (dB μ V)
0.15 - 0.50	97-87	84-74	84-74	74-64
0.50 - 30	87	74	74	64

NOTE:

- 1) The lower limit shall apply at the band edges.
- 2) The limit decreases linearly with the logarithm of the frequency in the range 0.15 - 0.50 MHz.

5.1.2.2 Test Setup

Please refer to 4.5 section description of test setup of test setup 2 or setup 3. The photo of test setup please refer to ANNEX B.

5.1.2.3 Test Procedure

The EUT is connected to the power mains through a LISN which provides 50 Ω /50 μ H of coupling impedance for the measuring instrument. The test frequency range is from 150 kHz to 30 MHz. The maximum conducted interference is searched using Peak (PK), Quasi-peak (QP) and Average (AV) detectors; the emission levels that are more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors. Tests for both L phase and N phase lines of the power mains connected to the EUT are performed.

5.1.2.4 Test Result

Please refer to ANNEX A.2.

5.1.3 Harmonic Current Emissions

5.1.3.1 Limit

Limits for Class A equipment				Limits for Class D equipment		
odd harmonic		Even harmonics		Harmonic order (n)	Maximum permissible harmonic current per watt mA/W	Maximum permissible harmonic current A
Harmonic order (n)	Maximum permissible harmonic current A	Harmonic order (n)	Maximum permissible harmonic current A			
3	2.30	2	1.08	3	3.4	2.30
5	1.14	4	0.43	5	1.9	1.14
7	0.77	6	0.30	7	1.0	0.77
9	0.40	$8 \leq n \leq 40$	$0.23 \times 8/n$	9	0.5	0.40
11	0.33			11	0.35	0.33
13	0.21			$15 \leq n \leq 39$	3.85/n	$0.15 \times 15/n$
$15 \leq n \leq 39$	$0.15 \times 15/n$					

Note: For Class B equipment, the harmonics of the input current shall not exceed the values given in Table “limits for Class A equipment” multiplied by a factor of 1,5.

For the purpose of harmonic current limitation, equipment is classified as follows :(Note: Class C equipment requirement not include in this standard.)

Class A:

- balanced three-phase equipment;
- household appliances, excluding equipment identified as class D;
- tools, excluding portable tools;
- dimmers for incandescent lamps;
- audio equipment.

Equipment not specified in one of the three other classes shall be considered as class A equipment.

Class B:

- portable tools;
- arc welding equipment which is not professional equipment.

Class C:

- lighting equipment.

Class D:

Equipment having a specified power according to 6.2.2 less than or equal to 600 W, of the following types:

- personal computers and personal computer monitors;
- television receivers.

5.1.3.2 Test Setup

Please refer to 4.5 section description of test setup of test setup 4. The photo of test setup please refer to ANNEX B.

5.1.3.3 Test Procedure

The EUT is placed on the top of a wooden table 0.8 m above the ground and operated to produce the maximum harmonic components under normal operating conditions for each successive harmonic component in turn.

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 necessary for the EUT to be exercised.

5.1.3.4 Test Result

Please refer to ANNEX A.3.

5.1.4 Voltage Fluctuations and Flicker Measurement

5.1.4.1 Limit

Test Item	Limit	Note
Pst	1.0	Short-term flicker indicator
Plt	0.65	Long-term flicker indicator
Tdt	0.5	Maximum time that dt exceeds 3%
dmax (%)	4%	Maximum relative voltage change
dc (%)	3.3%	Relative steady-state voltage change

5.1.4.2 Test Setup

Please refer to 4.5 section description of test setup of test setup 5. The photo of test setup please refer to ANNEX B.

5.1.4.3 Test Procedure

During the Flicker measurement, the measure time shall include that part of whole operation changes. The observation period for short-term flicker indicator is 10 minutes and the observation period for long-term flicker indicator is 2 hours. The test specifications refer the next table.

No.	Specification	Value
1	Test Frequency	50 Hz
2	Test Voltage	230 VAC
3	Waveform	Sine
4	Test Time	10 minutes for Pst; 2 hours for Plt

5.1.4.4 Test Result

Please refer to ANNEX A.4.

5.2 Immunity Tests

5.2.1 Test Performance Criteria for Immunity Test

5.2.1.1 Performance Criteria (EN 301489-1)

5.2.1.1.1 General Performance Criteria

Type	Description
Criterion A	The apparatus shall continue to operate as intended during and after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended.
Criterion B	The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended.
Criterion C	Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls.

5.2.1.1.2 Performance Criteria for CT and CR

During and after the test, the equipment shall continue to operate as intended. No degradation of performance or loss of function is allowed below a permissible performance level specified by the manufacturer when the equipment is used as intended. In some cases this permissible performance level may be replaced by a permissible loss of performance.

During the test the EUT shall not unintentionally transmit or change its actual operating state and stored data.

If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be deduced from the product description and documentation and what the user may reasonably expect from the equipment if used as intended.

5.2.1.1.3 Performance Criteria for TT and TR

For surges applied to symmetrically operated wired network ports intended to be connected directly to outdoor lines the following criteria applies:

- For products with only one symmetrical port intended for connection to outdoor lines, 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. A SW reboot is not allowed. Information stored in non-volatile memory, or protected by a battery backup, shall not be lost.
- For products with more than one symmetrical port intended for connection to outdoor lines, loss of function on the port under test is allowed, provided the function is self-recoverable. A SW reboot is not allowed. Information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

For all other ports the following applies:

- After the test, the equipment shall continue to operate as intended. No degradation of performance or loss of function is allowed below a permissible performance level specified by the manufacturer, when the equipment is

used as intended. In some cases this permissible performance level may be replaced by a permissible loss of performance.

- During the EMC exposure to an electromagnetic phenomenon, a degradation of performance is, however, allowed. No change of the actual mode of operation (e.g. unintended transmission) or stored data is allowed.
- If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be deduced from the product description and documentation and what the user may reasonably expect from the equipment if used as intended.

5.2.1.2 Performance criteria (EN 301489-17)

5.2.1.2.1 General Performance Criteria

Type	During test	After test
Criterion A	Shall operate as intended. (see note). Shall be no loss of function. Shall be no unintentional transmissions	Shall operate as intended. Shall be no degradation of performance. Shall be no loss of function. Shall be no loss of critical stored data.
Criterion B	May be loss of function.	Functions shall be self-recoverable. Shall operate as intended after recovering. Shall be no loss of critical stored data.
Criterion C	May be loss of function.	Functions shall be recoverable by the operator. Shall operate as intended after recovering. Shall be no loss of critical stored data
NOTE: For equipment that supports a PER or FER, the minimum performance level shall be a PER or FER less than or equal to 10 %. For equipment that does not support a PER or a FER, the minimum performance level shall be no loss of the wireless transmission function needed for the intended use of the equipment.		

About Bluetooth function Performance Criteria

Type	During test	After test
Criterion A	Shall operate as intended. May show degradation of performance (For example have noise or transmission short time interruption). Shall be no loss of Bluetooth function. Shall be no unintentional transmissions.	Shall operate as intended. Shall be no degradation of performance (For example have noise or transmission short time interruption) Shall be no loss of Bluetooth function. Shall be no loss of stored data or user programmable functions.
Criterion B	May show loss of function (For example Bluetooth transmission interruption). May show degradation of performance (For example have noise or transmission short time interruption). No unintentional transmissions.	Bluetooth Functions shall be self-recoverable. Shall operate as intended after recovering. Shall be no degradation of performance (For example have noise or transmission short time interruption). Shall be no loss of stored data or user programmable functions.
Criterion C	May be loss of function (For example Bluetooth transmission interruption).	Functions shall be recoverable by the operator. Shall operate as intended after recovering. Shall be no degradation of performance (For example have noise or transmission short time interruption).

5.2.1.2.2 Performance criteria for Continuous phenomena

The performance criteria A shall apply.

Where the EUT is a transmitter in standby mode, unintentional transmission shall not occur during the test.

Where the EUT is a transceiver in receive mode, unintentional transmission shall not occur during the test.

5.2.1.2.3 Performance criteria for Transient phenomena

The performance criteria B shall apply, except for voltage dips greater than or equal to 100 ms and voltage interruptions of 5 000 ms duration, for which performance criteria C shall apply.

Where the EUT is a transmitter in standby mode, unintentional transmission shall not occur as a result of the application of the test.

Where the EUT is a transceiver in receive mode, unintentional transmission shall not occur as a result of the application of the test.

5.2.2 Electrostatic Discharge Immunity

5.2.2.1 Test Specification

Specification	Value
Basic Standard	EN 61000-4-2
Discharge Impedance	330 Ohm / 150 pF
Discharge Voltage	Air Discharge: 2 kV; 4 kV; 8 kV; Contact Discharge: 2 kV; 4 kV
Polarity	Positive / Negative
Number of Discharge	Minimum 20 times at each test point
Discharge Mode	Single discharge
Discharge Period	1 second minimum

5.2.2.2 Test Setup

Please refer to 4.5 section description of test setup of test setup 6. The photo of test setup please refer to ANNEX B.

5.2.2.3 Test Procedure

1. Electrostatic discharges are applied only to those points and surfaces of the EUT that are accessible to users during normal operation.
2. The test is performed with at least ten single discharges on the pre-selected points in the most sensitive polarity.
3. The time interval between two successive single discharges is at least 1 second.
4. The ESD generator is held perpendicularly to the surface to which the discharge is applied and the return cable is at least 0.2 meters from the EUT.
5. Contact discharges are applied to the non-insulating coating, with the pointed tip of the generator penetrating the coating and contacting the conducting substrate.
6. Air discharges are applied with the round discharge tip of the discharge electrode approaching the EUT as fast as possible (without causing mechanical damage) to touch the EUT. After each discharge, the ESD generator is removed from the EUT and re-triggered for a new single discharge. The test is repeated until all discharges were completed.
7. At least ten single discharges (in the most sensitive polarity) are applied to the Horizontal Coupling Plane at points on each side of the EUT. The ESD generator is positioned vertically at a distance of 0.1 meters from the EUT with the discharge electrode touching the HCP.
8. At least ten single discharges (in the most sensitive polarity) are applied to the center of one vertical edge of the Vertical Coupling Plane in sufficiently different positions that the four faces of the EUT were completely illuminated. The VCP (dimensions 0.5 m*0.5 m) is placed vertically to and 0.1 meters from the EUT.

5.2.2.4 Test Result

Please refer to ANNEX A.5.

5.2.3 Radio Frequency Electromagnetic Field Immunity

5.2.3.1 Test Specification

Specification	Value
Basic Standard	EN 61000-4-3
Frequency Range	80 MHz to 6000 MHz
Field Strength	3 V/m (unmodulated, r.m.s)
Modulation	1 kHz 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

5.2.3.2 Test Setup

Please refer to 4.5 section description of test setup of test setup 7. The photo of test setup please refer to ANNEX B.

5.2.3.3 Test Procedure

PER Test:

Before testing, we should set the base station(CMW500) to the mode that needs to be tested, such as Bluetooth or WIFI, then set EUT to the corresponding mode and connect to Base station. Adjust the base station interface to the PER interface, and observe the PER value on the base station interface by adding interference signal during the test.

The test procedure was in accordance with EN 61000-4-3.

1. The testing is performed in a fully anechoic chamber. The transmit antenna is located at a distance of 3 meters from the EUT.
2. The test signal is 80% amplitude modulated with a 1 kHz sine wave.
3. The frequency range is swept from 80 MHz to 6000 MHz with the exception of the exclusion band for transmitters, receivers and duplex transceivers. The rate of sweep does not exceed 1.5×10^{-3} decade/s. Where the frequency range is swept incrementally, the step size is 1% of fundamental.
4. The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.
5. The field strength level is 3 V/m.
6. The test is performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides, but only the worst side data is reported in this report.

5.2.3.4 Test Result

Please refer to ANNEX A.6.

5.2.4 Electrical Fast Transient / Burst Immunity

5.2.4.1 Test Specification

Specification	Value
Basic Standard	EN 61000-4-4
Test Voltage	AC Power Port: 1 kV.
	DC Power Ports, Wired Network Ports: 0.5 kV.
Polarity	Positive / Negative
Impulse Frequency	5 kHz
Impulse Wave Shape	5/50 ns
Burst Duration	15 ms
Burst Period	300 ms
Test Duration	> 1 min

5.2.4.2 Test Setup

Please refer to 4.5 section description of test setup of test setup 8. The photo of test setup please refer to ANNEX B.

5.2.4.3 Test Procedure

1. The EUT is tested with 1000 V discharges to the AC power input leads, and 500 V for wired network port.
2. Both positive and negative polarity discharges are applied.
3. The length of the "hot wire" from the coaxial output of the EFT generator to the terminals on the EUT should not exceed 1m.
4. The duration time of each test sequential is 1min.
5. The transient / burst waveform is in accordance with IEC 61000-4-4, 5/50 ns.

5.2.4.4 Test Result

Please refer to ANNEX A.7.

5.2.5 Transients and Surges

Specification	Value
Basic Standard	ISO 7637-2
Immunity test level	III
Voltage	12 V
Test pulse number	1, 2a, 2b, 3a / 3b,4
Repetition Rate	For the purpose of EMC testing it is sufficient to apply pulses 1, 2a, 2b and 4, 10 times each, and apply the test pulses 3a and 3b for 20 minutes each.

5.2.5.1 Test Setup

Please refer to 4.5 section description of test setup of test setup 9. The photo of test setup please refer to ANNEX B.

5.2.5.2 Test Procedure

1. The immunity of ESA representative of its type shall be tested by the method(s) according to ISO 7637-2: 2011.
2. For test pulses 3a and 3b, the leads between the terminals of the test pulse generator and the DUT shall be laid out in a straight parallel line at a height of (500+10 mm) above the ground plane and shall have a length of (0,5 ± 0,1) m.
3. Please refer to Annex B for the photographs of the Test Configuration.

5.2.5.3 Test Result

Please refer to ANNEX A.8.

5.2.6 Surge Immunity

5.2.6.1 Test Specification

AC Power Port and Wired Network Port

Specification	Value	
Ports class	AC Power Port	Wired Network Port
Basic Standard	EN 61000-4-5	
Waveform	Voltage: 1.2/50 μ s	Voltage: 10/700 μ s
Test Voltage	line to ground 2 kV, line to line 1 kV; line to ground 1 kV, line to line 0.5 kV(Note 1)	0.5 kV, or 1 kV See Note 2,3,4
Polarity	Positive / Negative	
Phase Angle	0°, 90°, 180°, 270°	N/A
Repetition Rate	60 seconds	
Times	5 times per condition	

Note 1: The test level for AC mains ports, in telecommunications centres.

Note 2: The test level for wired network ports, intended to be connected to indoor cables (longer than 30 m) shall be 0,5 kV (applied line to ground, or shield to ground).The test generator shall provide the 1,2/50 μ s pulse.

Note 3: The test level for symmetrically operated, wired network ports, intended to be directly connected to wired network ports via outdoor cables, shall be 1 kV (applied lines to ground).The test generator shall provide the 10/700 μ s pulse.

Note 4: The test level for non-symmetrically operated wired network ports, intended to be directly connected to wired network ports via outdoor cables, shall be 1 kV (applied line to ground, or shield to ground) and 0,5 kV (applied line to line).The test generator shall provide the 1,2/50 μ s pulse.

5.2.6.2 Test Setup

Please refer to 4.5 section description of test setup of test setup 10. The photo of test setup please refer to ANNEX B.

5.2.6.3 Test Procedure

The EUT and the auxiliary equipment are placed on a table of 0.8 m heights above a metal ground reference plane. The size of ground plane is greater than 1 m*1 m and project beyond the EUT by at least 0.1 m on all sides. The ground plane is connected to the protective earth. The length of power cord between the coupling device and the EUT is less than 2 meters (provided by the manufacturer).

The EUT is connected to the power mains through a coupling device that directly couples the surge interference signal. The surge noise is applied synchronized to the voltage phase at the zero crossing and the peak value of the AC voltage wave (positive and negative).

The surges are applied line to line and line(s) to earth. When testing line to earth the test voltage is applied successively between each of the lines and earth. Set up to the test level specified increased the test voltage. All lower levels including the selected test level are tested. The polarity of each surge level included positive and negative test pulses.

5.2.6.4 Test Result

Please refer to ANNEX A.9.

5.2.7 Immunity to Conducted Disturbances Induced by RF Fields

5.2.7.1 Test Specification

Specification	Value
Basic Standard	EN 61000-4-6
Frequency Range	0.15 MHz – 80 MHz
Field Strength	3 V rms (unmodulated, r.m.s)
Modulation	1 kHz sine wave, 80% AM
Frequency Step	1% of fundamental
Coupled Cable	AC Power Line; DC Power Line; Wired Network Line
Coupling Device	CDN-M2+3

5.2.7.2 Test Setup

Please refer to 4.5 section description of test setup of test setup 11. The photo of test setup please refer to ANNEX B.

5.2.7.3 Test Procedure

PER Test:

Before testing, we should set the base station(CMW500) to the mode that needs to be tested, such as Bluetooth or WIFI, then set EUT to the corresponding mode and connect to Base station. Adjust the base station interface to the PER interface, and observe the PER value on the base station interface by adding interference signal during the test.

The test procedure was in accordance with EN 61000-4-6.

1. The EUT shall be tested within its intended operating and climatic conditions.
2. The test shall be performed with the test generator connected to each of the coupling and decoupling devices in turn, while the other non-excited RF input ports of the coupling devices are terminated by a 50 Ohm load resistor.
3. The test signal is 80% amplitude modulated with a 1 kHz sine wave.
4. The frequency range is swept from 150 kHz to 80 MHz, using the signal level established during the setting process and with a disturbance signal of 80% amplitude. The sweep rate shall not exceed 1.5×10^{-3} decades/s. The step size shall not exceed 1% of the start and thereafter 1% of the preceding frequency value where the frequency is swept incrementally.
5. The dwell time at each frequency shall not be less than the time necessary for the EUT to be exercised, and able to respond. Sensitive frequencies such as clock frequencies and harmonics or frequencies of dominant interest, shall be analyzed separately.
6. Attempts should be made to fully exercise the EUT during test, and to fully interrogate all exercise modes selected for susceptibility.

5.2.7.4 Test Result

Please refer to ANNEX A.10.

5.2.8 Voltage Dips and Short Interruptions Immunity

5.2.8.1 Test Specification

Specification	Value
Basic Standard	EN 61000-4-11
Voltage Dips	100% reduction: 10 ms; 100% reduction: 20 ms; 30% reduction: 500 ms
Voltage Interruptions	100% reduction: 5000 ms
Voltage Phase Angle	0°

5.2.8.2 Test Setup

Please refer to 4.5 section description of test setup of test setup 12. The photo of test setup please refer to ANNEX B.

5.2.8.3 Test Procedure

The power cord is used as supplied by the manufacturer. The EUT was connected to the line output of the Voltage Dips and Interruption Generator.

The EUT is tested for a) 100% voltage dip of supplied voltage with duration of 10 ms; b) 100% voltage dip of supplied voltage with duration of 20 ms;c) 30% voltage dip of supplied voltage and duration 500 ms.Both of the dip tests are carried out for a sequence of three voltage dips with intervals of 10 seconds.

100% voltage interruption of supplied voltage with duration of 5000 ms is followed, which is a sequence of three voltage interruptions with intervals of 10 seconds.

Voltage reductions occur at 0 degrees crossover point of the voltage waveform. The performance of the EUT is checked after the voltage dip or interruption.

5.2.8.4 Test Result

Please refer to ANNEX A.11.

ANNEX A TEST RESULTS

A.1 Radiated Emission

Note 1: The symbol of "--" in the table which means not application.

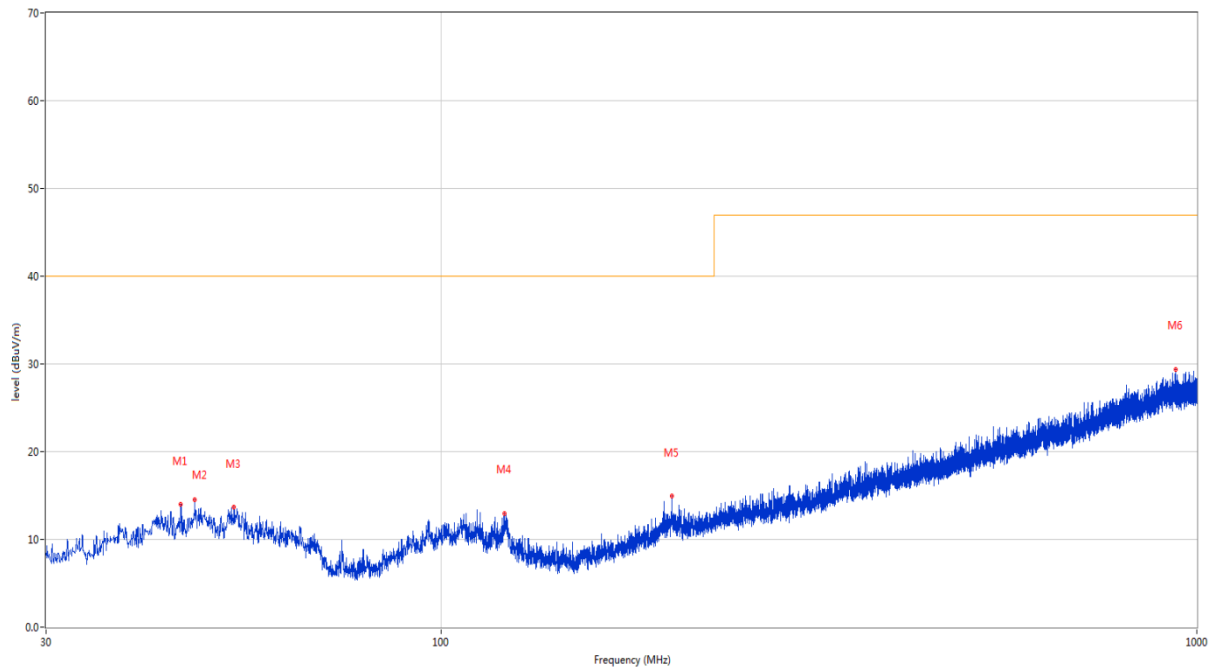
Note 2: Measurements shall be made with a quasi-peak measuring receiver in the frequency range 30 MHz to 1000 MHz. To reduce the testing time, a peak measuring receiver may be used instead of a quasi-peak measuring receiver. In case of dispute, measurement with a quasi-peak measuring receiver will take precedence.

Note 3: The marked spikes near 2400 MHz with circle should be ignored because they are Bluetooth carrier frequency.

Test Data and Plots (Below 1 GHz)

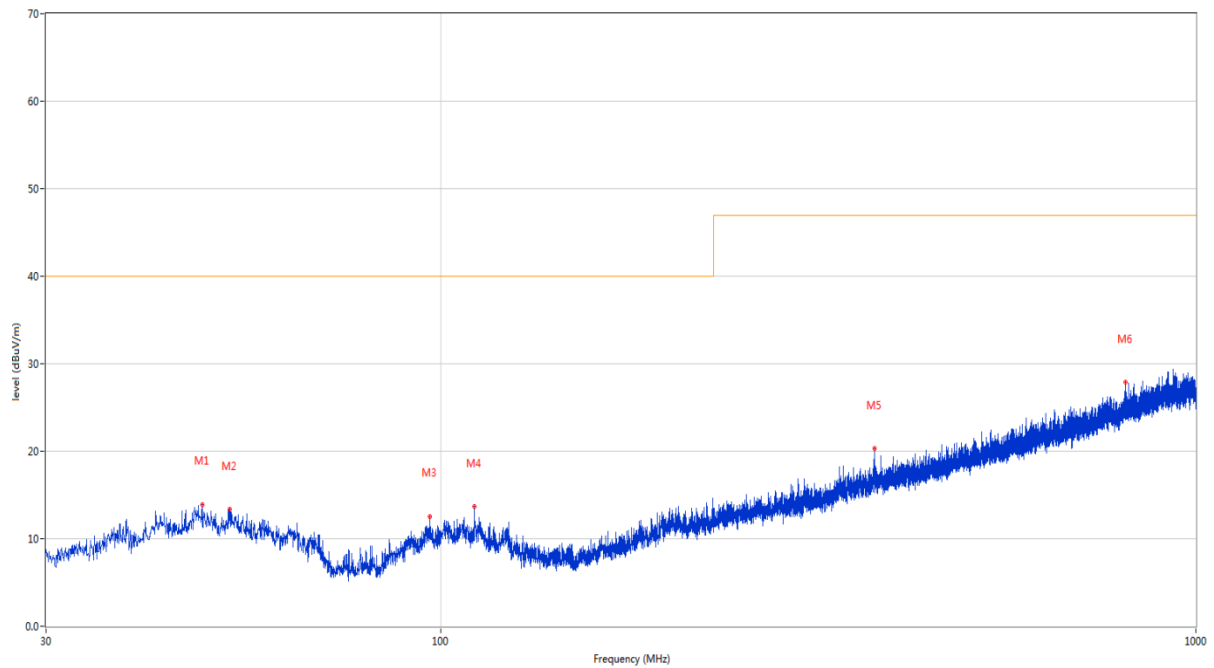
The Working Test Mode

A.1.1 Test Antenna Vertical, 30 MHz – 1 GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	45.229	14.02	-23.19	40.0	-25.98	Peak	295.60	100	Vertical	Pass
2	47.218	14.58	-22.83	40.0	-25.42	Peak	85.30	100	Vertical	Pass
3	53.183	13.68	-22.97	40.0	-26.32	Peak	239.50	200	Vertical	Pass
4	121.277	12.99	-25.80	40.0	-27.01	Peak	253.50	100	Vertical	Pass
5	201.835	14.96	-23.82	40.0	-25.04	Peak	0.00	100	Vertical	Pass
6	936.902	29.40	-9.59	47.0	-17.60	Peak	130.80	100	Vertical	Pass

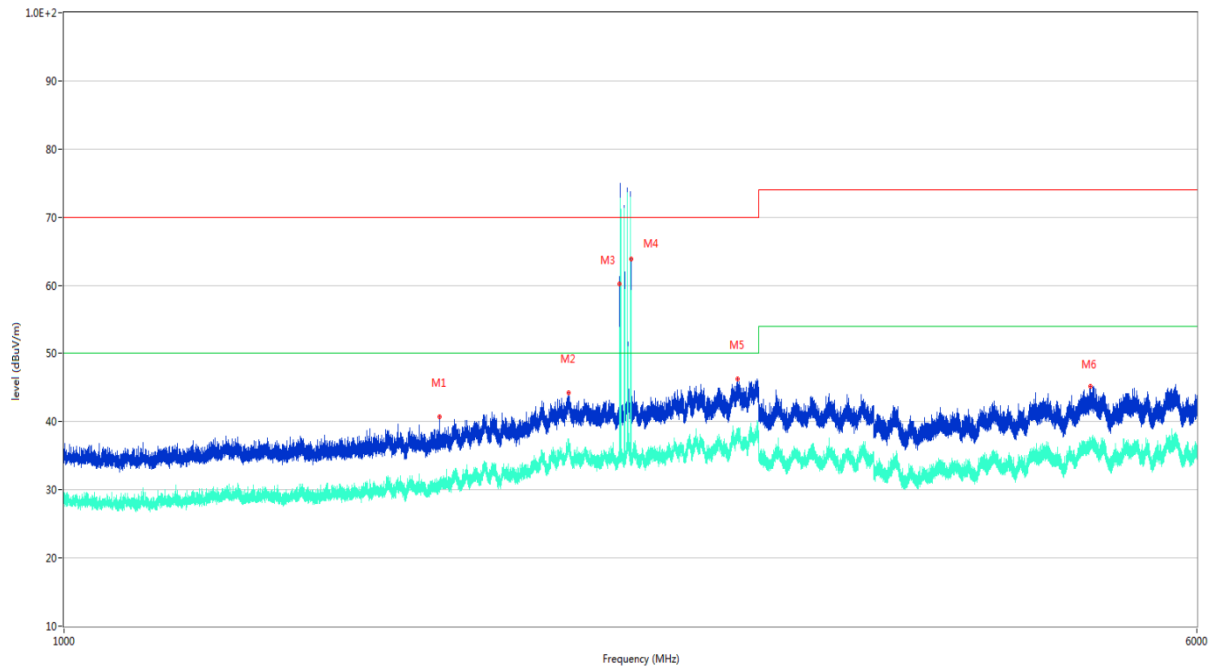
A.1.2 Test Antenna Horizontal, 30 MHz – 1 GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	48.285	13.88	-22.58	40.0	-26.12	Peak	277.20	200	Horizontal	Pass
2	52.504	13.40	-23.09	40.0	-26.60	Peak	0.10	100	Horizontal	Pass
3	96.639	12.48	-24.80	40.0	-27.52	Peak	0.00	200	Horizontal	Pass
4	110.850	13.73	-24.52	40.0	-26.27	Peak	179.00	200	Horizontal	Pass
5	375.174	20.29	-19.09	47.0	-26.71	Peak	312.30	100	Horizontal	Pass
6	806.388	27.94	-10.98	47.0	-19.06	Peak	290.40	200	Horizontal	Pass

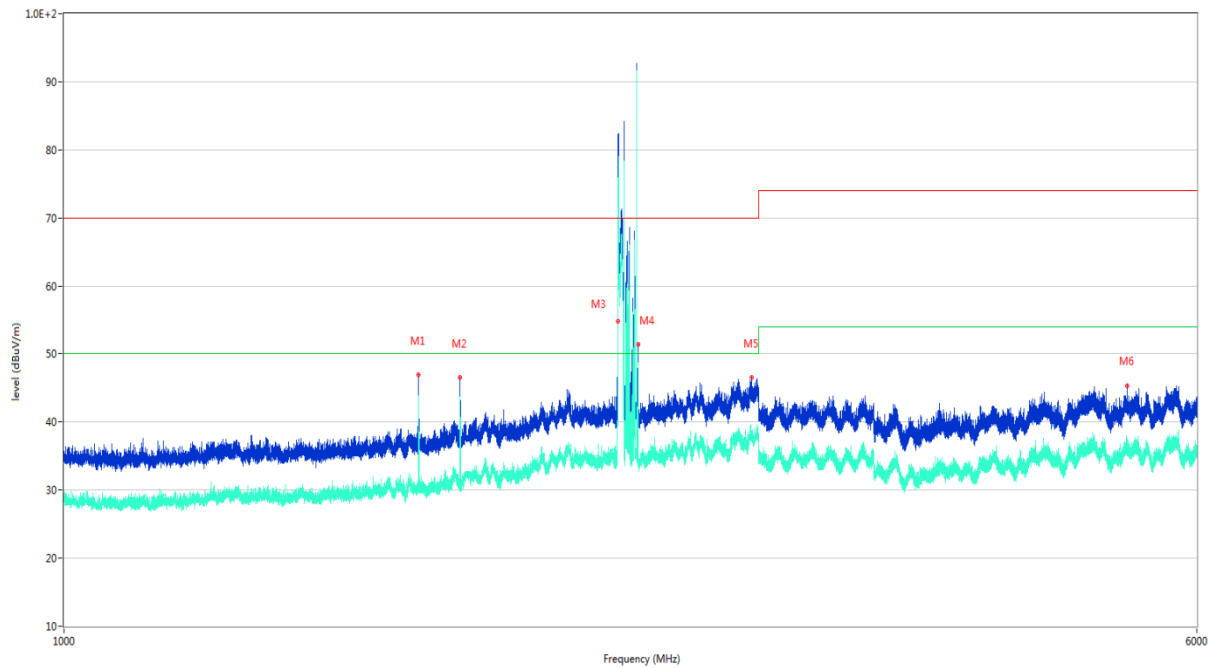
Test Data and Plots (Above 1 GHz)

A.1.3 Test Antenna Vertical, 1 GHz – 6 GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1810.300	40.71	-14.73	70.0	-29.29	Peak	358.30	100	Vertical	Pass
1**	1810.300	31.10	-14.73	50.0	-18.90	AV	358.30	100	Vertical	Pass
2	2222.400	44.26	-8.41	70.0	-25.74	Peak	226.90	100	Vertical	Pass
2**	2222.400	35.51	-8.41	50.0	-14.49	AV	226.90	100	Vertical	Pass
3	2408.900	60.21	-8.84	70.0	-9.79	Peak	165.40	100	Vertical	N/A
3**	2408.900	52.41	-8.84	50.0	2.41	AV	165.40	100	Vertical	N/A
4	2451.100	63.91	-10.09	70.0	-6.09	Peak	320.90	100	Vertical	N/A
4**	2451.100	57.98	-10.09	50.0	7.98	AV	320.90	100	Vertical	N/A
5	2903.500	46.22	-5.93	70.0	-23.78	Peak	283.60	100	Vertical	Pass
5**	2903.500	37.53	-5.93	50.0	-12.47	AV	283.60	100	Vertical	Pass
6	5069.100	45.23	-3.06	74.0	-28.77	Peak	54.40	100	Vertical	Pass
6**	5069.100	36.12	-3.06	54.0	-17.88	AV	54.40	100	Vertical	Pass

A.1.4 Test Antenna Horizontal, 1 GHz – 6 GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1752.100	46.92	-14.66	70.0	-23.08	Peak	301.10	100	Horizontal	Pass
1**	1752.100	42.83	-14.66	50.0	-7.17	AV	301.10	100	Horizontal	Pass
2	1871.100	46.56	-13.82	70.0	-23.44	Peak	90.10	100	Horizontal	Pass
2**	1871.100	43.40	-13.82	50.0	-6.60	AV	90.10	100	Horizontal	Pass
3	2401.200	54.74	-9.37	70.0	-15.26	Peak	337.80	100	Horizontal	N/A
3**	2401.200	45.35	-9.37	50.0	-4.65	AV	337.80	100	Horizontal	N/A
4	2479.900	51.39	-9.76	70.0	-18.61	Peak	0.80	100	Horizontal	N/A
4**	2479.900	48.55	-9.76	50.0	-1.45	AV	0.80	100	Horizontal	N/A
5	2967.500	46.54	-5.51	70.0	-23.46	Peak	99.80	100	Horizontal	Pass
5**	2967.500	37.90	-5.51	50.0	-12.10	AV	99.80	100	Horizontal	Pass
6	5376.000	45.31	-3.25	74.0	-28.69	Peak	135.30	100	Horizontal	Pass
6**	5376.000	35.46	-3.25	54.0	-18.54	AV	135.30	100	Horizontal	Pass

A.2 Conducted Emissions

Note: Not applicable.

A.3 Harmonic Current Emissions

Note: Not applicable.

A.4 Voltage Fluctuations and Flicker Measurement

Note: Not applicable.

A.5 Electrostatic Discharge Immunity

Test Points	Discharge Level (kV)	Discharge Mode	Number of Discharge	Verdict
HCP	±4	Contact	100	Pass
VCP	±4	Contact	100	Pass
Shell and Crack	±8	Air	100	Pass
Keys	±8	Air	80	Pass

Note: The performance criteria in TT and TR is only applicable to the TC01 Test Mode of the EUT, performance of the other modes comply with the performance criteria in Criterion B.

A.6 Radio Frequency Electromagnetic Field Immunity

Antenna Polarity	Frequency (MHz)	Side	Field Strength (V/m)	Verdict
Vertical	80 – 1000, 1000 – 3000, 3000 – 6000	Front	3	Pass
		Back	3	Pass
		Left	3	Pass
		Right	3	Pass
Horizontal	80 – 1000, 1000 – 3000, 3000 – 6000	Front	3	Pass
		Back	3	Pass
		Left	3	Pass
		Right	3	Pass

Note 1: The performance criteria in CT and CR is only applicable to the TC01 Test Mode of the EUT, performance of the other modes comply with the performance criteria in Criterion A.

Note 2: During the test, the PER of Bluetooth are less than 10%.

A.7 Electrical Fast Transient / Burst Immunity

Note: Not applicable.

A.8 Transients and Surges

Note: Not applicable.

A.9 Surge Immunity

Note: Not applicable.

A.10 Immunity to Conducted Disturbances Induced by RF Fields

Note: Not applicable.

A.11 Voltage Dips and Short Interruptions Immunity

Note: Not applicable.

ANNEX B TEST SETUP PHOTOS

Please refer the document “BL-SZ2140930-AE.PDF”.

ANNEX C EUT EXTERNAL PHOTOS

Please refer the document “BL-SZ2140930-AW.PDF”.

ANNEX D EUT INTERNAL PHOTOS

Please refer the document “BL-SZ2140930-AI.PDF”.

--END OF REPORT--

Safety

TEST REPORT

ISSUED BY
Shenzhen BALUN Technology Co., Ltd.



FOR
SwitchBot Contact Sensor

ISSUED TO
Woan Technology (Shenzhen) Co., Ltd.

Room 101-116, Building B4, Yintian Industrial Zone, Xixiang Street,
Bao'an District, Shenzhen, Guangdong, P.R.China, 518102

Tested by:

James Wang

Date

May 18, 2021

Approved by:

Wei Yanquan
(Chief Engineer)

Date

May 18, 2021

Report No.: BL-SZ2140930-101

EUT Name: SwitchBot Contact Sensor

Model Name: W1201500 (Refer to section 2.4)

Brand Name: SwitchBot

Test Standard: IEC 62368-1:2014

EN 62368-1:2014+A11:2017

Test conclusion: Pass

Test Date: Apr. 28, 2021 ~ May 07, 2021

Date of Issue: May 18, 2021

NOTE: This test report of test results only related to the testing samples, which can be duplicated completely for the legal use with the approval of the applicant; it shall not be reproduced except in full, without the written approval of Shenzhen BALUN Technology Co., Ltd. BALUN Laboratory. Any objections should be raised within thirty days from the date of issue. To validate the report, please contact us.

Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong, P. R. China 518055
TEL: +86-755-66850100, FAX: +86-755-61824271

Email: qc@baluntek.com

www.baluntek.com

Revision History

Version	Issue Date	Revisions
<u>Rev. 01</u>	<u>May 18, 2021</u>	<u>Initial Issue</u>

TABLE OF CONTENTS

1	ADMINISTRATIVE DATA (GENERAL INFORMATION)	3
1.1	Identification of the Testing Laboratory	3
1.2	Identification of the Responsible Testing Location	3
1.3	Laboratory Condition	3
1.4	Announce	3
2	PRODUCT INFORMATION	4
2.1	Applicant Information	4
2.2	Manufacturer Information	4
2.3	Factory Information	4
2.4	General Description for Equipment under Test (EUT)	4
2.5	Ancillary Equipment	4
2.6	Technical Information	4
3	SUMMARY OF TEST	6
3.1	Test Standards	6
3.2	Possible test case verdict	6
3.3	Test item	7
3.4	General information	8
4	GENERAL TEST CONFIGURATIONS	11
4.1	Test Environments	11
4.2	Test Equipment List	11
5	TEST RESULTS	12
6	Product Marking Label	68
7	PHOTO DOCUMENT	69

1 ADMINISTRATIVE DATA (GENERAL INFORMATION)

1.1 Identification of the Testing Laboratory

Company Name	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province. P.R. China
Phone Number	+86 755 6685 0100

1.2 Identification of the Responsible Testing Location

Test Location	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province. P.R. China
Description	All measurement facilities used to collect the measurement data are located at Block B, FL 1, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China 518055

1.3 Laboratory Condition

Ambient Temperature	20°C to 25°C
Ambient Relative Humidity	45% to 75%
Ambient Pressure	100kPa to 102kPa

1.4 Announce

- (1) The test report reference to the report template version v1.8.
- (2) The test report is invalid if not marked with the signatures of the persons responsible for preparing and approving the test report.
- (3) The test report is invalid if there is any evidence and/or falsification.
- (4) The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein.
- (5) This document may not be altered or revised in any way unless done so by BALUN and all revisions are duly noted in the revisions section.
- (6) Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory.

2 PRODUCT INFORMATION

2.1 Applicant Information

Applicant	Woan Technology (Shenzhen) Co., Ltd.
Address	Room 101-116, Building B4, Yintian Industrial Zone, Xixiang Street, Bao'an District, Shenzhen, Guangdong, P.R.China, 518102

2.2 Manufacturer Information

Manufacturer	Woan Technology (Shenzhen) Co., Ltd.
Address	Room 101-116, Building B4, Yintian Industrial Zone, Xixiang Street, Bao'an District, Shenzhen, Guangdong, P.R.China, 518102

2.3 Factory Information

Factory	Woan Technology (Shenzhen) Co., Ltd.
Address	Room 101-116, Building B4, Yintian Industrial Zone, Xixiang Street, Bao'an District, Shenzhen, Guangdong, P.R.China, 518102

2.4 General Description for Equipment under Test (EUT)

EUT Name	SwitchBot Contact Sensor
Model Name Under Test	W1201500
Series Model Name	W1201501, W1201502, W1201503, W1201504, W1201505
Description of Model name differentiation	Only model name different.
Hardware Version	V1.0
Software Version	V4.1.5
Dimensions(Approx.)	70.5*25.5*23mm
Weight(Approx.)	43g (not included batteries)

2.5 Ancillary Equipment

N/A

2.6 Technical Information

The requirement for the following technical information of the EUT was tested in this report:

Ratings	Input: DC 3V (Supplied by 2*AAA type batteries)
Classification of use by	☒ Ordinary person ☐ Instructed person ☐ Skilled person ☒ Children likely to be present
Supply Connection	☐ AC Mains ☐ DC Mains ☒ External Circuit - not Mains connected - ☒ ES1 ☐ ES2 ☐ ES3
Supply % Tolerance	☐ +10%/-10% ☐ +20%/-15%

	☐ +____%/ -____% ☒ None
Supply Connection – Type	☐ pluggable equipment type A - ☐ non-detachable supply cord ☐ appliance coupler ☐ direct plug-in ☐ mating connector ☐ pluggable equipment type B - ☐ non-detachable supply cord ☐ appliance coupler ☐ permanent connection ☐ mating connector ☒ other: not directly connect to mains
Considered current rating of protective device as part of building or equipment installation	N/A
Equipment mobility	☐ movable ☐ hand-held ☐ transportable ☐ stationary ☐ for building-in ☐ direct plug-in ☐ rack-mounting ☒ wall-mounted
Over voltage category (OVC)	☐ OVC I ☐ OVC II ☐ OVC III ☐ OVC IV ☒ other: not directly connect to mains
Class of equipment	☐ Class I ☐ Class II ☒ Class III
Access location	☐ restricted access location ☒ N/A
Pollution degree (PD)	☐ PD 1 ☒ PD 2 ☐ PD 3
Manufacturer's specified maximum operating ambient	60°C
IP protection class	☒ IPX0 ☐ IP____
Power Systems	N/A
Altitude during operation (m)	☒ 2000m or less ☐ 5000 m
Altitude of test laboratory (m)	☒ 2000m or less ☐ _____ m
Mass of equipment (kg)	☒ 0.043kg (not included batteries)
Note: The above EUT information was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.	

3 SUMMARY OF TEST

3.1 Test Standards

No.	Identity	Document Title
1	IEC 62368-1:2014	Audio/video, information and communication technology equipment –Part 1: Safety requirements
2	EN 62368-1:2014+A11:2017	Audio/video, information and communication technology equipment –Part 1: Safety requirements

3.2 Possible test case verdict

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

3.3 Test item

Tests performed (name of test and test clause):		Summary of compliance with National Differences: List of countries addressed: 1. European group
5.2	Electrical energy source classifications	
5.4.1.4, 6.3.2, 9.0, B.2.6	Maximum operating temperatures for materials, components and systems	
6.2.2	Electrical power sources (PS) measurements for classification	
8.7	Equipment mounted to a wall, ceiling or other structure	
9.4.1	Equipment safeguards for thermal burn	
Annex B.3	Simulated Abnormal operating condition tests	
Annex B.4	Simulated single fault conditions	
Annex F. 3.9	Durability, legibility and permanence of markings	
Annex M	Batteries	
• Maximal ambient temperature as specified by the manufacturer: +60°C.		

3.4 General information

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.

GENERAL PRODUCT INFORMATION:

The equipment is a SwitchBot Contact Sensor, basic model name is W1201500.

1. All tests are performed on model W1201500.
2. Instructions and equipment marking related to safety is applied in the language that is acceptable in the country in which the equipment is to be sold.
3. The specified Max. ambient temperature is +60°C.
4. The equipment was evaluated for a maximum operating altitude of 2000m.

ENERGY SOURCE IDENTIFICATION AND CLASSIFICATION TABLE:

(Note 1: Identify the following six (6) energy source forms based on the origin of the energy.)

(Note 2: The identified classification e.g., ES2, TS1, should be with respect to its ability to cause pain or injury on the body or its ability to ignite a combustible material. Any energy source can be declared Class 3 as a worse case classification e.g. PS3, ES3.

Electrically-caused injury (Clause 5):

(Note: Identify type of source, list sub-assembly or circuit designation and corresponding energy source classification)

Example: 5Vdc input

Source of electrical energy	Corresponding classification (ES)
All circuits	ES1

Electrically-caused fire (Clause 6):

(Note: List sub-assembly or circuit designation and corresponding energy source classification)

Example: Battery pack (maximum 85 watts): PS1

Source of power or PIS	Corresponding classification (PS)
Internal circuit	PS1

Injury caused by hazardous substances (Clause 7)

(Note: Specify hazardous chemicals, whether produces ozone or other chemical construction not addressed as part of the component evaluation.)

Example: Liquid in filled component Glycol

Source of hazardous substances	Corresponding chemical
Battery	Complied with annex M

Mechanically-caused injury (Clause 8)

(Note: List moving part(s), fan, special installations, etc. & corresponding MS classification based on Table 35.)

Example: Wall mount unit MS1

Source of kinetic/mechanical energy	Corresponding classification (MS)
Edges and corners of enclosure	MS1
Mass of EUT	MS1
Wall mount equipment	MS1

Thermal burn injury (Clause 9)

(Note: Identify the surface or support, and corresponding energy source classification based on type of part, location, operating temperature and contact time in Table 38.)

Example: Hand-held scanner – thermoplastic enclosure TS1

Source of thermal energy	Corresponding classification (TS)
Accessible parts	TS1

Radiation (Clause 10)

(Note: List the types of radiation present in the product and the corresponding energy source classification.)

Example: DVD – Class 1 Laser Product

Type of radiation	Corresponding classification (RS)
LEDs for indication	RS1

OVERVIEW OF EMPLOYED SAFEGUARDS

Clause	Possible Hazard			
5.1	Electrically-caused injury			
Body Part (e.g. Ordinary)	Energy Source	Safeguards		
		Basic	Supplementar y	Reinforced (Enclosure)
Ordinary	ES1: all circuits	N/A	N/A	N/A
6.1	Electrically-caused fire			
Material part (e.g. mouse enclosure)	Energy Source	Safeguards		
		Basic	Supplementar y	Reinforced
Ordinary	PS1:< 15W internal circuits	N/A	N/A	N/A
7.1	Injury caused by hazardous substances			
Body Part (e.g., skilled)	Energy Source (hazardous material)	Safeguards		
		Basic	Supplementar y	Reinforced
Ordinary	AAA type non- rechargeable battery	N/A	Comply with annex M	N/A
8.1	Mechanically-caused injury			
Body Part (e.g. Ordinary)	Energy Source (MS3:High Pressure Lamp)	Safeguards		
		Basic	Supplementar y	Reinforced (Enclosure)
Ordinary	MS1: Edges and corners	N/A	N/A	N/A

Ordinary	MS1: Mass of EUT	N/A	N/A	N/A
Ordinary	MS1: Wall mount equipment	N/A	N/A	N/A
9.1	Thermal Burn –			
Body Part (e.g., Ordinary)	Energy Source (TS2)	Safeguards		
		Basic	Supplementary	Reinforced
Ordinary	TS1: Accessible parts	N/A	N/A	N/A
10.1	Radiation			
Body Part (e.g., Ordinary)	Energy Source (Output from audio port)	Safeguards		
		Basic	Supplementary	Reinforced
Ordinary	RS1: LEDs for indication	N/A	N/A	N/A
Supplementary Information: (1) See attached energy source diagram for additional details. (2) “N” – Normal Condition; “A” – Abnormal Condition; “S” Single Fault				

4 GENERAL TEST CONFIGURATIONS

4.1 Test Environments

Temperature (°C)	20°C to 25°C
Relative Humidity (%)	45% to 75%
Atmospheric Pressure (kPa)	100kPa to 102kPa

4.2 Test Equipment List

No.	Equipment name	Manufacture	Serial No.	Calibration Due Date	Usage
1	Digital Caliper	CHUANLIANG	BZ-SFT-L003	2021/10/21	√
2	Heating Recorder	Agilent	BZ-SFT-L090	2021/06/04	√
3	Pull and push Tester	AIDEBAO	BZ-SFT-L046	2021/06/10	√
4	Electronic Scale	YINGHENG	BZ-SFT-L107	2021/10/19	√
5	Stop Watch	HUIBO	BZ-SFT-L068	2021/06/11	√

IEC 62368-1

Clause	Requirement-Test	Result-Remark	Verdict
--------	------------------	---------------	---------

5 TEST RESULTS

4	General Requirements		P
4.1.1	Acceptance of materials, components and subassemblies	See appended table 4.1.2	P
4.1.2	Use of components	Components which are certified to IEC and/or national standards are used correctly within their ratings. Components not covered by IEC standards are tested under the conditions present in the equipment. See also Annex G	P
4.1.3	Equipment design and construction	Evaluation of safeguards regarding limiting the outputs to fulfill ES1 and protection in regard to risk of spread of fire, mechanical and thermal burn injury considered.	P
4.1.15	Markings and instructions..... :		P
4.4.4	Safeguard robustness	See below.	P
4.4.4.2	Steady force tests..... :	(See Annex T.4)	N/A
4.4.4.3	Drop tests :	(See Annex T.7)	N/A
4.4.4.4	Impact tests :		N/A
4.4.4.5	Internal accessible safeguard enclosure and barrier tests :		N/A
4.4.4.6	Glass Impact tests..... :	No such glass used.	N/A
4.4.4.7	Thermoplastic material tests :	(See Annex T.8)	N/A
4.4.4.8	Air comprising a safeguard..... :		N/A
4.4.4.9	Accessibility and safeguard effectiveness	After tests of 4.4.4.2, 4.4.4.3, no safeguard damaged.	P
4.5	Explosion	No explosion occurs during normal/abnormal operation and single fault conditions	P
4.6	Fixing of conductors		N/A
4.6.1	Fix conductors not to defeat a safeguard		N/A

IEC 62368-1			
Clause	Requirement-Test	Result-Remark	Verdict
4.6.2	10 N force test applied to		N/A
4.7	Equipment for direct insertion into mains socket - outlets	The EUT is not for direct insertion into mains socket outlets, class III equipment	N/A
4.7.2	Mains plug part complies with the relevant standard		N/A
4.7.3	Torque (Nm)		N/A
4.8	Products containing coin/button cell batteries	professional equipment and equipment for use in locations where it is unlikely that children will be present	N/A
4.8.2	Instructional safeguard		N/A
4.8.3	Battery Compartment Construction		N/A
	Means to reduce the possibility of children removing the battery.....		—
4.8.4	Battery Compartment Mechanical Tests		N/A
4.8.5	Battery Accessibility		N/A
4.9	Likelihood of fire or shock due to entry of conductive object.....	No likelihood of conductive object entry into enclosure.	P

5	Electrically-caused injury		P
5.2.1	Electrical energy source classifications	(See appended table 5.2)	P
5.2.2	ES1, ES2 and ES3 limits	ES1	P
5.2.2.2	Steady-state voltage and current	(See appended table 5.2)	P
5.2.2.3	Capacitance limits.....	Class III equipment	N/A
5.2.2.4	Single pulse limits	No such single pulses generated in the EUT or applied to it.	N/A
5.2.2.5	Limits for repetitive pulses	No such repetitive pulses within the EUT	N/A
5.2.2.6	Ringling signals	No such ringing signals within the EUT	N/A
5.2.2.7	Audio signals	No such audio signals	N/A
5.3	Protection against electrical energy sources	See below	P

IEC 62368-1			
Clause	Requirement-Test	Result-Remark	Verdict
5.3.1	General Requirements for accessible parts to ordinary, instructed and skilled persons	See only 4.3 and 5.3 to 5.5 which applies to protection between the accessible parts and hazardous parts of other circuits.	P
5.3.2.1	Accessibility to electrical energy sources and safeguards	Only ES1 circuit can be accessed for this product.	P
5.3.2.2	Contact requirements	No ES3 circuit.	P
	a) Test with test probe from Annex V		N/A
	b) Electric strength test potential (V)		N/A
	c) Air gap (mm)		N/A
5.3.2.4	Terminals for connecting stripped wire	No such terminals.	N/A
5.4	Insulation materials and requirements		P
5.4.1.2	Properties of insulating material		P
5.4.1.3	Humidity conditioning	No hygroscopic material used.	N/A
5.4.1.4	Maximum operating temperature for insulating materials	(See appended table 5.4.1.4)	P
5.4.1.5	Pollution degree	2	—
5.4.1.5.2	Test for pollution degree 1 environment and for an insulating compound	Pollution degree 2 is applied. No insulating compound applied (however see 5.5.4).	N/A
5.4.1.5.3	Thermal cycling	See above	N/A
5.4.1.6	Insulation in transformers with varying dimensions	No such transformer within the EUT	N/A
5.4.1.7	Insulation in circuits generating starting pulses	No such starting pulses within the EUT	N/A
5.4.1.8	Determination of working voltage		N/A
5.4.1.9	Insulating surfaces		N/A
5.4.1.10	Thermoplastic parts on which conductive metallic parts are directly mounted		N/A
5.4.1.10.2	Vicat softening temperature.....		N/A
5.4.1.10.3	Ball pressure		N/A
5.4.2	Clearances		N/A
5.4.2.2	Determining clearance using peak working voltage		N/A
5.4.2.3	Determining clearance using required withstand voltage		N/A

IEC 62368-1			
Clause	Requirement-Test	Result-Remark	Verdict
	a) a.c. mains transient voltage		—
	b) d.c. mains transient voltage		—
	c) external circuit transient voltage.....		—
	d) transient voltage determined by measurement :		—
5.4.2.4	Determining the adequacy of a clearance using an electric strength test		N/A
5.4.2.5	Multiplication factors for clearances and test voltages		N/A
5.4.3	Creepage distances.....		N/A
5.4.3.1	General		N/A
5.4.3.3	Material Group		—
5.4.4	Solid insulation		N/A
5.4.4.2	Minimum distance through insulation		N/A
5.4.4.3	Insulation compound forming solid insulation		N/A
5.4.4.4	Solid insulation in semiconductor devices		N/A
5.4.4.5	Cemented joints		N/A
5.4.4.6	Thin sheet material		N/A
5.4.4.6.1	General requirements		N/A
5.4.4.6.2	Separable thin sheet material		N/A
	Number of layers (pcs)		N/A
5.4.4.6.3	Non-separable thin sheet material		N/A
5.4.4.6.4	Standard test procedure for non-separable thin sheet material.....	See above	N/A
5.4.4.6.5	Mandrel test		N/A
5.4.4.7	Solid insulation in wound components		N/A
5.4.4.9	Solid insulation at frequencies >30 kHz		N/A
5.4.5	Antenna terminal insulation	No such antenna terminal used.	N/A
5.4.5.1	General		N/A
5.4.5.2	Voltage surge test		N/A
	Insulation resistance (MΩ)		N/A

IEC 62368-1			
Clause	Requirement-Test	Result-Remark	Verdict
5.4.6	Insulation of internal wire as part of supplementary safeguard	No such insulation of internal wire as part of supplementary safeguard.	N/A
5.4.7	Tests for semiconductor components and for cemented joints	No tests necessary – see only 5.4.4.4.	N/A
5.4.8	Humidity conditioning		N/A
	Relative humidity (%)		—
	Temperature (°C)		—
	Duration (h)		—
5.4.9	Electric strength test.....		N/A
5.4.9.1	Test procedure for a solid insulation type test		N/A
5.4.9.2	Test procedure for routine tests		N/A
5.4.10	Protection against transient voltages between external circuit		N/A
5.4.10.1	Parts and circuits separated from external circuits		N/A
5.4.10.2	Test methods		N/A
5.4.10.2.1	General		N/A
5.4.10.2.2	Impulse test.....		N/A
5.4.10.2.3	Steady-state test		N/A
5.4.11	Insulation between external circuits and earthed circuitry		N/A
5.4.11.1	Exceptions to separation between external circuits and earth		N/A
5.4.11.2	Requirements		N/A
	Rated operating voltage U_{op} (V)		—
	Nominal voltage U_{peak} (V)		—
	Max increase due to variation U_{sp}		—
	Max increase due to ageing ΔU_{sa}		—
	$U_{op} = U_{peak} + \Delta U_{sp} + \Delta U_{sa}$		—
5.5	Components as safeguards		
5.5.1	General		N/A
5.5.2	Capacitors and RC units		N/A
5.5.2.1	General requirement		N/A

IEC 62368-1			
Clause	Requirement-Test	Result-Remark	Verdict
5.5.2.2	Safeguards against capacitor discharge after disconnection of a connector		N/A
5.5.3	Transformers		N/A
5.5.4	Optocouplers		N/A
5.5.5	Relays		N/A
5.5.6	Resistors		N/A
5.5.7	SPD's		N/A
5.5.7.1	Use of an SPD connected to reliable earthing	No such construction.	N/A
5.5.7.2	Use of an SPD between mains and protective earth		N/A
5.5.8	Insulation between the mains and external circuit consisting of a coaxial cable	No such external circuits.	N/A
5.6	Protective conductor		N/A
5.6.2	Requirement for protective conductors	Class III equipment with no means of earthing	N/A
5.6.2.1	General requirements		N/A
5.6.2.2	Colour of insulation		N/A
5.6.3	Requirement for protective earthing conductors		NA
	Protective earthing conductor size (mm ²)		—
5.6.4	Requirement for protective bonding conductors		N/A
5.6.4.1	Protective bonding conductors		N/A
	Protective bonding conductor size (mm ²).....		—
	Protective current rating (A)		—
5.6.4.3	Current limiting and overcurrent protective devices		N/A
5.6.5	Terminals for protective conductors		N/A
5.6.5.1	Requirement		N/A
	Conductor size (mm ²), nominal thread diameter (mm).		N/A
5.6.5.2	Corrosion		N/A
5.6.6	Resistance of the protective system		N/A
5.6.6.1	Requirements		N/A
5.6.6.2	Test Method Resistance (Ω).....		N/A
5.6.7	Reliable earthing		N/A

IEC 62368-1			
Clause	Requirement-Test	Result-Remark	Verdict
5.7	Prospective touch voltage, touch current and protective conductor current		N/A
5.7.2	Measuring devices and networks		N/A
5.7.2.1	Measurement of touch current		N/A
5.7.2.2	Measurement of prospective touch voltage		N/A
5.7.3	Equipment set-up, supply connections and earth connections		N/A
	System of interconnected equipment (separate connections/single connection)		—
	Multiple connections to mains (one connection at a time/simultaneous connections)		—
5.7.4	Earthed conductive accessible parts		N/A
5.7.5	Protective conductor current		N/A
	Supply Voltage (V)		—
	Measured current (mA)		—
	Instructional Safeguard		N/A
5.7.6	Prospective touch voltage and touch current due to external circuits	No external circuits.	N/A
5.7.6.1	Touch current from coaxial cables		N/A
5.7.6.2	Prospective touch voltage and touch current from external circuits		N/A
5.7.7	Summation of touch currents from external circuits	No external circuits.	N/A
	a) Equipment with earthed external circuits Measured current (mA)		N/A
	b) Equipment whose external circuits are not referenced to earth. Measured current (mA)		N/A

6	Electrically- caused fire		P
6.2	Classification of power sources (PS) and potential ignition sources (PIS)		P
6.2.2	Power source circuit classifications	All circuits regarded as PS1	P
6.2.2.1	General		P
6.2.2.2	Power measurement for worst-case load fault ... :	(See appended table 6.2.2)	N/A
6.2.2.3	Power measurement for worst-case power source fault	(See appended table 6.2.2)	N/A

IEC 62368-1			
Clause	Requirement-Test	Result-Remark	Verdict
6.2.2.4	PS1	(See appended table 6.2.2)	P
6.2.2.5	PS2		N/A
6.2.2.6	PS3		N/A
6.2.3	Classification of potential ignition sources		N/A
6.2.3.1	Arcing PIS		N/A
6.2.3.2	Resistive PIS		N/A
6.3	Safeguards against fire under normal operating and abnormal operating conditions		P
6.3.1 (a)	No ignition and attainable temperature value less than 90 % defined by ISO 871 or less than 300 °C for unknown materials	No ignition and no such temperature attained within the equipment. (See appended table 5.4.1.4, 6.3.2, 9.0, B.2.6)	P
6.3.1 (b)	Combustible materials outside fire enclosure	No fire enclosure required.	P
6.4	Safeguards against fire under single fault conditions		P
6.4.1	Safeguard Method		P
6.4.2	Reduction of the likelihood of ignition under single fault conditions in PS1 circuits	The apparatus is power supplied by 2*AAA batteries which was considered as PS1 power source.	P
6.4.3	Reduction of the likelihood of ignition under single fault conditions in PS2 and PS3 circuits	See above	N/A
6.4.3.1	General		N/A
6.4.3.2	Supplementary Safeguards		N/A
	Special conditions if conductors on printed boards are opened or peeled		N/A
6.4.3.3	Single Fault Conditions..... :		N/A
	Special conditions for temperature limited by fuse	No such consideration.	N/A
6.4.4	Control of fire spread in PS1 circuits		P
6.4.5	Control of fire spread in PS2 circuits		N/A
6.4.5.2	Supplementary safeguards	(See appended tables 4.1.2 and Annex G)	N/A
6.4.6	Control of fire spread in PS3 circuit	PS1.	N/A
6.4.7	Separation of combustible materials from a PIS		N/A
6.4.7.1	General..... :		N/A
6.4.7.2	Separation by distance		N/A

IEC 62368-1			
Clause	Requirement-Test	Result-Remark	Verdict
6.4.7.3	Separation by a fire barrier	No specific barrier provided.	N/A
6.4.8	Fire enclosures and fire barriers		N/A
6.4.8.1	Fire enclosure and fire barrier material properties	No fire enclosure required	N/A
6.4.8.2.1	Requirements for a fire barrier		N/A
6.4.8.2.2	Requirements for a fire enclosure	No fire enclosure required	N/A
6.4.8.3	Constructional requirements for a fire enclosure and a fire barrier	See below	N/A
6.4.8.3.1	Fire enclosure and fire barrier openings		N/A
6.4.8.3.2	Fire barrier dimensions	No fire barrier.	N/A
6.4.8.3.3	Top Openings in Fire Enclosure: dimensions (mm) :		N/A
	Needle Flame test		N/A
6.4.8.3.4	Bottom Openings in Fire Enclosure, condition met a), b) and/or c) dimensions (mm) :		N/A
	Flammability tests for the bottom of a fire enclosure :		N/A
6.4.8.3.5	Integrity of the fire enclosure, condition met: a), b) or c) :		N/A
6.4.8.4	Separation of PIS from fire enclosure and fire barrier distance (mm) or flammability rating :		N/A
6.5	Internal and external wiring		N/A
6.5.1	Requirements		N/A
6.5.2	Cross-sectional area (mm ²) :		—
6.5.3	Requirements for interconnection to building wiring :		N/A
6.6	Safeguards against fire due to connection to additional equipment		N/A
	External port limited to PS2 or complies with Clause Q.1		N/A

7	INJURY CAUSED BY HAZARDOUS SUBSTANCES		N/A
7.2	Reduction of exposure to hazardous substances	No such source	N/A
7.3	Ozone exposure		N/A
7.4	Use of personal safeguards (PPE)		N/A

IEC 62368-1			
Clause	Requirement-Test	Result-Remark	Verdict
	Personal safeguards and instructions		—
7.5	Use of instructional safeguards and instructions		N/A
	Instructional safeguard (ISO 7010)		—
7.6	Batteries		N/A

8	MECHANICALLY-CAUSED INJURY		P
8.1	General	No moving parts in the equipment – see below regarding edges and corners.	P
8.2	Mechanical energy source classifications	MS1	P
8.3	Safeguards against mechanical energy sources		P
8.4	Safeguards against parts with sharp edges and corners	Edges and corners of the enclosure are rounded.	P
8.4.1	Safeguards		N/A
8.5	Safeguards against moving parts	No moving parts.	N/A
8.5.1	MS2 or MS3 part required to be accessible for the function of the equipment		N/A
8.5.2	Instructional Safeguard..... :		—
8.5.4	Special categories of equipment comprising moving parts		N/A
8.5.4.1	Large data storage equipment		N/A
8.5.4.2	Equipment having electromechanical device for destruction of media		N/A
8.5.4.2.1	Safeguards and Safety Interlocks		N/A
8.5.4.2.2	Instructional safeguards against moving parts		N/A
	Instructional Safeguard..... :		—
8.5.4.2.3	Disconnection from the supply		N/A
8.5.4.2.4	Probe type and force (N)		N/A
8.5.5	High Pressure Lamps		N/A
8.5.5.1	Energy Source Classification		N/A
8.5.5.2	High Pressure Lamp Explosion Test		N/A
8.6	Stability	MS1	N/A
8.6.1	Product classification		N/A

IEC 62368-1			
Clause	Requirement-Test	Result-Remark	Verdict
	Instructional Safeguard.....:		—
8.6.2	Static stability		N/A
8.6.2.2	Static stability test		N/A
	Applied Force		—
8.6.2.3	Downward Force Test		N/A
8.6.3	Relocation stability test		N/A
	Unit configuration during 10° tilt		—
8.6.4	Glass slide test		N/A
8.6.5	Horizontal force test (Applied Force).....:		N/A
	Position of feet or movable parts.....:		—
8.7	Equipment mounted to wall or ceiling	Mass: 0.043kg, install height not been clarified, MS3	P
8.7.1	Mounting Means (Length of screws (mm) and mounting surface)	Use sticker	P
8.7.2	Direction and applied force.....:	1.26N, downward force, 1 mins	P
8.8	Handles strength		N/A
8.8.1	Classification		N/A
8.8.2	Applied Force		N/A
8.9	Wheels or casters attachment requirements	Not such equipment.	N/A
8.9.1	Classification		N/A
8.9.2	Applied force		—
8.10	Carts, stands and similar carriers	Not such equipment.	N/A
8.10.1	General		N/A
8.10.2	Marking and instructions		N/A
	Instructional Safeguard.....:		—
8.10.3	Cart, stand or carrier loading test and compliance		N/A
	Applied force		—
8.10.4	Cart, stand or carrier impact test		N/A
8.10.5	Mechanical stability		N/A
	Applied horizontal force (N).....:		—
8.10.6	Thermoplastic temperature stability (°C).....:		N/A
8.11	Mounting means for rack mounted equipment	Not such equipment.	N/A

IEC 62368-1			
Clause	Requirement-Test	Result-Remark	Verdict
8.11.1	General		N/A
8.11.2	Product Classification		N/A
8.11.3	Mechanical strength test, variable N		N/A
8.11.4	Mechanical strength test 250N, including end stops		N/A
8.12	Telescoping or rod antennas	No such parts.	N/A
	Button/Ball diameter (mm).....		—

9	Thermal burn injury		P
9.2	Thermal energy source classifications	No part considered to be accessible other than enclosure. The equipment evaluated by temperature test (see table 5.4.1.4).	P
9.3	Safeguard against thermal energy sources	Temperature of enclosure classed as TS1.	P
9.4	Requirements for safeguards		P
9.4.1	Equipment safeguard	Enclosure provided to limit the transfer of thermal energy of internal parts under normal operating conditions and abnormal operating conditions.	P
9.4.2	Instructional safeguard		N/A

10	RADIATION		P
10.2	Radiation energy source classification	RS1	N/A
10.2.1	General classification	RS1	P
10.3	Protection against laser radiation	No laser radiation	N/A
	Laser radiation that exists equipment:		—
	Normal, abnormal, single-fault		
	Instructional safeguard		—
	Tool		—
10.4	Protection against visible, infrared, and UV radiation		P
10.4.1	General	RS1	N/A
10.4.1.a)	RS3 for Ordinary and instructed persons.....		N/A

IEC 62368-1			
Clause	Requirement-Test	Result-Remark	Verdict
10.4.1.b)	RS3 accessible to a skilled person		N/A
	Personal safeguard (PPE) instructional safeguard :		—
10.4.1.c)	Equipment visible, IR, UV does not exceed RS1. :		P
10.4.1.d)	Normal, abnormal, single-fault conditions		N/A
10.4.1.e)	Enclosure material employed as safeguard is opaque.....		P
10.4.1.f)	UV attenuation.....		N/A
10.4.1.g)	Materials resistant to degradation UV		N/A
10.4.1.h)	Enclosure containment of optical radiation		N/A
10.4.1.i)	Exempt Group under normal operating conditions		N/A
10.4.2	Instructional safeguard.....		N/A
10.5	Protection against x-radiation	No such x-radiation generated from the equipment	N/A
10.5.1	X- radiation energy source that exists equipment		N/A
	Normal, abnormal, single fault conditions		N/A
	Equipment safeguards		N/A
	Instructional safeguard for skilled person.....		N/A
10.5.3	Most unfavourable supply voltage to give maximum radiation.....		—
	Abnormal and single-fault condition		N/A
	Maximum radiation (pA/kg)		N/A
10.6	Protection against acoustic energy sources	Not such an equipment.	N/A
10.6.1	General		N/A
10.6.2	Classification		N/A
	Acoustic output, dB(A).....		N/A
	Output voltage, unweighted r.m.s.....		N/A
10.6.4	Protection of persons		N/A
	Instructional safeguards		N/A

IEC 62368-1			
Clause	Requirement-Test	Result-Remark	Verdict
	Equipment safeguard prevent ordinary person to RS2..... :		—
	Means to actively inform user of increase sound pressure..... :		—
	Equipment safeguard prevent ordinary person to RS2..... :		—
10.6.5	Requirements for listening devices (headphones, earphones, etc.)		N/A
10.6.5.1	Corded passive listening devices with analog input		N/A
	Input voltage with 94 dB(A) L_{Aeq} acoustic pressure output		—
10.6.5.2	Corded listening devices with digital input		N/A
	Maximum dB(A)..... :		—
10.6.5.3	Cordless listening device		N/A
	Maximum dB(A)..... :		—

B	NORMAL OPERATING CONDITION TESTS, ABNORMAL OPERATING CONDITION TESTS AND SINGLE FAULT CONDITION TESTS		P
B.2	Normal Operating Conditions	See the following details.	P
B.2.1	General requirements		P
	Audio Amplifiers and equipment with audio amplifiers	Not such equipment.	N/A
B.2.3	Supply voltage and tolerances	DC 3V	P
B.2.5	Input test.....	(See appended table B.2.5)	N/A
B.3	Simulated abnormal operating conditions		P
B.3.1	General requirements	(See appended table B.3 & B.4)	P
B.3.2	Covering of ventilation openings		P
B.3.3	D.C. mains polarity test	The EUT is not connected to a D.C. mains	N/A
B.3.4	Setting of voltage selector.....	No setting of voltage selector within the EUT	N/A
B.3.5	Maximum load at output terminals	No output terminals	N/A
B.3.6	Reverse battery polarity	No reverse battery polarity	N/A

IEC 62368-1			
Clause	Requirement-Test	Result-Remark	Verdict
B.3.7	Abnormal operating conditions as specified in Clause E.2.	Not such equipment.	N/A
B.3.8	Safeguards functional during and after abnormal operating conditions	All safeguards remained effective.	P
B.4	Simulated single fault conditions		P
B.4.2	Temperature controlling device open or short-circuited :	No such device used.	N/A
B.4.3	Motor tests	No motors used.	N/A
B.4.3.1	Motor blocked or rotor locked increasing the internal ambient temperature:		N/A
B.4.4	Short circuit of functional insulation	See the following details.	P
B.4.4.1	Short circuit of clearances for functional insulation	(See appended table B.4)	P
B.4.4.2	Short circuit of creepage distances for functional insulation		N/A
B.4.4.3	Short circuit of functional insulation on coated printed boards	No coated printed boards within the EUT	N/A
B.4.5	Short circuit and interruption of electrodes in tubes and semiconductors		N/A
B.4.6	Short circuit or disconnect of passive components		N/A
B.4.7	Continuous operation of components	The EUT is continuous operating type and no such components intended for short time operation or intermittent operation	N/A
B.4.8	Class 1 and Class 2 energy sources within limits during and after single fault conditions	No change to circuits classified in 5.3.	P
B.4.9	Battery charging under single fault conditions		P

C	UV RADIATION		N/A
C.1	Protection of materials in equipment from UV radiation	No such UV generated from the equipment.	N/A
C.1.2	Requirements	See above.	N/A
C.1.3	Test method	See above.	N/A
C.2	UV light conditioning test	See above.	N/A
C.2.1	Test apparatus	See above.	N/A
C.2.2	Mounting of test samples	See above.	N/A

IEC 62368-1			
Clause	Requirement-Test	Result-Remark	Verdict
C.2.3	Carbon-arc light-exposure apparatus	See above.	N/A
C.2.4	Xenon-arc light exposure apparatus	See above.	N/A

D	TEST GENERATORS		N/A
D.1	Impulse test generators	No such consideration.	N/A
D.2	Antenna interface test generator	See above.	N/A
D.3	Electronic pulse generator	See above.	N/A

E	TEST CONDITIONS FOR EQUIPMENT CONTAINING AUDIO AMPLIFIERS		N/A
E.1	Audio amplifier normal operating conditions	Not such equipment.	N/A
	Audio signal voltage (V)	See above.	—
	Rated load impedance (Ω)	See above.	—
E.2	Audio amplifier abnormal operating conditions	See above.	N/A

F	EQUIPMENT MARKINGS, INSTRUCTIONS, AND INSTRUCTIONAL SAFEGUARDS		P
F.1	General requirements	See the following details.	P
	Instructions – Language	English checked	—
F.2	Letter symbols and graphical symbols	See the following details.	P
F.2.1	Letter symbols according to IEC60027-1	Letter symbols for quantities and units are complied with IEC 60227-1.	P
F.2.2	Graphic symbols IEC, ISO or manufacturer specific		N/A
F.3	Equipment markings		P
F.3.1	Equipment marking locations	Equipment marking is located on the enclosure surface and is easily visible.	P
F.3.2	Equipment identification markings	See the following details.	P
F.3.2.1	Manufacturer identification	See copy of marking or labelling	—
F.3.2.2	Model identification	See copy of marking or labelling	—
F.3.3	Equipment rating markings	See the following details.	N/A
F.3.3.1	Equipment with direct connection to mains	Class III equipment	N/A
F.3.3.2	Equipment without direct connection to mains		P
F.3.3.3	Nature of supply voltage		—

IEC 62368-1			
Clause	Requirement-Test	Result-Remark	Verdict
F.3.3.4	Rated voltage		—
F.3.3.4	Rated frequency		—
F.3.3.6	Rated current or rated power		—
F.3.3.7	Equipment with multiple supply connections		N/A
F.3.4	Voltage setting device	Auto range and no voltage selector provide within the equipment.	N/A
F.3.5	Terminals and operating devices		N/A
F.3.5.1	Mains appliance outlet and socket-outlet markings	No such devices on the equipment.	N/A
F.3.5.2	Switch position identification marking	No such switch on the equipment.	N/A
F.3.5.3	Replacement fuse identification and rating markings		N/A
F.3.5.4	Replacement battery identification marking		N/A
F.3.5.5	Terminal marking location		N/A
F.3.6	Equipment markings related to equipment classification		N/A
F.3.6.1	Class I Equipment		N/A
F.3.6.1.1	Protective earthing conductor terminal		N/A
F.3.6.1.2	Neutral conductor terminal		N/A
F.3.6.1.3	Protective bonding conductor terminals		N/A
F.3.6.2	Class II equipment (IEC60417-5172)		N/A
F.3.6.2.1	Class II equipment with or without functional earth		N/A
F.3.6.2.2	Class II equipment with functional earth terminal marking		N/A
F.3.7	Equipment IP rating marking	IPX0.	—
F.3.8	External power supply output marking	No external power supply output	N/A
F.3.9	Durability, legibility and permanence of marking	Marking is considered to be legible and easily discernible. See also the following details.	P

IEC 62368-1			
Clause	Requirement-Test	Result-Remark	Verdict
F.3.10	Test for permanence of markings	The label was subjected to the permanence of marking test. The label was rubbed with cloth soaked with water for 15 sec. And then again for 15 sec. With the cloth soaked with petroleum spirit. After this test there was no damage to the label. The marking on the label did not fade. There was no curling and lifting of the label edge. After each test, the marking remained legible.	P
F.4	Instructions		P
	a) Equipment for use in locations where children not likely to be present - marking		N/A
	b) Instructions given for installation or initial use		P
	c) Equipment intended to be fastened in place		N/A
	d) Equipment intended for use only in restricted access area		N/A
	e) Audio equipment terminals classified as ES3 and other equipment with terminals marked in accordance F.3.6.1	No such terminals provided.	N/A
	f) Protective earthing employed as safeguard		N/A
	g) Protective earthing conductor current exceeding ES2 limits		N/A
	h) Symbols used on equipment	No such symbols used as a safeguard considered.	N/A
	i) Permanently connected equipment not provided with all-pole mains switch	Not permanently connected equipment.	N/A
	j) Replaceable components or modules providing safeguard function	No such markings.	N/A
F.5	Instructional safeguards		P
	Where "instructional safeguard" is referenced in the test report it specifies the required elements, location of marking and/or instruction		P

IEC 62368-1			
Clause	Requirement-Test	Result-Remark	Verdict
G	COMPONENTS		P
G.1	Switches		N/A
G.1.1	General requirements	No switch used.	N/A
G.1.2	Ratings, endurance, spacing, maximum load		N/A
G.2	Relays		N/A
G.2.1	General requirements		N/A
G.2.2	Overload test		N/A
G.2.3	Relay controlling connectors supply power		N/A
G.2.4	Mains relay, modified as stated in G.2		N/A
G.3	Protection Devices		N/A
G.3.1	Thermal cut-offs	No thermal cut-off provided within the equipment.	N/A
G.3.1.1a) &b)	Thermal cut-outs separately approved according to IEC 60730 with conditions indicated in a) & b)	See above.	N/A
G.3.1.1c)	Thermal cut-outs tested as part of the equipment as indicated in c)	See above.	N/A
G.3.1.2	Thermal cut-off connections maintained and secure	See above.	N/A
G.3.2	Thermal links		N/A
G.3.2.1a)	Thermal links separately tested with IEC 60691	No thermal link provided within the equipment.	N/A
G.3.2.1b)	Thermal links tested as part of the equipment	See above.	N/A
	Aging hours (H)	See above.	—
	Single Fault Condition	See above.	—
	Test Voltage (V) and Insulation Resistance (Ω) ..	See above.	—
G.3.3	PTC Thermistors	No PTC thermistor provided within the equipment.	N/A
G.3.4	Overcurrent protection devices		N/A
G.3.5	Safeguards components not mentioned in G.3.1 to G.3.5		N/A
G.3.5.1	Non-resettable devices suitably rated and marking provided		N/A
G.3.5.2	Single faults conditions		N/A
G.4	Connectors		N/A

IEC 62368-1			
Clause	Requirement-Test	Result-Remark	Verdict
G.4.1	Spacings	No such connector with insulated surfaces accessible within the EUT	N/A
G.4.2	Mains connector configuration		N/A
G.4.3	Plug is shaped that insertion into mains socket-outlets or appliance coupler is unlikely		N/A
G.5	Wound Components		N/A
G.5.1	Wire insulation in wound components	No Wound Components	N/A
G.5.1.2 a)	Two wires in contact inside wound component, angle between 45° and 90°		N/A
G.5.1.2 b)	Construction subject to routine testing		N/A
G.5.2	Endurance test on wound components		N/A
G.5.2.1	General test requirements		N/A
G.5.2.2	Heat run test		N/A
	Time (s)		—
	Temperature (°C).....		—
G.5.2.3	Wound Components supplied by mains		N/A
G.5.3	Transformers		N/A
G.5.3.1	Requirements applied (IEC61204-7, IEC61558-1/-2, and/or IEC62368-1).....	No Transformers	N/A
	Position.....		—
	Method of protection		—
G.5.3.2	Insulation		N/A
	Protection from displacement of windings		—
G.5.3.3	Overload test.....		N/A
G.5.3.3.1	Test conditions		N/A
G.5.3.3.2	Winding Temperatures testing in the unit		N/A
G.5.3.3.3	Winding Temperatures - Alternative test method		N/A
G.5.4	Motors		N/A
G.5.4.1	General requirements	No motors used.	N/A
	Position		—
G.5.4.2	Test conditions		N/A
G.5.4.3	Running overload test		N/A

IEC 62368-1			
Clause	Requirement-Test	Result-Remark	Verdict
G.5.4.4	Locked-rotor overload test		N/A
	Test duration (days)		—
G.5.4.5	Running overload test for d.c. motors in secondary circuits		N/A
G.5.4.5.2	Tested in the unit		N/A
	Electric strength test (V).....		—
G.5.4.5.3	Tested on the Bench - Alternative test method; test time (h)		N/A
	Electric strength test (V).....		—
G.5.4.6	Locked-rotor overload test for d.c. motors in secondary circuits		N/A
G.5.4.6.2	Tested in the unit		N/A
	Maximum Temperature		N/A
	Electric strength test (V)		N/A
G.5.4.6.3	Tested on the bench - Alternative test method; test time (h)		N/A
	Electric strength test (V).....		N/A
G.5.4.7	Motors with capacitors		N/A
G.5.4.8	Three-phase motors		N/A
G.5.4.9	Series motors		N/A
	Operating voltage		—
G.6	Wire Insulation		N/A
G.6.1	General	No Wire Insulation	N/A
G.6.2	Solvent-based enamel wiring insulation		N/A
G.7	Mains supply cords		N/A
G.7.1	General requirements	No mains cord provided.	N/A
	Type.....		—
	Rated current (A).....		—
	Cross-sectional area (mm ²), (AWG).....		—
G.7.2	Compliance and test method		N/A
G.7.3	Cord anchorages and strain relief for non-detachable power supply cords		N/A

IEC 62368-1			
Clause	Requirement-Test	Result-Remark	Verdict
G.7.3.2	Cord strain relief		N/A
G.7.3.2.1	Requirements		N/A
	Strain relief test force (N)		—
G.7.3.2.2	Strain relief mechanism failure		N/A
G.7.3.2.3	Cord sheath or jacket position, distance (mm)....		—
G.7.3.2.4	Strain relief comprised of polymeric material		N/A
G.7.4	Cord Entry		N/A
G.7.5	Non-detachable cord bend protection		N/A
G.7.5.1	Requirements		N/A
G.7.5.2	Mass (g)		—
	Diameter (m)		—
	Temperature (°C).....		—
G.7.6	Supply wiring space		N/A
G.7.6.2	Stranded wire		N/A
G.7.6.2.1	Test with 8 mm strand		N/A
G.8	Varistors		N/A
G.8.1	General requirements		N/A
G.8.2	Safeguard against shock		N/A
G.8.3	Safeguard against fire		N/A
G.8.3.2	Varistor overload test.....		N/A
G.8.3.3	Temporary overvoltage.....		N/A
G.9	Integrated Circuit (IC) Current Limiters		N/A
G.9.1 a)	Manufacturer defines limit at max. 5A.	No IC current limiter provided within the equipment.	N/A
G.9.1 b)	Limiters do not have manual operator or reset		N/A
G.9.1 c)	Supply source does not exceed 250 VA		—
G.9.1 d)	IC limiter output current (max. 5A)		—
G.9.1 e)	Manufacturers' defined drift		—
G.9.2	Test Program 1		N/A
G.9.3	Test Program 2		N/A
G.9.4	Test Program 3		N/A

IEC 62368-1			
Clause	Requirement-Test	Result-Remark	Verdict
G.10	Resistors		N/A
G.10.1	General requirements	No such resistors	N/A
G.10.2	Resistor test		N/A
G.10.3	Test for resistors serving as safeguards between the mains and an external circuit consisting of a coaxial cable	No such resistors	N/A
G.10.3.1	General requirements		N/A
G.10.3.2	Voltage surge test		N/A
G.10.3.3	Impulse test		N/A
G.11	Capacitor and RC units		N/A
G.11.1	General requirements	No such Capacitor and RC units	N/A
G.11.2	Conditioning of capacitors and RC units		N/A
G.11.3	Rules for selecting capacitors		N/A
G.12	Optocouplers		N/A
	Optocouplers comply with IEC 60747-5-5:2007 Spacing or Electric Strength Test (specify option and test results).....:	No such Optocouplers	N/A
	Type test voltage Vini, a		—
	Routine test voltage, Vini,b		—
G.13	Printed boards		P
G.13.1	General requirements	See the following details.	P
G.13.2	Uncoated printed boards	The insulation between conductors on the outer surfaces of an uncoated printed board or over the outer surface of coated printed boards complied with the minimum clearance and creepage requirements of 5.4.2 and 5.4.3.	P
G.13.3	Coated printed boards	No coated printed board or multilayer board applied for within the equipment.	N/A
G.13.4	Insulation between conductors on the same inner surface	See above.	N/A
	Compliance with cemented joint requirements (Specify construction).....:		—

IEC 62368-1			
Clause	Requirement-Test	Result-Remark	Verdict
G.13.5	Insulation between conductors on different surfaces	See above.	N/A
	Distance through insulation.....:		N/A
	Number of insulation layers (pcs)		—
G.13.6	Tests on coated printed boards	See above.	N/A
G.13.6.1	Sample preparation and preliminary inspection		N/A
G.13.6.2a)	Thermal conditioning		N/A
G.13.6.2b)	Electric strength test		N/A
G.13.6.2c)	Abrasion resistance test		N/A
G.14	Coating on components terminals		N/A
G.14.1	Requirements		N/A
G.15	Liquid filled components		N/A
G.15.1	General requirements	No such device provided within the equipment.	N/A
G.15.2	Requirements		N/A
G.15.3	Compliance and test methods		N/A
G.15.3.1	Hydrostatic pressure test		N/A
G.15.3.2	Creep resistance test		N/A
G.15.3.3	Tubing and fittings compatibility test		N/A
G.15.3.4	Vibration test		N/A
G.15.3.5	Thermal cycling test		N/A
G.15.3.6	Force test		N/A
G.15.4	Compliance		N/A
G.16	IC including capacitor discharge function (ICX)		N/A
a)	Humidity treatment in accordance with sc5.4.8 – 120 hours	No such ICX provided within the equipment.	N/A
b)	Impulse test using circuit 2 with $U_c =$ to transient voltage		N/A
C1)	Application of ac voltage at 110% of rated voltage for 2.5 minutes		N/A
C2)	Test voltage		—

IEC 62368-1			
Clause	Requirement-Test	Result-Remark	Verdict
D1)	10,000 cycles on and off using capacitor with smallest capacitance resistor with largest resistance specified by manufacturer		N/A
D2)	Capacitance		—
D3)	Resistance		—

H	CRITERIA FOR TELEPHONE RINGING SIGNALS		N/A
H.1	General	No telephone ringing signal generated within the equipment.	N/A
H.2	Method A		N/A
H.3	Method B		N/A
H.3.1	Ringing signal		N/A
H.3.1.1	Frequency (Hz)		—
H.3.1.2	Voltage (V)		—
H.3.1.3	Cadence; time (s) and voltage (V)		—
H.3.1.4	Single fault current (mA):		—
H.3.2	Tripping device and monitoring voltage		N/A
H.3.2.1	Conditions for use of a tripping device or a monitoring voltage complied with		N/A
H.3.2.2	Tripping device		N/A
H.3.2.3	Monitoring voltage (V)		—

J	INSULATED WINDING WIRES FOR USE WITHOUT INTERLEAVED INSULATION		N/A
	General requirements		N/A

K	SAFETY INTERLOCKS		N/A
K.1	General requirements	No safety interlock provided within the equipment.	N/A
K.2	Components of safety interlock safeguard mechanism		N/A
K.3	Inadvertent change of operating mode		N/A
K.4	Interlock safeguard override		N/A
K.5	Fail-safe		N/A

IEC 62368-1

Clause	Requirement-Test	Result-Remark	Verdict
	Compliance		N/A
K.6	Mechanically operated safety interlocks		N/A
K.6.1	Endurance requirement		N/A
K.6.2	Compliance and Test method		N/A
K.7	Interlock circuit isolation		N/A
K.7.1	Separation distance for contact gaps & interlock circuit elements (type and circuit location)		N/A
K.7.2	Overload test, Current (A).....		N/A
K.7.3	Endurance test		N/A
K.7.4	Electric strength test		N/A

L	DISCONNECT DEVICES		N/A
L.1	General requirements	Class III equipment, supply by DC source	N/A
L.2	Permanently connected equipment		N/A
L.3	Parts that remain energized		N/A
L.4	Single phase equipment		N/A
L.5	Three-phase equipment		N/A
L.6	Switches as disconnect devices		N/A
L.7	Plugs as disconnect devices		N/A
L.8	Multiple power sources		N/A

M	EQUIPMENT CONTAINING BATTERIES AND THEIR PROTECTION CIRCUITS		P
M.1	General requirements		P
M.2	Safety of batteries and their cells		P
M.2.1	Requirements		P
M.2.2	Compliance and test method (identify method) .. :		N/A
M.3	Protection circuits		N/A
M.3.1	Requirements		N/A
M.3.2	Tests		N/A
	- Overcharging of a rechargeable battery		N/A

IEC 62368-1			
Clause	Requirement-Test	Result-Remark	Verdict
	- Unintentional charging of a non-rechargeable battery		N/A
	- Reverse charging of a rechargeable battery		N/A
	- Excessive discharging rate for any battery		N/A
M.3.3	Compliance		N/A
M.4	Additional safeguards for equipment containing secondary lithium battery		N/A
M.4.1	General		N/A
M.4.2	Charging safeguards		N/A
M.4.2.1	Charging operating limits		N/A
M.4.2.2a)	Charging voltage, current and temperature		—
M.4.2.2 b)	Single faults in charging circuitry		—
M.4.3	Fire Enclosure		N/A
M.4.4	Endurance of equipment containing a secondary lithium battery		N/A
M.4.4.2	Preparation		N/A
M.4.4.3	Drop and charge/discharge function tests		N/A
	Drop		N/A
	Charge		N/A
	Discharge		N/A
M.4.4.4	Charge-discharge cycle test		N/A
M.4.4.5	Result of charge-discharge cycle test		N/A
M.5	Risk of burn due to short circuit during carrying		N/A
M.5.1	Requirement		N/A
M.5.2	Compliance and Test Method (Test of P.2.3)		N/A
M.6	Prevention of short circuits and protection from other effects of electric current		N/A
M.6.1	Short circuits		N/A
M.6.1.1	General requirements		N/A
M.6.1.2	Test method to simulate an internal fault		N/A

IEC 62368-1			
Clause	Requirement-Test	Result-Remark	Verdict
M.6.1.3	Compliance (Specify M.6.1.2 or alternative method)		N/A
M.6.2	Leakage current (mA)		N/A
M.7	Risk of explosion from lead acid and NiCd batteries		N/A
M.7.1	Ventilation preventing explosive gas concentration		N/A
M.7.2	Compliance and test method		N/A
M.8	Protection against internal ignition from external spark sources of lead acid batteries		N/A
M.8.1	General requirements		N/A
M.8.2	Test method		N/A
M.8.2.1	General requirements		N/A
M.8.2.2	Estimation of hypothetical volume V_z (m ³ /s)		—
M.8.2.3	Correction factors.....		—
M.8.2.4	Calculation of distance d (mm)		—
M.9	Preventing electrolyte spillage		N/A
M.9.1	Protection from electrolyte spillage		N/A
M.9.2	Tray for preventing electrolyte spillage		N/A
M.10	Instructions to prevent reasonably foreseeable misuse (Determination of compliance: inspection, data review; or abnormal testing)		N/A

N	ELECTROCHEMICAL POTENTIALS		N/A
	Metal(s) used :	Class III equipment.	—

O	MEASUREMENT OF CREEPAGE DISTANCES AND CLEARANCES		N/A
	Figures O.1 to O.20 of this Annex applied :	Class III equipment.	—

P	SAFEGUARDS AGAINST ENTRY OF FOREIGN OBJECTS AND SPILLAGE OF INTERNAL LIQUIDS		N/A
P.1	General requirements		N/A
P.2.2	Safeguards against entry of foreign object	The enclosure thickness at the opening is not less than the vertical dimension of the opening.	N/A
P.2.3	Safeguard against the consequences of entry of foreign object	See above.	N/A

IEC 62368-1			
Clause	Requirement-Test	Result-Remark	Verdict
P.2.3.1	Safeguards against the entry of a foreign object	See above.	N/A
	Openings in transportable equipment		N/A
	Transportable equipment with metalized plastic parts :		N/A
P.2.3.2	Openings in transportable equipment in relation to metallized parts of a barrier or enclosure (identification of supplementary safeguard) :		N/A
P.3	Safeguards against spillage of internal liquids	No such liquids.	N/A
P.3.1	General requirements		N/A
P.3.2	Determination of spillage consequences		N/A
P.3.3	Spillage safeguards		N/A
P.3.4	Safeguards effectiveness		N/A
P.4	Metallized coatings and adhesive securing parts	No such construction.	N/A
P.4.2 a)	Conditioning testing		N/A
	Tc (°C)..... :		—
	Tr (°C)..... :		—
	Ta (°C)..... :		—
P.4.2 b)	Abrasion testing..... :		N/A
P.4.2 c)	Mechanical strength testing..... :		N/A

Q	CIRCUITS INTENDED FOR INTERCONNECTION WITH BUILDING WIRING		N/A
Q.1	Limited power sources		N/A
Q.1.1 a)	Inherently limited output		N/A
Q.1.1 b)	Impedance limited output		N/A
	- Regulating network limited output under normal operating and simulated single fault condition		N/A
Q.1.1 c)	Overcurrent protective device limited output		N/A
Q.1.1 d)	IC current limiter complying with G.9		N/A
Q.1.2	Compliance and test method		N/A
Q.2	Test for external circuits – paired conductor cable		N/A
	Maximum output current (A)..... :		—
	Current limiting method..... :		—

IEC 62368-1

Clause	Requirement-Test	Result-Remark	Verdict
--------	------------------	---------------	---------

R	LIMITED SHORT CIRCUIT TEST		N/A
R.1	General requirements	No such consideration.	N/A
R.2	Determination of the overcurrent protective device and circuit	See above.	N/A
R.3	Test method Supply voltage (V) and short-circuit current (A)). :	See above.	N/A

S	TESTS FOR RESISTANCE TO HEAT AND FIRE		N/A
S.1	Flammability test for fire enclosures and fire barrier materials of equipment where the steady state power does not exceed 4 000 W	Class III equipment	N/A
	Samples, material :		—
	Wall thickness (mm)..... :		—
	Conditioning (°C)..... :		—
	Test flame according to IEC 60695-11-5 with conditions as set out		N/A
	- Material not consumed completely		N/A
	- Material extinguishes within 30s		N/A
	- No burning of layer or wrapping tissue		N/A
S.2	Flammability test for fire enclosure and fire barrier integrity		N/A
	Samples, material :		—
	Wall thickness (mm)..... :		—
	Conditioning (°C)..... :		—
	Test flame according to IEC 60695-11-5 with conditions as set out		N/A
	Test specimen does not show any additional hole		N/A
S.3	Flammability test for the bottom of a fire enclosure		N/A
	Samples, material :		—
	Wall thickness (mm)..... :		—
	Cheesecloth did not ignite		N/A
S.4	Flammability classification of materials		N/A

IEC 62368-1			
Clause	Requirement-Test	Result-Remark	Verdict
S.5	Flammability test for fire enclosures and fire barrier materials of equipment where the steady state power does not exceed 4 000 W		N/A
	Samples, material		—
	Wall thickness (mm).....		—
	Conditioning (test condition), (°C).....		—
	Test flame according to IEC 60695-11-20 with conditions as set out		N/A
	After every test specimen was not consumed completely		N/A
	After fifth flame application, flame extinguished within 1 min		N/A

T	MECHANICAL STRENGTH TESTS		N/A
T.1	General requirements		N/A
T.2	Steady force test, 10 N		N/A
T.3	Steady force test, 30 N		N/A
T.4	Steady force test, 100 N		N/A
T.5	Steady force test, 250 N		N/A
T.6	Enclosure impact test		N/A
	Fall test		N/A
	Swing test		N/A
T.7	Drop test	(See appended table T.7)	N/A
T.8	Stress relief test	(See appended table T.8)	N/A
T.9	Impact Test (glass)	No glass used.	N/A
T.9.1	General requirements		N/A
T.9.2	Impact test and compliance		N/A
	Impact energy (J)		—
	Height (m)		—
T.10	Glass fragmentation test.....		N/A
T.11	Test for telescoping or rod antennas	No such antennas provided within the equipment.	N/A
	Torque value (Nm)	See above.	—

IEC 62368-1			
Clause	Requirement-Test	Result-Remark	Verdict

U	MECHANICAL STRENGTH OF CATHODE RAY TUBES (CRT) AND PROTECTION AGAINST THE EFFECTS OF IMPLOSION		N/A
U.1	General requirements	No CRT provided within the equipment.	N/A
U.2	Compliance and test method for non-intrinsically protected CRTs	See above.	N/A
U.3	Protective Screen	See above.	N/A

V	DETERMINATION OF ACCESSIBLE PARTS (FINGERS, PROBES AND WEDGES)		N/A
V.1	Accessible parts of equipment	No access with test probes to any hazardous parts	N/A
V.2	Accessible part criterion	See above.	N/A

IEC 62368-1			
Clause	Requirement-Test	Result-Remark	Verdict

ATTACHMENT TO TEST REPORT IEC 62368-1 EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES (Audio/video, information and communication technology equipment Part 1: Safety requirements)	
Differences according to	EN 62368-1:2014+A11:2017
Attachment Form No.....	EU_GD_IEC62368_1D_II
Attachment Originator	Nemko AS
Master Attachment.....	Date 2021-02-04
Copyright © 2021 IEC System for Conformity Testing and Certification of Electrical Equipment (IECEE), Geneva, Switzerland. All rights reserved.	

	CENELEC COMMON MODIFICATIONS (EN)					P																																				
	Clauses, subclauses, notes, tables, figures and annexes which are additional to those in IEC 62368-1:2014 are prefixed “Z”.					P																																				
CONTENTS	Add the following annexes: Annex ZA (normative) Normative references to international publications with their corresponding European publications Annex ZB (normative) Special national conditions Annex ZC (informative) A-deviations Annex ZD (informative) IEC and CENELEC code designations for flexible cords					P																																				
	Delete all the “country” notes in the reference document (IEC 62368-1:2014) according to the following list: <table><tr><td>0.2.1</td><td>Note</td><td>1</td><td>Note 3</td><td>4.1.15</td><td>Note</td></tr><tr><td>4.7.3</td><td>Note 1 and 2</td><td>5.2.2.2</td><td>Note</td><td>5.4.2.3.2.2 Table 13</td><td>Note c</td></tr><tr><td>5.4.2.3.2.4</td><td>Note 1 and 3</td><td>5.4.2.5</td><td>Note 2</td><td>5.4.5.1</td><td>Note</td></tr><tr><td>5.5.2.1</td><td>Note</td><td>5.5.6</td><td>Note</td><td>5.6.4.2.1</td><td>Note 2 and 3</td></tr><tr><td>5.7.5</td><td>Note</td><td>5.7.6.1</td><td>Note 1 and 2</td><td>10.2.1 Table 39</td><td>Note 2, 3 and 4</td></tr><tr><td>10.5.3</td><td>Note 2</td><td>10.6.2.1</td><td>Note 3</td><td>F.3.3.6</td><td>Note 3</td></tr></table>					0.2.1	Note	1	Note 3	4.1.15	Note	4.7.3	Note 1 and 2	5.2.2.2	Note	5.4.2.3.2.2 Table 13	Note c	5.4.2.3.2.4	Note 1 and 3	5.4.2.5	Note 2	5.4.5.1	Note	5.5.2.1	Note	5.5.6	Note	5.6.4.2.1	Note 2 and 3	5.7.5	Note	5.7.6.1	Note 1 and 2	10.2.1 Table 39	Note 2, 3 and 4	10.5.3	Note 2	10.6.2.1	Note 3	F.3.3.6	Note 3	P
0.2.1	Note	1	Note 3	4.1.15	Note																																					
4.7.3	Note 1 and 2	5.2.2.2	Note	5.4.2.3.2.2 Table 13	Note c																																					
5.4.2.3.2.4	Note 1 and 3	5.4.2.5	Note 2	5.4.5.1	Note																																					
5.5.2.1	Note	5.5.6	Note	5.6.4.2.1	Note 2 and 3																																					
5.7.5	Note	5.7.6.1	Note 1 and 2	10.2.1 Table 39	Note 2, 3 and 4																																					
10.5.3	Note 2	10.6.2.1	Note 3	F.3.3.6	Note 3																																					
	For special national conditions, see Annex ZB.					P																																				
1	Add the following note:					P																																				

IEC 62368-1			
Clause	Requirement-Test	Result-Remark	Verdict
	NOTE Z1 The use of certain substances in electrical and electronic equipment is restricted within the EU: see Directive 2011/65/EU.		
4.Z1	Add the following new subclause after 4.9: To protect against excessive current, short-circuits and earth faults in circuits connected to an a.c. mains, protective devices shall be included either as integral parts of the equipment or as parts of the building installation, subject to the following, a), b) and c): a) except as detailed in b) and c), protective devices necessary to comply with the requirements of B.3.1 and B.4 shall be included as parts of the equipment; b) for components in series with the mains input to the equipment such as the supply cord, appliance coupler, r.f.i. filter and switch, short-circuit and earth fault protection may be provided by protective devices in the building installation; c) it is permitted for pluggable equipment type B or permanently connected equipment, to rely on dedicated overcurrent and short-circuit protection in the building installation, provided that the means of protection, e.g. fuses or circuit breakers, is fully specified in the installation instructions. If reliance is placed on protection in the building installation, the installation instructions shall so state, except that for pluggable equipment type A the building installation shall be regarded as providing protection in accordance with the rating of the wall socket outlet.	See below.	N/A
5.4.2.3.2.4	Add the following to the end of this subclause: The requirement for interconnection with external circuit is in addition given in EN 50491-3:2009.	No external circuits.	N/A
10.2.1	Add the following to ^{c)} and ^{d)} in table 39: For additional requirements, see 10.5.1.	No such radiation from the equipment.	N/A
10.5.1	Add the following after the first paragraph: <i>For RS 1 compliance is checked by measurement under the following conditions:</i> <i>In addition to the normal operating conditions, all controls adjustable from the outside by hand, by any</i>		N/A

IEC 62368-1			
Clause	Requirement-Test	Result-Remark	Verdict
	<i>object such as a tool or a coin, and those internal adjustments or presets which are not locked in a reliable manner, are adjusted so as to give maximum radiation whilst maintaining an intelligible picture for 1 h, at the end of which the measurement is made.</i> NOTE Z1 Soldered joints and paint lockings are examples of adequate locking. <i>The dose-rate is determined by means of a radiation monitor with an effective area of 10 cm², at any point 10 cm from the outer surface of the apparatus.</i> <i>Moreover, the measurement shall be made under fault conditions causing an increase of the high-voltage, provided an intelligible picture is maintained for 1 h, at the end of which the measurement is made.</i> <i>For RS1, the dose-rate shall not exceed 1 µSv/h taking account of the background level.</i> NOTE Z2 These values appear in Directive 96/29/Euratom of 13 May 1996.		
10.6.1	Add the following paragraph to the end of the subclause: EN 71-1:2011, 4.20 and the related tests methods and measurement distances apply.	No such x-radiation generated from the equipment.	N/A
10.Z1	Add the following new subclause after 10.6.5. 10.Z1 Non-ionizing radiation from radio frequencies in the range 0 to 300 GHz The amount of non-ionizing radiation is regulated by European Council Recommendation 1999/519/EC of 12 July 1999 on the limitation of exposure of the general public to electromagnetic fields (0 Hz to 300 GHz). For intentional radiators, ICNIRP guidelines should be taken into account for Limiting Exposure to Time-Varying Electric, Magnetic, and Electromagnetic Fields (up to 300 GHz). For hand-held and body-mounted devices, attention is drawn to EN 50360 and EN 50566	No such consideration for the purpose of personal music players.	N/A
G.7.1	Add the following note:		P

IEC 62368-1			
Clause	Requirement-Test	Result-Remark	Verdict
	NOTE Z1 The harmonized code designations corresponding to the IEC cord types are given in Annex ZD.		
Bibliography	Add the following standards: Add the following notes for the standards indicated: IEC 60130-9 NOTE Harmonized as EN 60130-9. IEC 60269-2 NOTE Harmonized as HD 60269-2. IEC 60309-1 NOTE Harmonized as EN 60309-1. IEC 60364 NOTE some parts harmonized in HD 384/HD 60364 series. IEC 60601-2-4 NOTE Harmonized as EN 60601-2-4. IEC 60664-5 NOTE Harmonized as EN 60664-5. IEC 61032:1997 NOTE Harmonized as EN 61032:1998 (not modified). IEC 61508-1 NOTE Harmonized as EN 61508-1. IEC 61558-2-1 NOTE Harmonized as EN 61558-2-1. IEC 61558-2-4 NOTE Harmonized as EN 61558-2-4. IEC 61558-2-6 NOTE Harmonized as EN 61558-2-6. IEC 61643-1 NOTE Harmonized as EN 61643-1. IEC 61643-21 NOTE Harmonized as EN 61643-21. IEC 61643-311 NOTE Harmonized as EN 61643-311. IEC 61643-321 NOTE Harmonized as EN 61643-321. IEC 61643-331 NOTE Harmonized as EN 61643-331.		
ZB	ANNEX ZB, SPECIAL NATIONAL CONDITIONS (EN)		P
4.1.15	Denmark, Finland, Norway and Sweden To the end of the subclause the following is added: Class I pluggable equipment type A intended for connection to other equipment or a network shall, if safety relies on connection to reliable earthing or if surge suppressors are connected between the network terminals and accessible parts, have a marking stating that the equipment shall be connected to an earthed mains socket-outlet. The marking text in the applicable countries shall be as follows: In Denmark: "Apparatets stikprop skal tilsluttes en stikkontakt med jord som giver forbindelse til stikproppens jord." In Finland: "Laite on liitettävä suojakoskettimilla varustettuun pistorasiaan"		N/A

IEC 62368-1			
Clause	Requirement-Test	Result-Remark	Verdict
	In Norway: "Apparatet må tilkoples jordet stikkontakt" In Sweden: "Apparaten skall anslutas till jordat uttag"		
4.7.3	United Kingdom To the end of the subclause the following is added: The torque test is performed using a socket-outlet complying with BS 1363, and the plug part shall be assessed to the relevant clauses of BS 1363. Also see Annex G.4.2 of this annex	The equipment is not direct plug-in equipment.	N/A
5.2.2.2	Denmark After the 2nd paragraph add the following: A warning (marking safeguard) for high touch current is required if the touch current exceeds the limits of 3,5 mA a.c. or 10 mA d.c.	No high touch current.	N/A
5.4.11.1 and Annex G	Finland and Sweden To the end of the subclause the following is added: For separation of the telecommunication network from earth the following is applicable: If this insulation is solid, including insulation forming part of a component, it shall at least consist of either • two layers of thin sheet material, each of which shall pass the electric strength test below, or • one layer having a distance through insulation of at least 0,4 mm, which shall pass the electric strength test below. If this insulation forms part of a semiconductor component (e.g. an optocoupler), there is no distance through insulation requirement for the insulation consisting of an insulating compound completely filling the casing, so that clearances and creepage distances do not exist, if the component passes the electric strength test in accordance with the compliance clause below and in addition • passes the tests and inspection criteria of 5.4.8 with an electric strength test of 1,5 kV multiplied by 1,6 (the electric strength test of 5.4.9 shall be performed using 1,5 kV), and	No TNV circuits.	N/A

IEC 62368-1			
Clause	Requirement-Test	Result-Remark	Verdict
	• is subject to routine testing for electric strength during manufacturing, using a test voltage of 1,5kV. It is permitted to bridge this insulation with a capacitor complying with EN 60384-14:2005, subclass Y2. A capacitor classified Y3 according to EN 60384-14:2005, may bridge this insulation under the following conditions: • the insulation requirements are satisfied by having a capacitor classified Y3 as defined by EN 60384-14, which in addition to the Y3 testing, is tested with an impulse test of 2,5 kV defined in 5.4.11; • the additional testing shall be performed on all the test specimens as described in EN 60384-14; the impulse test of 2,5 kV is to be performed before the endurance test in EN 60384-14, in the sequence of tests as described in EN 60384-14.		
5.5.2.1	Norway After the 3rd paragraph the following is added: Due to the IT power system used, capacitors are required to be rated for the applicable line-to-line voltage (230 V).		N/A
5.5.6	Finland, Norway and Sweden To the end of the subclause the following is added: Resistors used as basic safeguard or bridging basic insulation in class I pluggable equipment type A shall comply with G.10.1 and the test of G.10.2.	No such resistors.	N/A
5.6.1	Denmark Add to the end of the subclause Due to many existing installations where the socket-outlets can be protected with fuses with higher rating than the rating of the socket-outlets the protection for pluggable equipment type A shall be an integral part of the equipment. <i>Justification:</i> In Denmark an existing 13 A socket outlet can be protected by a 20 A fuse.		N/A
5.6.4.2.1	Ireland and United Kingdom		N/A

IEC 62368-1			
Clause	Requirement-Test	Result-Remark	Verdict
	After the indent for pluggable equipment type A , the following is added: – the protective current rating is taken to be 13 A, this being the largest rating of fuse used in the mains plug.		
5.6.5.1	To the second paragraph the following is added: The range of conductor sizes of flexible cords to be accepted by terminals for equipment with a rated current over 10 A and up to and including 13 A is: 1,25 mm ² to 1,5 mm ² in cross-sectional area.	See above.	N/A
5.7.5	Denmark To the end of the subclause the following is added: The installation instruction shall be affixed to the equipment if the protective conductor current exceeds the limits of 3,5 mA a.c. or 10 mA d.c.	No high protective conductor current.	N/A
5.7.6.1	Norway and Sweden To the end of the subclause the following is added: The screen of the television distribution system is normally not earthed at the entrance of the building and there is normally no equipotential bonding system within the building. Therefore the protective earthing of the building installation needs to be isolated from the screen of a cable distribution system. It is however accepted to provide the insulation external to the equipment by an adapter or an interconnection cable with galvanic isolator, which may be provided by a retailer, for example. The user manual shall then have the following or similar information in Norwegian and Swedish language respectively, depending on in what country the equipment is intended to be used in: “Apparatus connected to the protective earthing of the building installation through the mains connection or through other apparatus with a connection to protective earthing – and to a television distribution system using coaxial cable, may in some circumstances create a fire hazard. Connection to a television distribution system therefore has to be provided through a device	Not such system.	N/A

IEC 62368-1			
Clause	Requirement-Test	Result-Remark	Verdict
	providing electrical isolation below a certain frequency range (galvanic isolator, see EN 60728-11)” NOTE In Norway, due to regulation for CATV-installations, and in Sweden, a galvanic isolator shall provide electrical insulation below 5 MHz. The insulation shall withstand a dielectric strength of 1,5 kV r.m.s., 50 Hz or 60 Hz, for 1 min. Translation to Norwegian (the Swedish text will also be accepted in Norway): “Apparater som er koplet til beskyttelsesjord via nettplugg og/eller via annet jordtilkoplet utstyr – og er tilkoplet et koaksialbasert kabel-TV nett, kan forårsake brannfare. For å unngå dette skal det ved tilkopling av apparater til kabel-TV nett installeres en galvanisk isolator mellom apparatet og kabel-TV nettet.” Translation to Swedish: ”Apparater som är kopplad till skyddsjord via jordat vägguttag och/eller via annan utrustning och samtidigt är kopplad till kabel-TV nät kan i vissa fall medföra risk för brand. För att undvika detta skall vid anslutning av apparaten till kabel-TV nät galvanisk isolator finnas mellan apparaten och kabel-TV nätet.”.		
5.7.6.2	Denmark To the end of the subclause the following is added: The warning (marking safeguard) for high touch current is required if the touch current or the protective current exceed the limits of 3,5 mA .	No external circuits.	N/A
B.3.1 and B.4	Ireland and United Kingdom The following is applicable: To protect against excessive currents and short-circuits in the primary circuit of direct plug-in equipment, tests according to Annexes B.3.1 and B.4 shall be conducted using an external miniature circuit breaker complying with EN 60898-1, Type B, rated 32A. If the equipment does not pass these tests, suitable protective devices shall be included as an integral part of the direct plug-in equipment,	The equipment is not direct plug-in equipment.	N/A

IEC 62368-1			
Clause	Requirement-Test	Result-Remark	Verdict
	until the requirements of Annexes B.3.1 and B.4 are met		
G.4.2	Denmark To the end of the subclause the following is added: Supply cords of single phase appliances having a rated current not exceeding 13 A shall be provided with a plug according to DS 60884-2-D1:2011. CLASS I EQUIPMENT provided with socket-outlets with earth contacts or which are intended to be used in locations where protection against indirect contact is required according to the wiring rules shall be provided with a plug in accordance with standard sheet DK 2-1a or DK 2-5a. If a single-phase equipment having a RATED CURRENT exceeding 13 A or if a poly-phase equipment is provided with a supply cord with a plug, this plug shall be in accordance with the standard sheets DK 6-1a in DS 60884-2-D1 or EN 60309-2. Mains socket outlets intended for providing power to Class II apparatus with a rated current of 2,5 A shall be in accordance DS 60884-2-D1:2011 standard sheet DKA 1-4a. Other current rating socket outlets shall be in compliance with Standard Sheet DKA 1-3a or DKA 1-1c. Mains socket-outlets with earth shall be in compliance with DS 60884-2-D1:2011 Standard Sheet DK 1-3a, DK 1-1c, DK1-1d, DK 1-5a or DK 1-7a <i>Justification:</i> Heavy Current Regulations, Section 6c		N/A
G.4.2	United Kingdom To the end of the subclause the following is added: The plug part of direct plug-in equipment shall be assessed to BS 1363: Part 1, 12.1, 12.2, 12.3, 12.9, 12.11, 12.12, 12.13, 12.16, and 12.17, except that the test of 12.17 is performed at not less than 125 °C. Where the metal earth pin is replaced by an Insulated Shutter Opening Device (ISOD), the requirements of clauses 22.2 and 23 also apply.	The equipment is not direct plug-in equipment.	N/A

IEC 62368-1			
Clause	Requirement-Test	Result-Remark	Verdict
G.7.1	United Kingdom To the first paragraph the following is added: Equipment which is fitted with a flexible cable or cord and is designed to be connected to a mains socket conforming to BS 1363 by means of that flexible cable or cord shall be fitted with a 'standard plug' in accordance with the Plugs and Sockets etc (Safety) Regulations 1994, Statutory Instrument 1994 No. 1768, unless exempted by those regulations. NOTE "Standard plug" is defined in SI 1768:1994 and essentially means an approved plug conforming to BS 1363 or an approved conversion plug.	The power supply cord has not been checked, see GENERAL PRODUCT INFORMATION.	N/A
G.7.1	Ireland To the first paragraph the following is added: Apparatus which is fitted with a flexible cable or cord shall be provided with a plug in accordance with Statutory Instrument 525: 1997, "13 A Plugs and Conversion Adapters for Domestic Use Regulations: 1997. S.I. 525 provides for the recognition of a standard of another Member State which is equivalent to the relevant Irish Standard	The power supply cord has not been checked, see GENERAL PRODUCT INFORMATION.	N/A
G.7.2	Ireland and United Kingdom To the first paragraph the following is added: A power supply cord with a conductor of 1,25 mm ² is allowed for equipment which is rated over 10 A and up to and including 13 A.	The power supply cord has not been checked, see GENERAL PRODUCT INFORMATION.	N/A
ZC	ANNEX ZC, NATIONAL DEVIATIONS (EN)		
10.5.2	Germany The following requirement applies: For the operation of any cathode ray tube intended for the display of visual images operating at an acceleration voltage exceeding 40 kV, authorization is required, or application of type approval (Bauartzulassung) and marking. <i>Justification:</i> German ministerial decree against ionizing radiation (Röntgenverordnung), in force since 2002-07-01, implementing the European Directive 96/29/EURATOM.	No CRT within the equipment.	N/A

IEC 62368-1

Clause	Requirement-Test	Result-Remark	Verdict
	NOTE Contact address: Physikalisch-Technische Bundesanstalt, Bundesallee 100, D-38116 Braunschweig, Tel.: Int +49-531-592-6320, Internet: http://www.ptb.de		

IEC 62368-1

Clause	Requirement-Test	Result-Remark	Verdict
--------	------------------	---------------	---------

4.1.2		TABLE: List of critical components				P
Object/part No.	Manufacturer/ trademark	Type/model	Technical data	Standard (Edition / year)	Mark(s) of conformity ¹	
PCB	Interchangeable	Interchangeable	V-1 or better; 85°C or above; Min.thickness:0.67 mm	UL 796 UL 94	UL	
Plastic Enclosure	Interchangeable	Interchangeable	HB or better; 60°C or above; Min.thick:1.0mm	UL 746 UL 94	UL	
Supplementary information:						

IEC 62368-1

Clause	Requirement-Test	Result-Remark	Verdict
--------	------------------	---------------	---------

4.8.4, 4.8.5	TABLE: Lithium coin/button cell batteries mechanical tests			N/A
(The following mechanical tests are conducted in the sequence noted.)				
4.8.4.2	TABLE: Stress relief test			—
Part		Material	Oven Temperature (°C)	Comments
4.8.4.3	TABLE: Battery replacement test			—
Battery part no. :				—
Battery Installation/withdrawal		Battery Installation/Removal Cycle	Comments	
		1		
		2		
		3		
		4		
		5		
		6		
		8		
		9		
		10		
4.8.4.4	TABLE: Drop test			—
Impact Area		Drop Distance	Drop No.	Observations
			1	
			2	
			3	
4.8.4.5	TABLE: Impact			—
Impacts per surface		Surface tested	Impact energy (Nm)	Comments
4.8.4.6	TABLE: Crush test			—
Test position		Surface tested	Crushing Force (N)	Duration force applied (s)

IEC 62368-1			
Clause	Requirement-Test	Result-Remark	Verdict
Supplementary information:			

4.8.5	TABLE: Lithium coin/button cell batteries mechanical test result			N/A
Test position	Surface tested	Force (N)	Duration force applied (s)	
Supplementary information:				

5.2	Table: Classification of electrical energy sources						P
5.2.2.2 – Steady State Voltage and Current conditions							
No.	Supply Voltage	Location (e.g. circuit designation)	Test conditions ¹⁾	Parameters			ES Class
				U (Vrms or Vpk)	I (Apk or Arms)	Hz	
1	--	Power supply	Normal	3.0VDC	--	--	ES1
			Abnormal	--	--	--	--
			Single fault C1 SC	--	--	--	--
5.2.2.3 - Capacitance Limits							
No.	Supply Voltage	Location (e.g. circuit designation)	Test conditions	Parameters		ES Class	
				Capacitance, nF	Upk (V)		
--	--	--	Normal	--	--	--	
			Abnormal	--	--	--	
			Single fault – SC/OC	--	--	--	
5.2.2.4 - Single Pulses							
No.	Supply	Location (e.g.	Test conditions	Parameters			ES Class

IEC 62368-1

Clause	Requirement-Test	Result-Remark	Verdict
--------	------------------	---------------	---------

	Voltage	circuit designation)		Duration (ms)	Upk (V)	Ipk (mA)	
--	--	--	Normal	--	--	--	--
			Abnormal	--	--	--	
			Single fault – SC/OC	--	--	--	

5.2.2.5 - Repetitive Pulses

No.	Supply Voltage	Location (e.g. circuit designation)	Test conditions	Parameters			ES Class
				Off time (ms)	Upk (V)	Ipk (mA)	
--	--	--	Normal	--	--	--	--
			Abnormal	--	--	--	
			Single fault – SC/OC	--	--	--	

Test Conditions:

Normal – Full load and no load.

Abnormal – Overload output

Supplementary information: SC=Short Circuit, OC=Open Circuit

5.4.1.4, 6.3.2, 9.0, B.2.6		TABLE: Temperature measurements				P
	Supply voltage (V) :	3.0Vd.c. (Supplied by 2*AAA batteries)		--		—
	Ambient T _{min} (°C) :	--		--		—
	Ambient T _{max} (°C) :	--		--		—
	T _{ma} (°C) :	--		--		—
Maximum measured temperature T of part/at:		T (°C)				Allowed T _{max} (°C)
PCB near U1		24.5	61.3	--	--	85
PCB near U5		24.6	61.4	--	--	85
Plastic enclosure inside near PCB		24.5	61.3	--	--	Ref.
Ambient		23.2	60.0	--	--	--
Touch temperature						

IEC 62368-1

Clause	Requirement-Test	Result-Remark	Verdict
--------	------------------	---------------	---------

Plastic enclosure outside near PCB	23.6	25.4	--	--	77
Button	23.4	25.2	--	--	77
Ambient	23.2	25.0	--	--	--

Supplementary information: * Temperature limit for TS1 of accessible enclosure according to Table 38.

Note 1: The apparatus was submitted and evaluated for maximum manufacturer's recommended ambient (T_{ma}) of 60°C.

Note 2: The temperatures were measured under the worst case normal mode defined in clause B.2.1.

Temperature T of winding:	t ₁ (°C)	R ₁ (Ω)	t ₂ (°C)	R ₂ (Ω)	T (°C)	Allowed T _{max} (°C)	Insulation class
--	--	--	--	--	--	--	--

5.4.1.8	Table: working voltage measurement	N/A
----------------	---	------------

Location	RMS voltage (V)	Peak voltage (V)	Comments
--	--	--	--

supplementary information:

5.4.1.10.2	TABLE: Vicat softening temperature of thermoplastics	N/A
-------------------	---	------------

Penetration (mm) :		—
--------------------------------	--	---

Object/ Part No./Material	Manufacturer/trademark	T softening (°C)
--	--	--

supplementary information:

5.4.1.10.3	TABLE: Ball pressure test of thermoplastics	N/A
-------------------	--	------------

Allowed impression diameter (mm)	≤ 2 mm	—
--	--------	---

Object/Part No./Material	Manufacturer/trademark	Test temperature (°C)	Impression diameter (mm)
--	--	--	--

Supplementary information:

IEC 62368-1

Clause	Requirement-Test	Result-Remark	Verdict
--------	------------------	---------------	---------

5.4.2.2, 5.4.2.4 and 5.4.3	TABLE: Minimum Clearances/Creepage distance						N/A
Clearance (cl) and creepage distance (cr) at/of/between:	Up (V)	U r.m.s. (V)	Frequency (kHz)	Required cl (mm)	cl (mm) ²	Required ³ cr (mm)	cr (mm)
--	--	--	--	--	--	--	--
Supplementary information:							

5.4.2.3	TABLE: Minimum Clearances distances using required withstand voltage				N/A
	Overvoltage Category (OV):				
	Pollution Degree:				
Clearance distanced between:		Required withstand voltage	Required cl (mm)	Measured cl (mm)	
--		--	--	--	
Supplementary information:					

5.4.2.4	TABLE: Clearances based on electric strength test			N/A
Test voltage applied between:	Required cl (mm)	Test voltage (kV) peak/ r.m.s. / d.c.	Breakdown Yes / No	
--	--	--	--	
Supplementary information:				

5.4.4.2, 5.4.4.5 c) 5.4.4.9	TABLE: Distance through insulation measurements					N/A
Distance through insulation di at/of:	Peak voltage (V)	Frequency (Hz)	Material	Required DTI (mm)	DTI (mm)	
--	--	--	--	--	--	
Supplementary information:						

5.4.9	TABLE: Electric strength tests						N/A
Test voltage applied between:	Voltage shape (AC, DC)		Test voltage (Vpeak)		Breakdown Yes / No		
--	--		--		--		

IEC 62368-1			
Clause	Requirement-Test	Result-Remark	Verdict

5.4.9	TABLE: Electric strength tests			N/A
Test voltage applied between:		Voltage shape (AC, DC)	Test voltage (Vpeak)	Breakdown Yes / No
Supplementary information:				

5.5.2.2	TABLE: Stored discharge on capacitors					N/A
Supply Voltage (V), Hz	Test Location	Operating Condition (N, S)	Switch position On or off	Measured Voltage (after 2 seconds)	ES Classification	
--	--	--	--	--	--	
Supplementary information:						

5.6.6.2	TABLE: Resistance of protective conductors and terminations					N/A
Accessible part		Test current (A)	Duration (min)	Voltage drop (V)	Resistance (Ω)	
--		--	--	--	--	
Supplementary Information:						

5.7.2.2, 5.7.4	TABLE: Earthed accessible conductive part			N/A
Supply voltage..... :		264Vac		—
Location		Test conditions specified in 6.1 of IEC 60990 or Fault Condition No in IEC 60990 clause 6.2.2.1 through 6.2.2.8, except for 6.2.2.7		Touch current (mA)
		1 (e closed, normal and reverse polarity p)		
		2* (netural open (switch n), earth intact and normal polarity, again in reverse polarity (switch p)		
		3 (for IT system, each phase conductor faulted to earth, one at a time (switch g)		
		4 (for three-phase, each phase conductor open, one at a time switches l)		

IEC 62368-1			
Clause	Requirement-Test	Result-Remark	Verdict

	5 (IT power system or three phase delta system)	
	6 (three-phase for use on centre-earthed delta supply system)	
	8 (incidental electrically connected to other parts)	

Notes:

[1] Supply voltage is the anticipated maximum Touch Voltage

[2] Earthed neutral conductor [Voltage differences less than 1% or more]

[3] Specify method used for measurement as described in IEC 60990 sub-clause 4.3

[4] IEC60990, sub-clause 6.2.2.7, Fault 7 not applicable.

[5] (*) IEC60990, sub-clause 6.2.2.2 is not applicable if switch or disconnect device (e.g., appliance coupler) provided.

a) Not considered IT power system.

b) Not three phase equipment.

c) Not IT power system or three phase delta system.

d) Not three-phase for use on centre-earthed delta supply system.

e) Not such parts.

6.2.2	Table: Electrical power sources (PS) measurements for classification					P
Source	Description	Measurement	Max Power after 3 s	Max Power after 5 s*	PS Classification	
--	All circuits	Power (W) :	0.006	--	PS1*	
		V _A (V) :	3.0	--		
		I _A (A) :	0.002	--		
Supplementary information: * Use 2*AAA non-rechargeable batteries was considered as PS1 power source.						

6.2.3.1	Table: Determination of Potential Ignition Sources (Arcing PIS)				N/A
Location	Open circuit voltage After 3 s (Vp)	Measured r.m.s current (Irms)	Calculated value (Vp x Irms)	Arcing PIS? Yes / No	
See below	--	--	--	--	
Supplementary information:					

IEC 62368-1

Clause	Requirement-Test	Result-Remark	Verdict
--------	------------------	---------------	---------

6.2.3.2	Table: Determination of Potential Ignition Sources (Resistive PIS)				N/A
Circuit Location (x-y)	Operating Condition (Normal / Describe Single Fault)	Measured wattage or VA During first 30 s (W / VA)	Measured wattage or VA After 30 s (W / VA)	Protective Circuit, Regulator, or PTC Operated? Yes / No (Comment)	Resistive PIS? Yes/No
--	--	--	--	--	--

Supplementary Information:

All power dissipating components in primary and secondary circuit which are supplied by a source exceeding 15W (since the output rating is higher than 15VA) are considered as resistive PIS.

A combination of voltmeter, VA and ammeter IA may be used instead of a wattmeter.

If a separate voltmeter and ammeter are used, the product of (VA x IA) is used to determine Resistive PIS classification.

A Resistive PIS: (a) dissipates more than 15 W, measured after 30 s of normal operation, or (b) under single fault conditions has either a power exceeding 100 W measured immediately after the introduction of the fault if electronic circuits, regulators or PTC devices are used, or has an available power exceeding 15 W measured 30 s after introduction of the fault.

8.5.5	TABLE: High Pressure Lamp		N/A
Description		Values	Energy Source Classification
Lamp type :			—
Manufacturer..... :			—
Cat no. :			—
Pressure (cold) (MPa) :			MS_
Pressure (operating) (MPa) :			MS_
Operating time (minutes)..... :			—
Explosion method :			—
Max particle length escaping enclosure (mm). :			MS_
Max particle length beyond 1 m (mm) :			MS_
Overall result :			
Supplementary information:			

IEC 62368-1							
Clause	Requirement-Test				Result-Remark		Verdict
B.2.5	TABLE: Input test						N/A*
U (V)	I (A)	I rated (A)	P (W)	P rated (W)	Fuse No	I fuse (A)	Condition/status
3.0	0.002	--	0.006	--	--	--	Normal operation
Supplementary information: * Supplied by 2*AAA non-rechargeable batteries, for reference only.							

B.3	TABLE: Abnormal operating condition tests							N/A
Ambient temperature (°C)					See below			—
Power source for EUT: Manufacturer, model/type, output rating :					--			—
Component No.	Abnormal Condition	Supply voltage, (V)	Test time (ms)	Fuse no.	Fuse current, (A)	- T-couple	- Temp. (°C)	Observation
Supplementary information: Test table is provided to record abnormal and fault conditions for all applicable energy sources including Thermal burn injury. Column "Abnormal/Fault." Specify if test condition by indicating "Abnormal" then the condition for a Clause B.3 test or "Single Fault" then the condition for Clause B.4.								

B.4	TABLE: Fault condition tests							P
Ambient temperature (°C)					25°C, if not specified			—
Power source for EUT: Manufacturer, model/type, output rating :					2*AAA non-rechargeable batteries			—
Component No.	Fault Condition	Supply voltage, (V)	Test time (ms)	Fuse no.	Fuse current, (A)	T-couple	Temp. (°C)	Observation
U1 Pin AD14-H23	S-C	3.0Vd.c.	10mins	--	--	--	--	Unit shutdown. No high temperature, no damaged, no hazard.
U1 Pin U1-W1	S-C	3.0V	10mins	--	--	--	--	Unit shutdown. No high temperature, no damaged, no hazard.

IEC 62368-1

Clause	Requirement-Test				Result-Remark				Verdict
U1 Pin A8-B7	S-C	3.0V	10mins	--	--	--	--	Unit shutdown. No high temperature, no damaged, no hazard.	
C1	S-C	3.0V	10mins	--	--	--	--	Unit shutdown. No high temperature, no damaged, no hazard.	
R3	S-C	3.0V	10mins	--	--	--	--	EUT work as normal operation, battery discharging current: Max. 0.002A No high temperature, no damaged, no hazard.	
Q1 Pin G-S	S-C	3.0V	10mins	--	--	--	--	Unit shutdown. No high temperature, no damaged, no hazard.	
Supplementary information: S-C: Short-Circuit									

Annex M			TABLE: Batteries							P
The tests of Annex M are applicable only when appropriate battery data is not available									N/A	
Is it possible to install the battery in a reverse polarity position?						Impossible			N/A	
	Non-rechargeable batteries			Rechargeable batteries						
	Discharging		Un- intentional charging	Charging		Discharging		Reversed charging		
	Meas. current	Manuf. Specs.		Meas. Current	Manuf. Specs.	Meas. Current	Manuf. Specs.	Meas. current	Manuf. Specs.	
Max. current during normal condition	0.002A	--	Impossible	--	--	--	--	--	--	

IEC 62368-1			
Clause	Requirement-Test	Result-Remark	Verdict

Annex M			TABLE: Batteries							P
The tests of Annex M are applicable only when appropriate battery data is not available									N/A	
Is it possible to install the battery in a reverse polarity position?					Impossible				N/A	
	Non-rechargeable batteries			Rechargeable batteries						
	Discharging		Un-intentional charging	Charging		Discharging		Reversed charging		
	Meas. current	Manuf. Specs.		Meas. Current	Manuf. Specs.	Meas. Current	Manuf. Specs.	Meas. current	Manuf. Specs.	
Max. current during fault condition	--	--	--	--	--	--	--	--	--	
Test results:									Verdict	
- Chemical leaks					No chemical leaks				P	
- Explosion of the battery					No explosion of the battery				P	
- Emission of flame or expulsion of molten metal					No emission of flame or expulsion of molten metal				P	
- Electric strength tests of equipment after completion of tests					No need				N/A	
Supplementary information: S-C: Short-Circuit										

Annex M.4	TABLE: Additional safeguards for equipment containing secondary lithium batteries					N/A
Battery/Cell No.	Test conditions	Measurements			Observation	
		U	I (A)	Temp (°C)		
--	Normal	--	--	--	--	
	Abnormal	--	--	--	--	
	Single fault	--	--	--	--	
Supplementary Information:						
Battery identification	Charging at T _{lowest} (°C)	Observation	Charging at T _{highest} (°C)	Observation		
--	--	--	--	--		
Supplementary Information:						

IEC 62368-1

Clause	Requirement-Test	Result-Remark	Verdict
--------	------------------	---------------	---------

Annex Q.1	TABLE: Circuits intended for interconnection with building wiring (LPS)					N/A	
Note: Measured UOC (V) with all load circuits disconnected:							
Output Circuit	Components	U _{oc} (V)	I _{sc} (A)		S (VA)		
			Meas.	Limit	Meas.	Limit	
--	--	--	--	8	--	100	
Supplementary Information: S-C: Short-circuited							

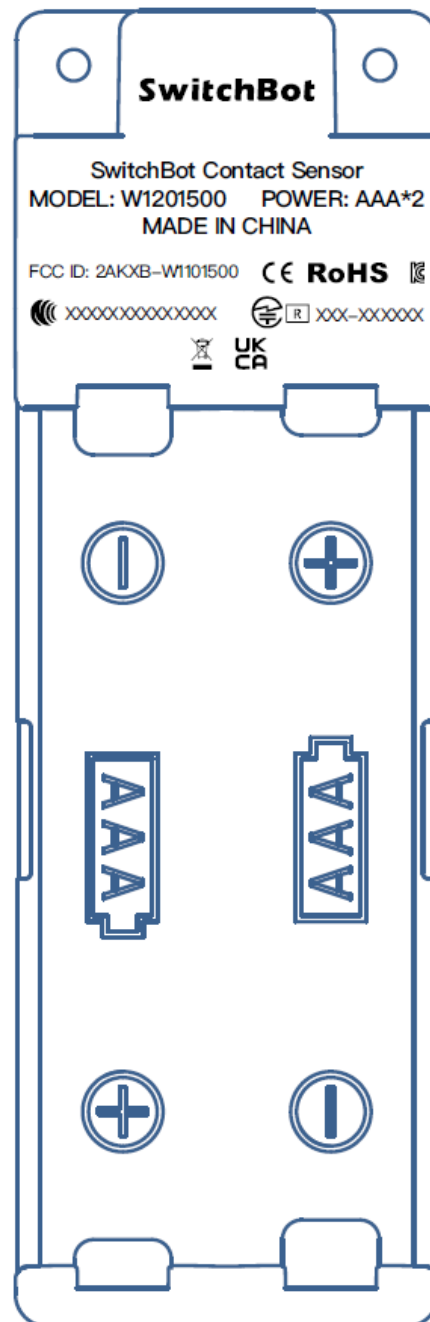
T.2, T.3, T.4, T.5	TABLE: Steady force test				N/A
Part/Location	Material	Thickness (mm)	Force (N)	Test Duration (sec)	Observation
Supplementary information:					

T.6, T.9	TABLE: Impact tests				N/A
Part/Location	Material	Thickness (mm)	Vertical distance (mm)	Observation	
Supplementary information:					

T.7	TABLE: Drop tests				N/A
Part/Location	Material	Thickness (mm)	Drop Height (mm)	Observation	
Supplementary information:					

T.8	TABLE: Stress relief test				N/A
Part/Location	Material	Thickness (mm)	Oven Temperature (°C)	Duration (h)	Observation
Supplementary information:					

6 Product Marking Label



Ref. label or marking of EUT

7 PHOTO DOCUMENT

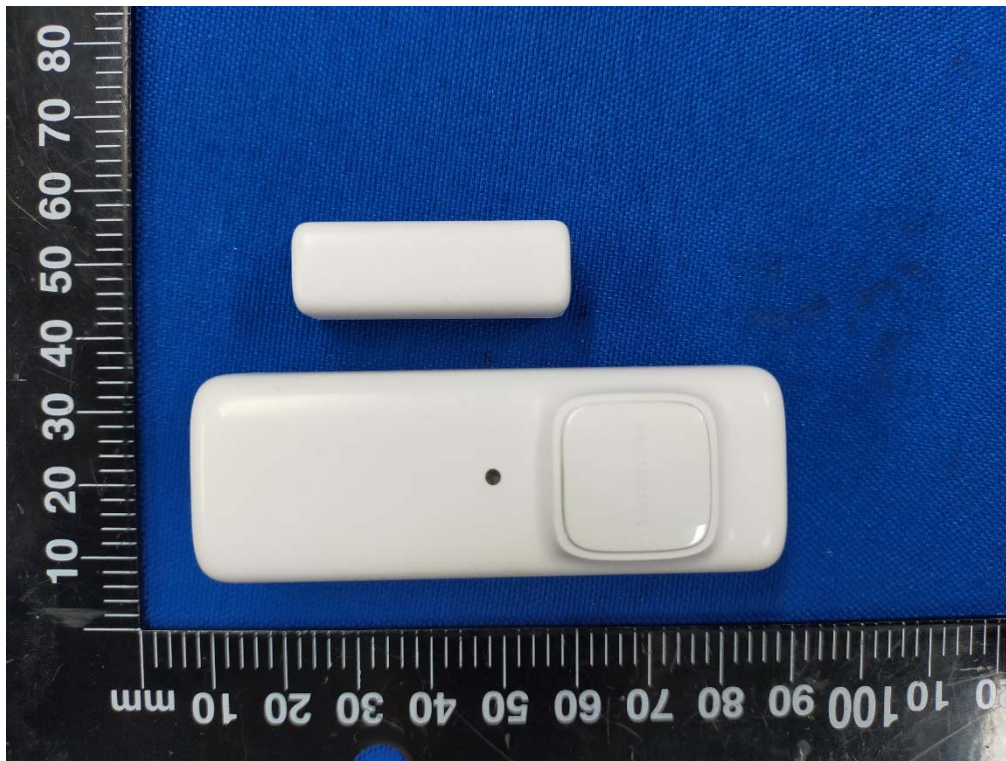


Photo 1: Appearance of the EUT

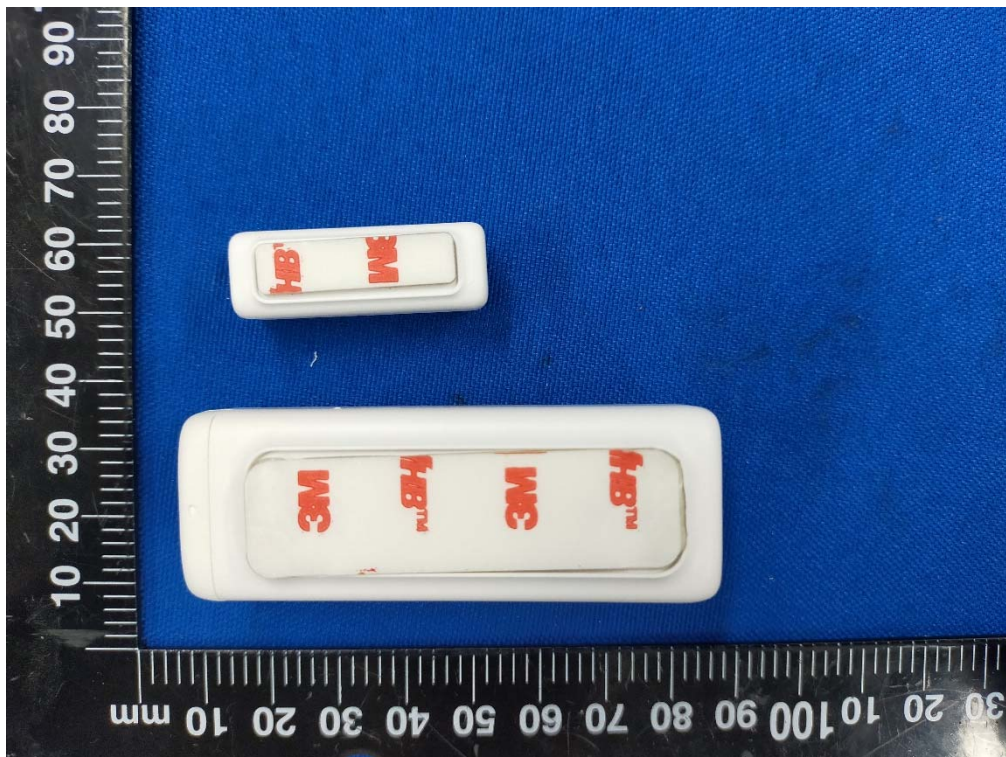


Photo 2: Appearance of the EUT

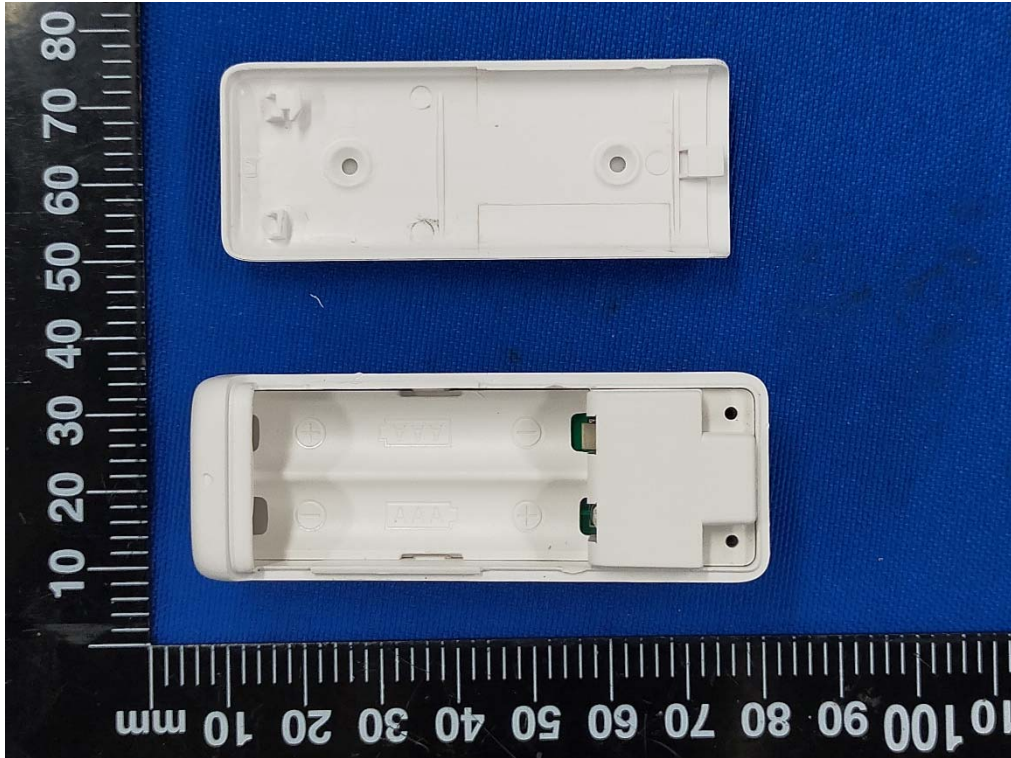


Photo 3: Inside view

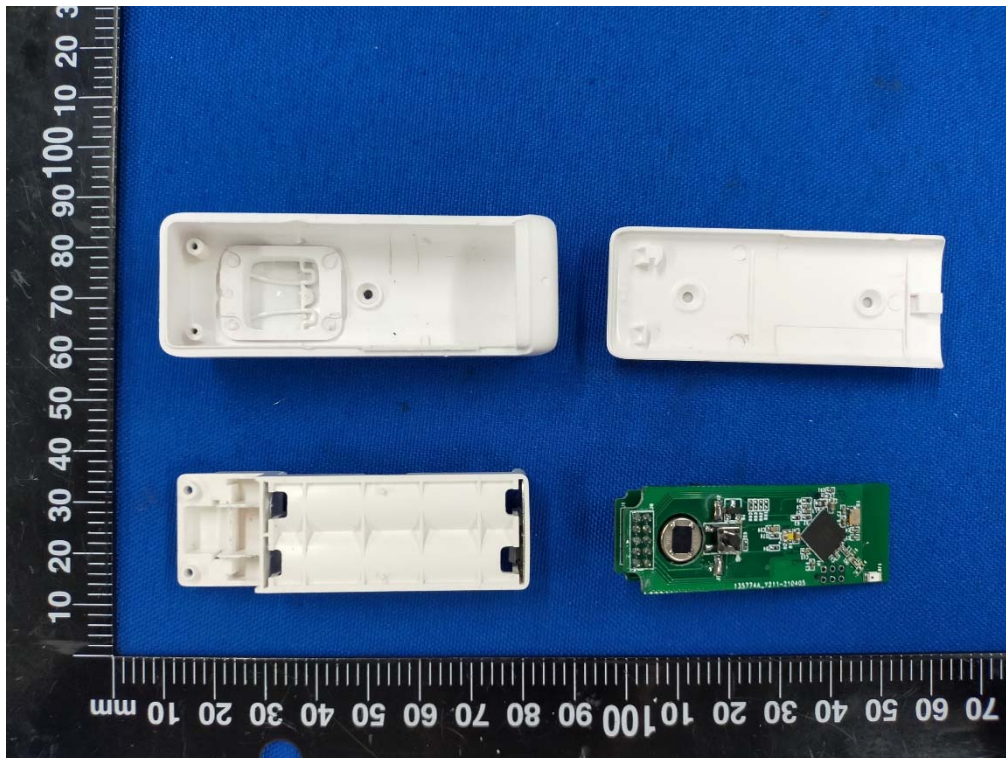


Photo 4: Inside view

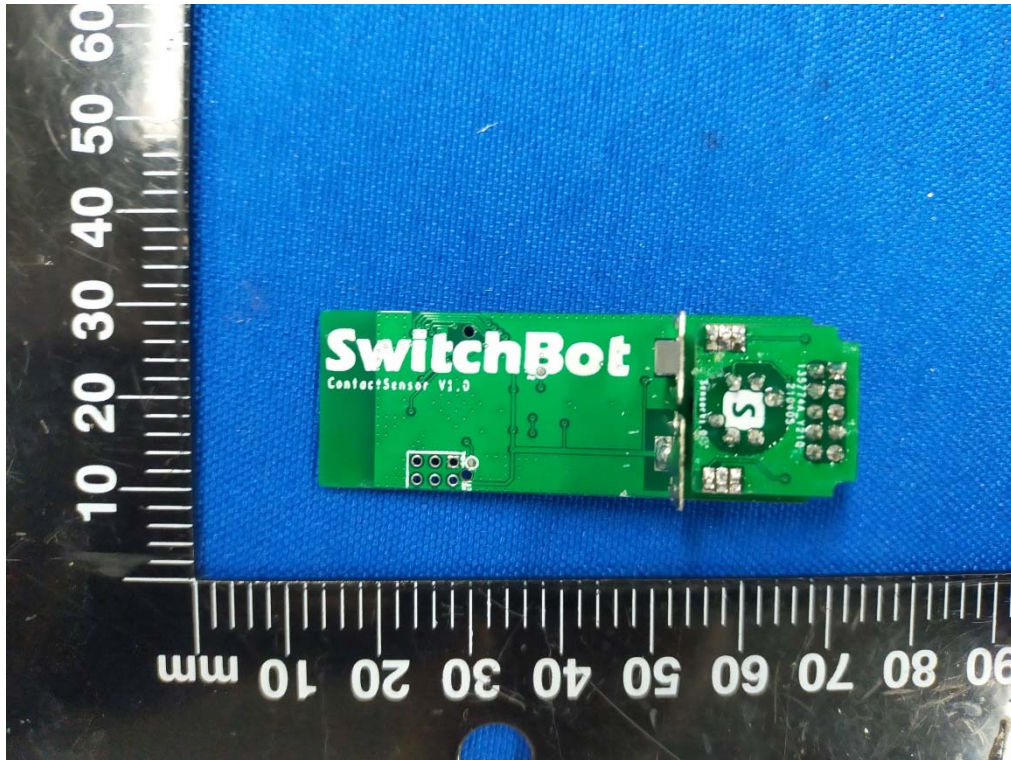


Photo 5: Main board bottom view

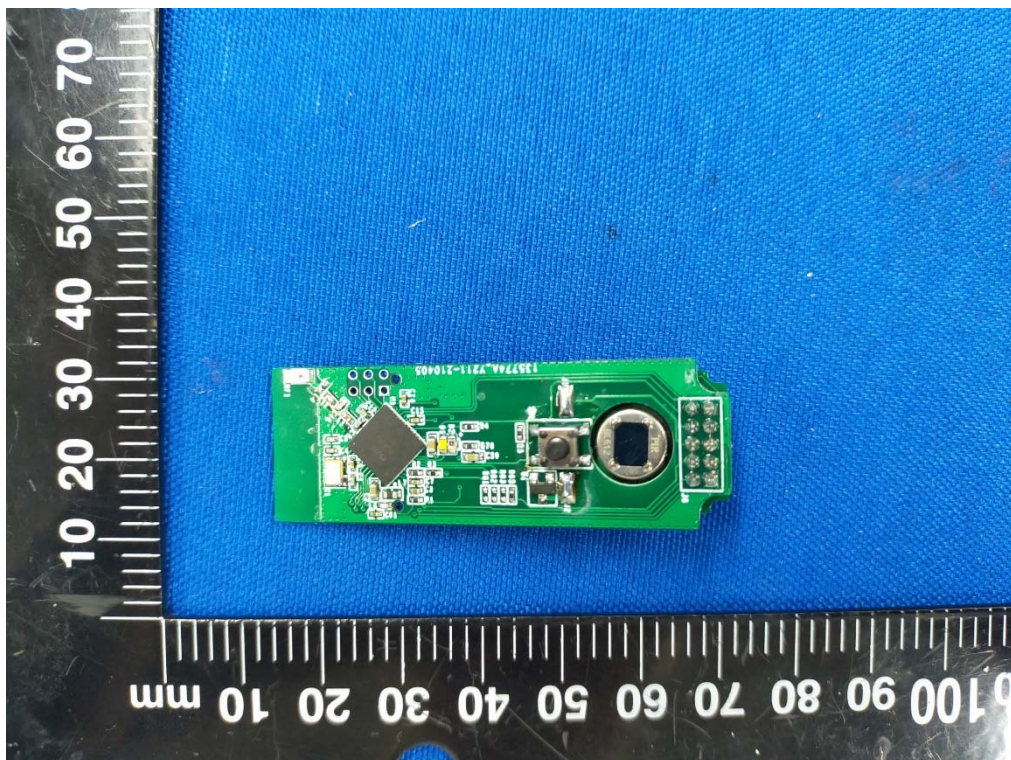


Photo 6: Main board top view

--The end of test report--