ATTESTATION OF CONFORMITY

Attestation Number:AOCSSH1230804-45338E-02
Date of Issue:2023/9/14

Applicant:

Company name: Guangzhou Langston Electronic Technology Co,Ltd
Address: Room 502, Building 4, Phoenix Creative Industry Park, No. 67 North Gongye Avenue, Haizhu District, Guangzhou

Product:

Name: ClipBuds
Model(s): TS03, TS06,TS07,TS08,TS09,TS10
Manufacturer & Address: Langston Group Limited
No.3, Tangzhou Road, Lijiafang, Shipai Town, Dongguan

Trade Mark: Langsdom

Bay Area Compliance Laboratories Corp. (Dongguan) hereby declares that the submitted sample(s) of the above equipment has been tested for CE regulations and in accordance with the European Directives and Standards:

EMC Directive 2014/30/EU

Essential Requirements		Harmonized Standards	Test Report Number
EMCD Clause 1(a)	Emission	EN 55032:2015+A11:2020+A1:2020* EN IEC 61000-3-2:2019+A1:2021* EN 61000-3-3:2013+A1:2019+A2:2021*	SSH1230804-45338E-01
EMCD Clause 1(b)	Immunity	EN 55035:2017+A11:2020	SSH1230804-45338E-01
*Note: Harmonized Standards not yet cited in OJ			

Mark is permitted only after all applicable requirements are met in accordance with the CE regulation requirements, including the manufacturer's issuance of a "Declaration of Conformity. The Declaration of Conformity is issued under the sole responsibility of the manufacturer. This attestation is specific to the standard(s) stated above and compliance with additional standards and/or CE regulations are applicable.

Attestation by:

RF Engineer: Rocky Xiao

Signature:

ATTESTATION OF CONFORMITY

Attestation Number:AOCSSH1230804-45338E-03
Date of Issue:2023/9/14

Applicant:

Company name: Guangzhou Langston Electronic Technology Co,Ltd
Address: Room 502, Building 4, Phoenix Creative Industry Park, No. 67 North Gongye Avenue, Haizhu District, Guangzhou

Product:

Name: ClipBuds
Model(s): TS03, TS06,TS07,TS08,TS09,TS10
Manufacturer & Address: Langston Group Limited
No.3, Tangzhou Road, Lijiafang, Shipai Town, Dongguan

Trade Mark: Langsdom

Bay Area Compliance Laboratories Corp. (Dongguan) hereby declares that the submitted sample(s) of the above equipment has been tested for CE regulations and in accordance with the European Directives and Standards:

Radio Equipment Directive 2014/53/EU

Essential Requirements		Harmonized Standards	Test Report Number
RED Article 3.2	Radio	ETSI EN 300 328 V2.2.2 (2019-07)	SSH1230804-45338E-22
RED Article 3.1(b)	EMC	ETSI EN 301 489-1 V2.2.3 (2019-11)* ETSI EN 301 489-17 V3.2.4 (2020-09)*	SSH1230804-45338E-02
RED Article 3.1(a)	Safety	EN IEC 62368-1:2020+A11:2020*	SSH1230804-45338E-SF
RED Article 3.1(a)	Health	EN 50663: 2017* EN 62479: 2010	SSH1230804-45338E
*Note: Harmonized Standards not yet cited in OJ			

Mark is permitted only after all applicable requirements are met in accordance with the CE regulation requirements, including the manufacturer's issuance of a "Declaration of Conformity. The Declaration of Conformity is issued under the sole responsibility of the manufacturer. This attestation is specific to the standard(s) stated above and compliance with additional standards and/or CE regulations are applicable.

Attestation by:

RF Engineer: Rocky Xiao

Signature:

EN 50663: 2017
EN 62479: 2010

ASSESSMENT REPORT

For

Guangzhou Langston Electronic Technology Co,Ltd

Room 502, Building 4, Phoenix Creative Industry Park, No. 67 North Gongye Avenue, Haizhu District, Guangzhou

Tested Model: TS03
Multiple Models: TS06,TS07,TS08,TS09,TS10

Report Type:	**Product Type:**
Original Report	ClipBuds

Report Number:	SSH1230804-45338E
Report Date:	2023/9/5
Reviewed By:	Rocky Xiao RF Engineer
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Dongguan) No.12, Pulong East 1st Road, Tangxia Town, Dongguan, Guangdong, China Tel: +86-769-86858888 Fax: +86-769-86858891 www.baclcorp.com.cn

TABLE OF CONTENTS

DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
1.0	SSH1230804-45338E	Original Report	2023/9/5

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

EUT Name:	ClipBuds
EUT Model:	TS03
Multiple Model:	TS06,TS07,TS08,TS09,TS10
Model Difference:	Please refer to the DoS
Rated Input Voltage:	DC 5V from charging case or 3.7V from battery
Serial Number:	29FJ-1
EUT Received Date:	2023/8/7
EUT Received Status:	Good

Objective

This report is prepared on behalf of ***Guangzhou Langston Electronic Technology Co,Ltd*** in accordance with EN 50663: 2017 Generic standard for assessment of low power electronic and electrical equipment related to human exposure restrictions for electromagnetic fields (10 MHz - 300 GHz);
And EN 62479: 2010 Assessment of the compliance of low power electronic and electrical equipment with the basic restrictions related to human exposure to electromagnetic fields (10 MHz to 300 GHz).

The objective is to determine the compliance of EUT with EN 50663: 2017 and EN 62479: 2010.

Test Methodology

All measurements contained in this report were conducted with EN 50663: 2017 and EN 62479: 2010.

Declarations

BACL is not responsible for the authenticity of any test data provided by the applicant. Data included from the applicant that may affect test results are marked with a triangle symbol "▲". Customer model name, addresses, names, trademarks etc. are not considered data.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.

Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.

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This report may contain data that are not covered by the accreditation scope and shall be marked with an asterisk "★".

RF Exposure Measurement

1. Introduction

These European Standards provides simple conformity assessment methods for low-power electronic and electrical equipment operating at frequencies between 10 MHz and 300 GHz to an electromagnetic field (EMF) exposure limit.

The object of this document is to demonstrate the compliance of such apparatus with the basic restrictions on exposure of the general public to electric, magnetic and electromagnetic fields and contact current.

2. Compliance Criteria

2.1 General considerations

Compliance of electromagnetic emissions from electronic and electrical equipment with the basic restrictions usually is determined by measurements and, in some cases, calculation of the exposure level. If the electrical power used by or radiated by the equipment is sufficiently low, the electromagnetic fields emitted will be incapable of producing exposures that exceed the basic restrictions. This standard provides simple EMF assessment procedures for this low power equipment.

Any relevant compliance assessment procedure which is consistent with the state of the art, reproducible and gives valid results can be used.

For transmitters intended for use with more than one antenna configuration option, the combination of transmitter and antenna(s) which generates the highest available antenna power and/or average total radiated power shall be assessed.

Four routes (Figure 1), as illustrated in Figure 1 and described as follows, can be used to demonstrate compliance with this standard:

A Typical usage, installation and the physical characteristics of equipment make it inherently compliant with the applicable EMF exposure levels such as those listed in the bibliography. This low-power equipment includes unintentional (or non-intentional) radiators, for example incandescent light bulbs and audio/visual (A/V) equipment, information technology equipment (ITE) and multimedia equipment (MME) that does not contain radio transmitters. NOTE Equipment is described as A/V equipment, ITE or MME if its main use is playback/recording of music, voice or images, or processing of digital information.

B The input power level to electrical or electronic components that are capable of radiating electromagnetic energy in the relevant frequency range is so low that the available antenna power and/or the average total radiated power cannot exceed the low-power exclusion level defined in 2.2.

C The available antenna power and/or the average total radiated power are limited by product standards for transmitters to levels below the low-power exclusion level defined in 2.2.

D Measurements or calculations show that the available antenna power and/or the average total radiated power are below the low-power exclusion level defined in 2.2.

If none of these routes can be used, then the equipment is deemed to be out of the scope of this standard and EMF assessment for conformity assessment purposes shall be made according to other standards, such as IEC 62311 or other EMF product standards.

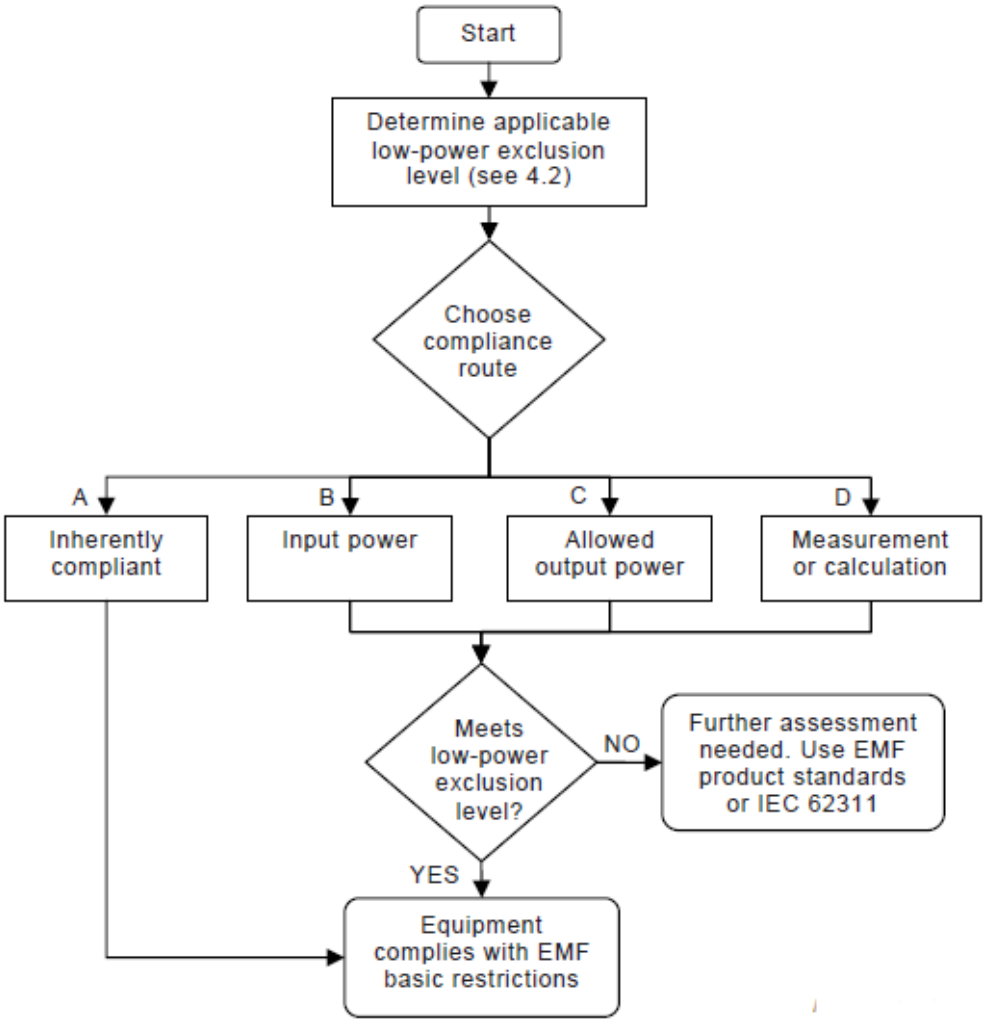


Figure 1 – Routes to show compliance with low-power exclusion level

2.2 Low-power exclusion level (Pmax)

Low-power electronic and electrical equipment is deemed to comply with the provisions of this standard if it can be demonstrated using routes B, C or D that the available antenna power and/or the average total radiated power is less than or equal to the applicable low-power exclusion level Pmax.

Annex A contains example values for Pmax derived from existing exposure limits listed in the bibliography, such as the ICNIRP guidelines [1], IEEE Std C95.1-1999 [2], and IEEE Std C95.1-2005 [3].

For wireless devices operated close to a person's body with available antenna powers and/or average total radiated powers higher than the Pmax values given in Annex A, the alternative Pmax values (called Pmax′), described in Annex B can also be used.

For low power equipment using pulsed signals, other limits may apply in addition to those considered in Annex A and Annex B. Both ICNIRP guidelines [1] and IEEE standards [2], [3] have specific restrictions on exposures to pulsed fields, and the requirements of those standards with respect to exposure to pulses shall be met. Annex C discusses this topic further.

2.3 Exposure to multiple transmitting sources

If equipment under test (EUT) is equipped with multiple intentional radiators, the overall conformity assessment might require more than just the assessment of conformity of each one of the radiators separately. The effect of multiple intentional radiators should be considered in the conformity assessment process.

3. Limit

Low-power electronic and electrical equipment is deemed to comply with the provisions of this standard if it can be demonstrated using routes B, C or D that the available antenna power and/or the average total radiated power is less than or equal to the applicable low-power exclusion level Pmax. Annex A contains example values for Pmax derived from existing exposure limits listed in the bibliography, such as the ICNIRP guidelines [1], IEEE Std C95.1-1999 [2], and IEEE Std C95.1-2005 [3].

For wireless devices operated close to a person's body with available antenna powers and/or average total radiated powers higher than the Pmax values given in Annex A, the alternative Pmax values (called Pmax′), described in Annex B can also be used.

Equipment complying with the requirements for the general public is deemed to comply with the requirements for workers without further testing. The conformity assessment to demonstrate equipment compliance shall be made according to EN 62479:2010, 4.1(Clause 2.1 of this document) and Clause 6. If routes B, C or D of 4.1 of EN 62479:2010 are followed then the values of Pmax, as described in 4.2 of EN 62479:2010 and given in Annex A of EN 62479:2010, shall be replaced by those in Table 1 below.

Table 1 — Values of *P*max

Exposure tier	Region of body	*P*max (mW)
General public	Head and trunk	20
	Limbs	40
Workers	Head and trunk	100
	Limbs	200

3.1 Annex A

Table A.1 – Example values of SAR-based P_{max} for some cases described by ICNIRP, IEEE Std C95.1-1999 and IEEE Std C95.1-2005

Guideline / Standard	SAR limit, SAR_{max} W/kg	Averaging mass, m g	P_{max} mW	Exposure tier[a]	Region of body[a]
ICNIRP [1]	2	10	20	General public	Head and trunk
	4	10	40	General public	Limbs
	10	10	100	Occupational	Head and trunk
	20	10	200	Occupational	Limbs
IEEE Std C95.1-1999 [2]	1,6	1	1,6	Uncontrolled environment	Head, trunk, arms, legs
	4	10	40	Uncontrolled environment	Hands, wrists, feet and ankles
	8	1	8	Controlled environment	Head, trunk, arms, legs
	20	10	200	Controlled environment	Hands, wrists, feet and ankles
IEEE Std C95.1-2005 [3]	2	10	20	Action level	Body except extremities and pinnae
	4	10	40	Action level	Extremities and pinnae
	10	10	100	Controlled environment	Body except extremities and pinnae
	20	10	200	Controlled environment	Extremities and pinnae

[a] Consult the appropriate standard for more information and definitions of terms.

3.2 Annex B

Based on a systematic study of canonical dipole antennas of different lengths and at different distances from a flat phantom, a simple equation was developed for predicting alternative higher values of the low-power exclusion levels, P_{max}':

$$P_{max}' = \exp\left[As + Bs^2 + C\ln(BW) + D\right] \quad \text{(B.1)}$$

Where s represents the nearest separation distance between the wireless device and the user's body, BW is the free-space antenna bandwidth, and A, B, C and D are third-order polynomials of frequency. The bandwidth corresponds to $|S11| \leq -7$ dB, which is the reciprocal of the radiation quality factor, defined as the ratio between the stored and the radiated energies of an antenna. In Equation (B.1), s is expressed in mm and BW is expressed in percent (e.g. enter 10 in the equation if the bandwidth is 10 %). The frequency dependent parameters A, B, C and D can be found from the following equations, where f is the frequency in GHz. This annex describes formulae to establish Pmax′ values for the 300 MHz to 6 GHz frequency range for devices that are located within 25 mm of the body.

Table B.1 – Some typical frequency bands of portable wireless devices and corresponding low-power exclusion levels P_{max}' predicted using Equations (B.1) through (B.9)

f GHz	BW %	Example air interface	P_{max}' mW			
			s = 5 mm		s = 25 mm	
			m = 1 g	m = 10 g	m = 1 g	m = 10 g
0,393	3,8	TETRA	97	292	265	526
0,420	4,8	TETRA	98	293	274	541
0,461	3,3	GSM	80	244	233	468
0,485	14,4	APCO	117	337	347	660
0,838	7,6	iDEN	48	148	198	399
0,859	8,1	IS-136	47	145	198	398
0,884	16,7	PDC	54	162	233	456
0,896	5,7	TETRA	40	127	176	360
0,918	4,8	iDEN	37	118	165	342
0,925	7,6	GSM	41	129	185	375
1,465	4,9	PDC	17	60	128	281
1,795	9,5	GSM	13	50	139	308
1,920	7,3	GSM	11	44	132	302
2,045	12,2	UMTS	11	44	146	330
2,350	4,3	WiBro	7,9	34	130	323
2,442	3,4	802.11b	7,3	32	130	328
3,550	14,1	WiMAX	6,7	37	244	657
5,250	3,8	WiMAX	6,8	53	258	845
5,788	1,3	WiMAX	6,2	52	164	564

§4.1 & §4.2 - MAXIMUM EMITTED AVERAGE POWER

Test Procedure

Refer to EN 50663:2017 and EN 62479:2010 §4.1&§4.2&§6.

Test Data

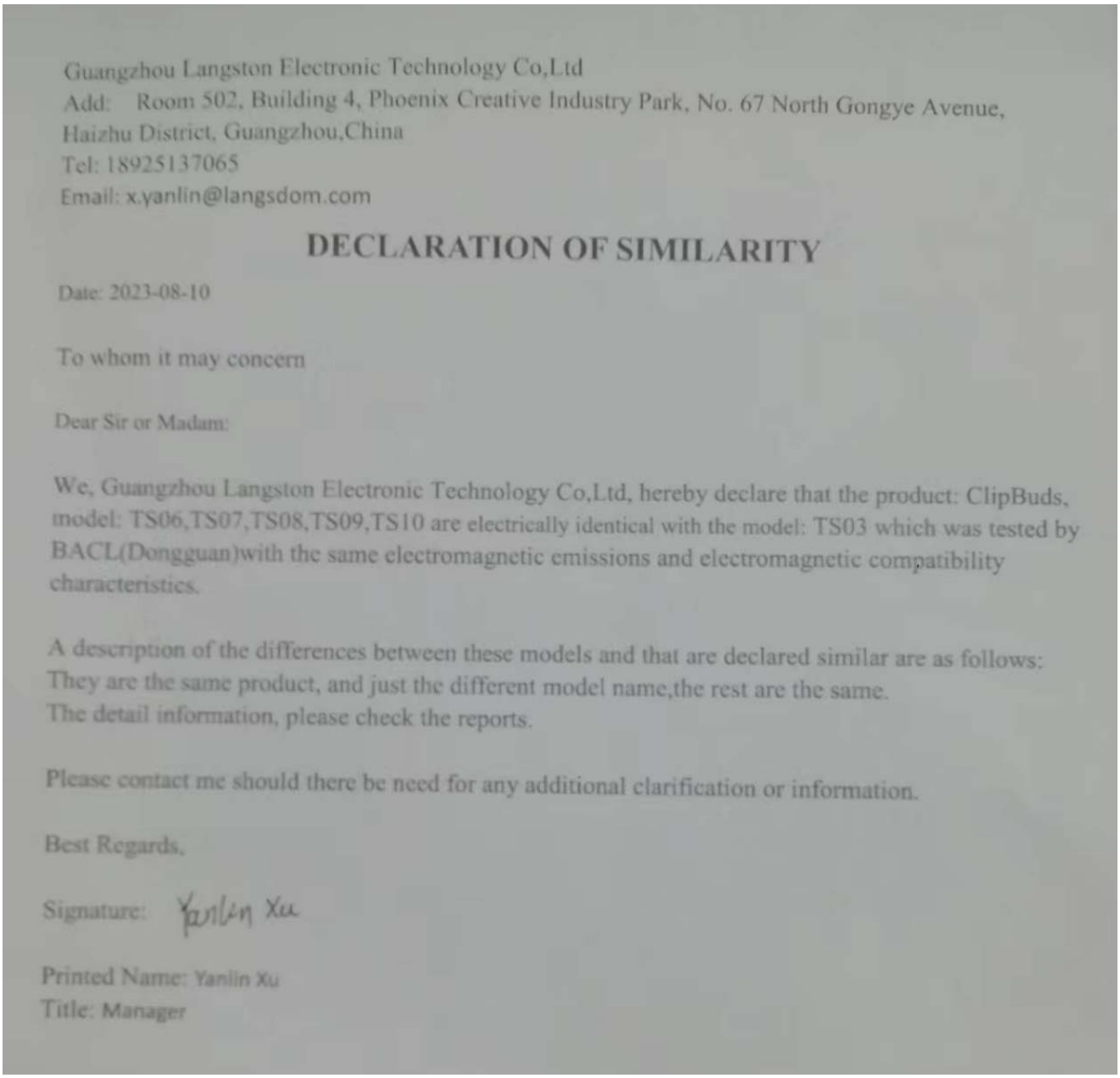
Mode	Frequency Band(MHz)	Tune-up power		Limit (mW)	Result
		dBm	mW		
BT	2402-2480	2	1.6	20	Pass

Conclusion: Compliant and no SAR test required.

EXHIBIT A – EUT PHOTOGRAPHS

For photos in this section, please refer to report No.: SSH1230804-45338E-02 EXHIBIT A.

DECLARATION OF SIMILARITY LETTER



Guangzhou Langston Electronic Technology Co,Ltd
Add: Room 502, Building 4, Phoenix Creative Industry Park, No. 67 North Gongye Avenue, Haizhu District, Guangzhou,China
Tel: 18925137065
Email: x.yanlin@langsdom.com

DECLARATION OF SIMILARITY

Date: 2023-08-10

To whom it may concern

Dear Sir or Madam:

We, Guangzhou Langston Electronic Technology Co,Ltd, hereby declare that the product: ClipBuds, model: TS06,TS07,TS08,TS09,TS10 are electrically identical with the model: TS03 which was tested by BACL(Dongguan)with the same electromagnetic emissions and electromagnetic compatibility characteristics.

A description of the differences between these models and that are declared similar are as follows:
They are the same product, and just the different model name,the rest are the same.
The detail information, please check the reports.

Please contact me should there be need for any additional clarification or information.

Best Regards,

Signature: Yanlin Xu

Printed Name: Yanlin Xu
Title: Manager

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

EN 55032:2015+A11:2020+A1:2020
EN 55035:2017+A11:2020
EN IEC 61000-3-2:2019+A1:2021
EN 61000-3-3:2013+A1:2019+A2:2021

TEST REPORT

For

Guangzhou Langston Electronic Technology Co,Ltd

Room 502, Building 4, Phoenix Creative Industry Park, No. 67 North Gongye Avenue, Haizhu District, Guangzhou

Tested Model: TS03
Multiple Model: TS06,TS07,TS08,TS09,TS10

Report Type: Original Report	**Product Type:** ClipBuds
Report Number:	SSH1230804-45338E-01
Report Date:	2023/9/5
Reviewed By:	Rocky Xiao RF Engineer
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Dongguan) No.12, Pulong East 1st Road, Tangxia Town, Dongguan, Guangdong, China Tel: +86-769-86858888 Fax: +86-769-86858891 www.baclcorp.com.cn

Table of Contents

DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
1.0	SSH1230804-45338E-01	Original Report	2023/9/5

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

EUT Name:	ClipBuds
EUT Model:	TS03
Multiple Model:	TS06,TS07,TS08,TS09,TS10
Model Difference:	Please refer to the DoS
Rated Input Voltage:	DC 5V from charging case or 3.7V from battery
Serial Number:	29FJ-1
EUT Received Date:	2023/8/7
EUT Received Status:	Good

Objective

This report is prepared on behalf of ***Guangzhou Langston Electronic Technology Co,Ltd*** in accordance with EN 55032:2015+A11:2020+A1:2020 Electromagnetic compatibility of multimedia equipment - Emission Requirements;
EN 55035:2017+A11:2020 Electromagnetic compatibility of multimedia equipment - Immunity requirements;
EN IEC 61000-3-2:2019+A1:2021 Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current ≤16 A per phase);
EN 61000-3-3:2013+A1:2019+A2:2021 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.

The objective is to determine the compliance of EUT with:
EN 55032:2015+A11:2020+A1:2020
EN 55035:2017+A11:2020
EN IEC 61000-3-2:2019+A1:2021
EN 61000-3-3:2013+A1:2019+A2:2021.

Test Methodology

All measurements contained in this report were conducted with
EN 55032:2015+A11:2020+A1:2020 Electromagnetic compatibility of multimedia equipment - Emission Requirements;
EN 55035:2017+A11:2020 Electromagnetic compatibility of multimedia equipment - Immunity requirements;
EN IEC 61000-3-2:2019+A1:2021 Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current ≤16 A per phase);
EN 61000-3-3:2013+A1:2019+A2:2021 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.

Declarations

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Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.

Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.

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SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in a typical fashion (as normally used by a typical user).

Test Mode:
M1: Charging

Equipment Modifications

No modification was made to the EUT.

EUT Exercise Software

No EUT software is used for testing.

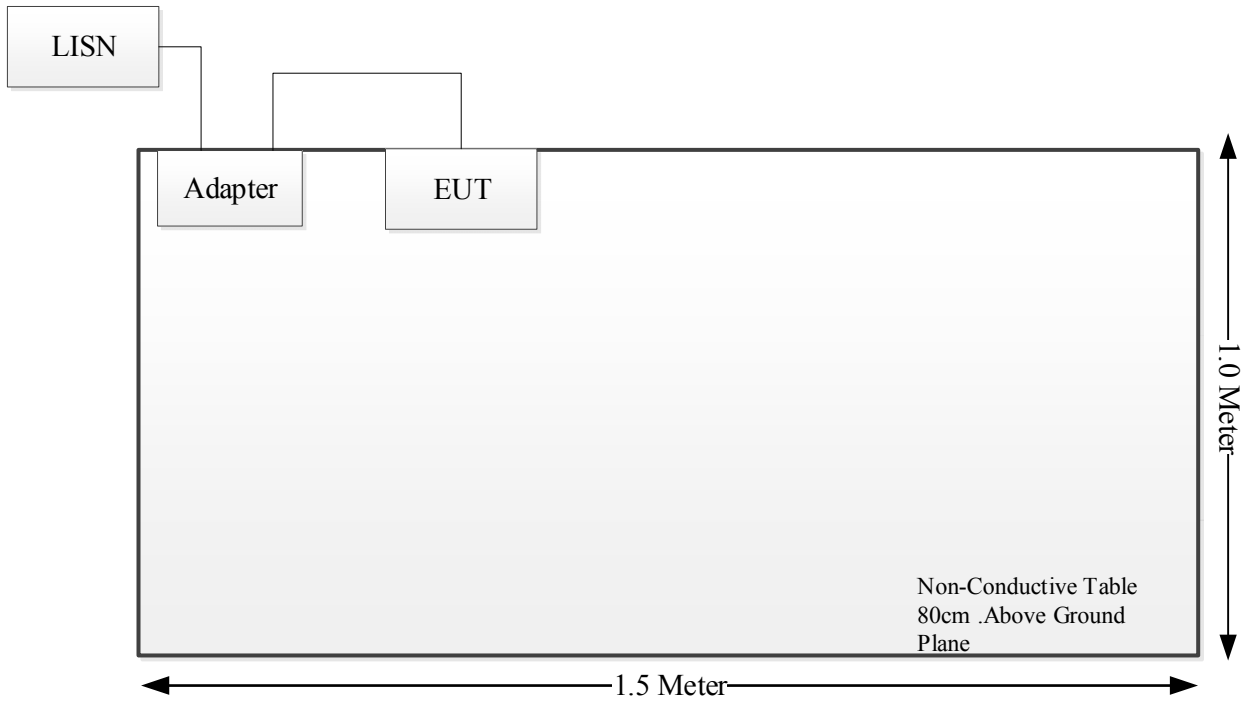
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
DOOGEE	Adapter(USB)	HJ0502000W2-EU	EMZBUA21103001EN

Support Cable List and Details

Cable Description	Shielding Cable	Ferrite Core	Length (m)	From Port	To
USB Cable	NO	NO	1	Adapter	EUT

Block Diagram of Test Setup



Test Equipment List

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Conducted emission					
R&S	LISN	ENV216	101614	2022/11/18	2023/11/17
R&S	EMI Test Receiver	ESCI	100035	2022/11/18	2023/11/17
MICRO-COAX	Coaxial Cable	C-NJNJ-50	C-0200-01	2022/9/5	2023/9/4
R&S	Test Software	EMC32	V9.10.00	N/A	N/A
Radiated emissions below 1GHz					
Sunol Sciences	Hybrid Antenna	JB3	A060611-2	2020/8/25	2023/8/24
Narda	Attenuator	757C-6dB	34010	2023/8/1	2024/7/31
Unknown	Coaxial Cable	C-NJNJ-50	C-1000-01	2023/8/1	2024/7/31
Unknown	Coaxial Cable	C-NJNJ-50	C-0400-04	2023/8/1	2024/7/31
Unknown	Coaxial Cable	C-NJNJ-50	C-0530-01	2023/8/1	2024/7/31
Sonoma	Amplifier	310N	185914	2023/8/1	2024/7/31
R&S	EMI Test Receiver	ESCI	100224	2022/11/18	2023/11/17
Farad	Test Software	EZ-EMC	V1.1.4.2	N/A	N/A
Radiated emissions above 1GHz					
AH	Horn Antenna	SAS-571	1394	2023/2/22	2026/2/21
HUBER+SUHNER	Coaxial Cable	SUCOFLEX 126EA	MY369/26/26EA	2022/10/13	2023/10/13
Unknown	Coaxial Cable	C-NJNJ-50	C-0200-02	2022/9/4	2023/9/3
AH	Preamplifier	PAM-0118P	530	2023/11/18	2024/11/17
R&S	Spectrum Analyzer	FSP 38	100478	2022/11/22	2023/11/21
Farad	Test Software	EZ-EMC	V1.1.4.2	N/A	N/A
EFT & Surge & Dips					
EM TEST	Ultra Compact Generator	UCS 500N5	P1406130994	2022/11/22	2023/11/21
EM TEST	AC Autotransformer	MV2616	P1450144859	N/A	N/A
Flicker					
EVERFINE	Harmonic & Flicker Measurement System	HFM3000	P630850CD1411115	2022/11/16	2023/11/15
EVERFINE	Harmonic & Flicker Testing Power Source	HFS-4000	P624486CD1411122	2022/11/22	2023/11/21
ESD					
TESEQ	ESD Generator	NSG 438	1019	2022/11/16	2023/11/15
CS					
HP	Signal Generator	8648A	3426A00831	2022/11/22	2023/11/21
AR	Power Amplifier	15A250	12934	N/A	N/A
Werlatone	Dual Directional Coupler	C5091-10	113192	2023/2/9	2024/2/8
NARDA	Attenuator	769-6	2754	N/A	N/A
HP	Power Meter	EPM-441A	GB37481494	2022/11/18	2023/11/17
Agilent	Power sensor	8482A	US37296108	2022/11/18	2023/11/17
COM-POWER	CDN	M325E	521064	2022/11/22	2023/11/21

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
RS					
AR	Antenna	ATL80M1G	0351400	N/A	N/A
AR	Antenna	ATT700M12G	0349410	N/A	N/A
HP	Signal Generator	8665B	3438a00584	2022/11/18	2023/11/17
AR	Power Amplifier	500W1000C	0353561	N/A	N/A
AR	Power Amplifier	60S1G6	0348711	N/A	N/A
PASTERNACK	Dual Directional Coupler	PE2239-30	1711	2023/7/15	2024/7/14
Agilent	Power Meter	E4419B	MY45103907	2022/11/18	2023/11/17
Agilent	E-Series Avg Power Sensor	E9301A	MY41497625	2022/11/22	2023/11/21
Agilent	E-Series Avg Power Sensor	E9301A	MY41497628	2022/11/22	2023/11/21

* Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Environmental Conditions

Test Item:	Conducted emission	Radiated emissions below 1GHz	Radiated emissions above 1GHz	EMS	Flicker
Temperature:	26.7°C	26.8°C	28.1°C	24.7~26.5°C	25.9°C
Relative Humidity:	63%	47%	40%	52~59%	58%
ATM Pressure:	99.7kPa	100.1kPa	100.0kPa	100.0kPa	100.0kPa
Tester:	Joe Li	Charlwin Zhang	Leo Yuan	Joe Li	Joe Li
Test Date:	2023/8/12	2023/8/15	2023/8/26	2023/8/21	2023/8/21

SUMMARY OF TEST RESULTS

SN	Rule and Clause	Description of Test	Test Result
1	EN 55032 Clause A.3	Conducted emissions	Compliant
2	EN 55032 Clause A.2	Radiated emissions	Compliant
3	EN 55035 Clause 4.2.1	Electrostatic discharges IEC 61000-4-2	Compliant
4	EN 55035 Clause 4.2.2.2	Continuous radiated disturbances IEC 61000-4-3	Compliant
5	EN 55035 Clause 4.2.2.3	Continuous conducted disturbances IEC 61000-4-6	Compliant
6	EN 55035 Clause 4.2.3	Power frequency magnetic fields IEC 61000-4-8	Not applicable
7	EN 55035 Clause 4.2.4	Electrical fast transients/burst IEC 61000-4-4	Compliant
8	EN 55035 Clause 4.2.5	Surges IEC 61000-4-5	Compliant
9	EN 55035 Clause 4.2.6	Voltage dips and short interruptions IEC 61000-4-11	Compliant
10	EN IEC 61000-3-2	Harmonic current emissions	Not applicable*
11	EN 61000-3-3	Voltage fluctuations and flicker	Compliant

Note:
Not applicable*: The maximum power of this EUT is less than 75W.

1 - CONDUCTED EMISSIONS

Measurement Uncertainty

Compliance or non- compliance with a disturbance limit shall be determined in the following manner：

If U_{lab} is less than or equal to U_{cispr} of Table 1, then:
-Compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
-Non - compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.
If U_{lab} is greater than U_{cispr} of Table 1, then:
-compliance is deemed to occur if no measured disturbance level, increased by (U_{lab}− U_{cispr}), exceeds the disturbance limit;
-Non - compliance is deemed to occur if any measured disturbance level, increased by (U_{lab} − U_{cispr}), exceeds the disturbance limit.

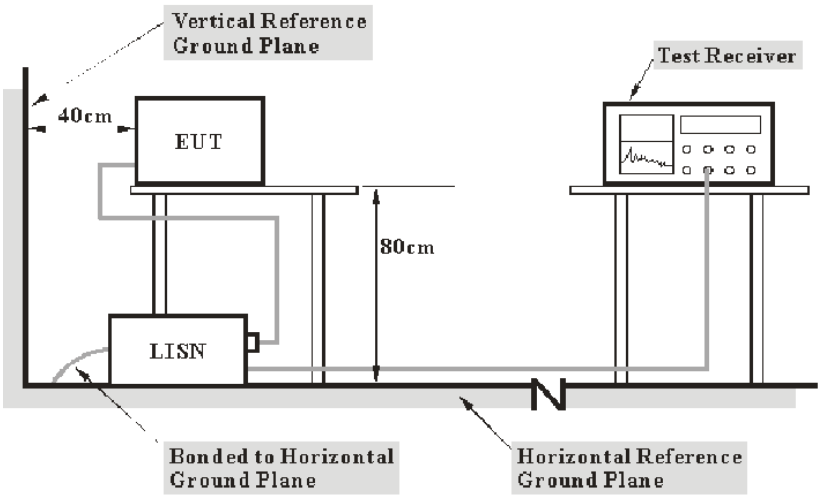
Based on CISPR 16-4-2-2011, measurement uncertainty of conducted disturbance at mains port using AMN at Bay Area Compliance Laboratories Corp. (Dongguan) is 3.12 dB (150 kHz to 30 MHz), and conducted disturbance at telecommunication port using AAN is 5.0 dB (150 kHz to 30 MHz).

Table 1 - Values of U_{cispr}

Measurement	U_{cispr}
Conducted disturbance at mains port using AMN (9 kHz to 150 kHz)	3.8 dB
(150 kHz to 30 MHz)	3.4 dB
Conducted disturbance at mains port using voltage probe (9 kHz to 30 MHz)	2.9 dB
Conducted disturbance at telecommunication port using AAN (150 kHz to 30 MHz)	5.0 dB
Conducted disturbance at telecommunication port using CVP (150 kHz to 30 MHz)	3.9 dB
Conducted disturbance at telecommunication port using CP (150 kHz to 30 MHz)	2.9 dB

Note: Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty. The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.

Test System Setup



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with CISPR 16-1-1:2010+A1:2010+A2 2014, CISPR 16-2-1:2008+A1:2010 +A2 2013 measurement procedure. The specification used was the EN 55032 Class B limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40cm long in the middle.

The spacing between the peripherals was 10cm.

The EUT was connected to a 230V/50Hz AC line power source.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
150 kHz - 30 MHz	9 kHz

Corrected Amplitude & Margin Calculation

The basic equation is as follows:

Result (QuasiPeak or Average) = Meter Reading + Corr.

Note:
Corr. = Cable loss + Factor of coupling device

The "**Margin**" column of the following data tables indicates the degree of compliance within the applicable limit. For example, a margin of 7dB means the emission is 7dB below the maximum limit. The equation for margin calculation is as follows:

Margin = Limit -Result

Test Procedure

During the conducted emissions test, the adapter of laptop was connected to the main outlet of the first LISN and the other support equipments were connected to the outlet of the second LISN.

Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance using all installation combination.

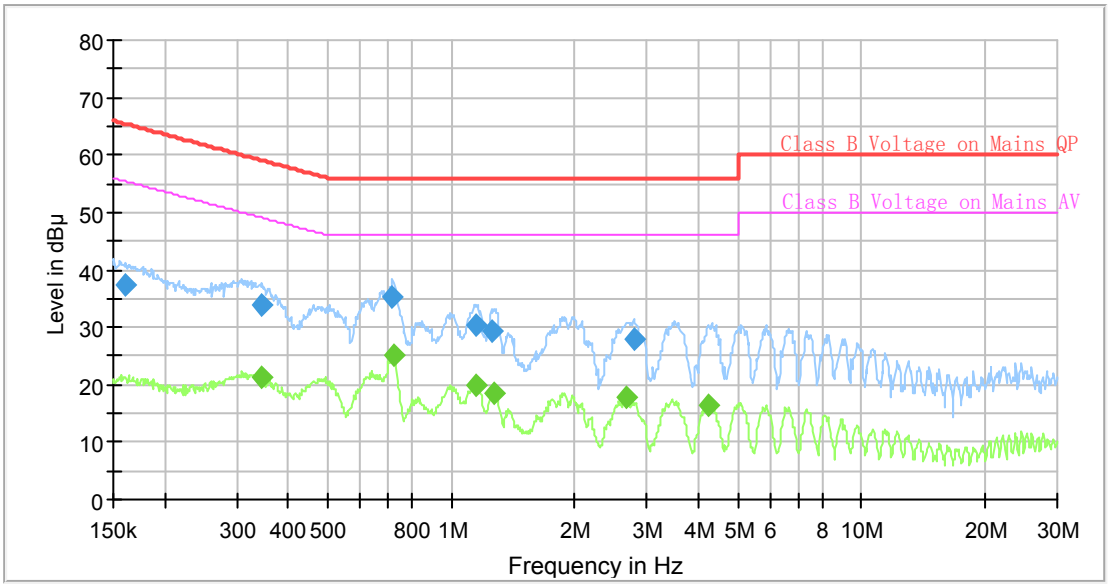
All data was recorded in the Quasi-peak and average detection mode.

The report shall list the six emissions with the smallest margin relative to the limit, unless the margin is greater than 20 dB.

Test Data

Please refer to following table and plots:

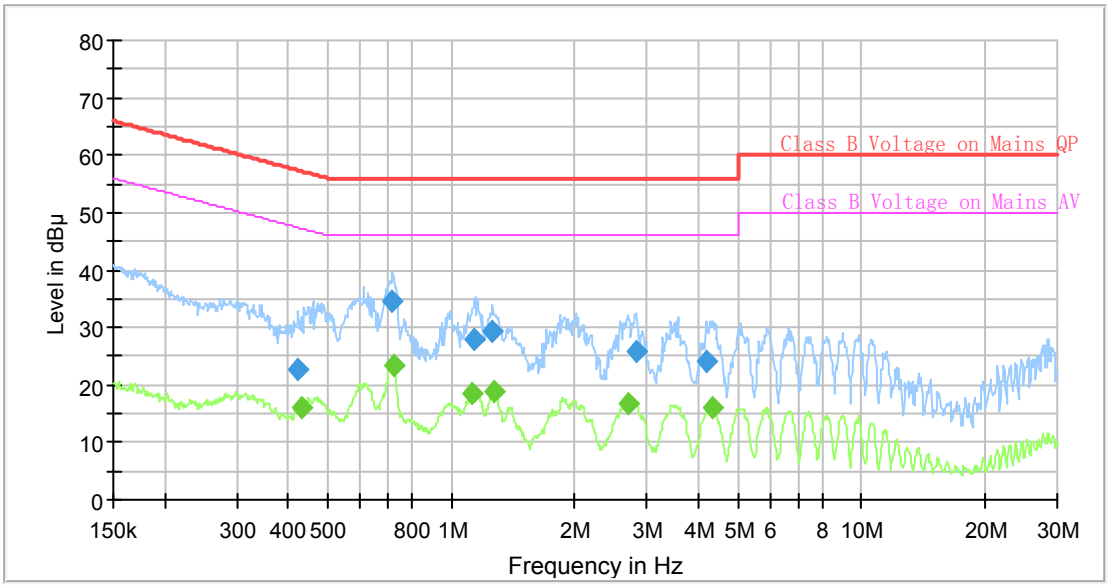
Port:	L
Test Mode:	M1
Power Source:	AC 230V/50Hz
Note:	



Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.160848	37.40	---	65.42	28.02	9.000	L1	9.6
0.343287	---	21.42	49.12	27.70	9.000	L1	9.6
0.346729	33.83	---	59.04	25.21	9.000	L1	9.6
0.718182	35.20	---	56.00	20.80	9.000	L1	9.7
0.721773	---	24.98	46.00	21.02	9.000	L1	9.7
1.147742	---	19.92	46.00	26.08	9.000	L1	9.7
1.153481	30.42	---	56.00	25.58	9.000	L1	9.7
1.255549	29.45	---	56.00	26.55	9.000	L1	9.7
1.274476	---	18.68	46.00	27.32	9.000	L1	9.7
2.679631	---	17.83	46.00	28.17	9.000	L1	9.7
2.788711	27.83	---	56.00	28.17	9.000	L1	9.7
4.239871	---	16.34	46.00	29.66	9.000	L1	9.7

Port: N
Test Mode: M1
Power Source: AC 230V/50Hz
Note:



Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.423284	22.78	---	57.38	34.60	9.000	N	9.6
0.431814	---	16.08	47.22	31.14	9.000	N	9.6
0.718182	34.68	---	56.00	21.32	9.000	N	9.6
0.721773	---	23.56	46.00	22.44	9.000	N	9.6
1.125072	---	18.60	46.00	27.40	9.000	N	9.6
1.142032	28.08	---	56.00	27.92	9.000	N	9.6
1.261826	29.30	---	56.00	26.70	9.000	N	9.6
1.268136	---	18.99	46.00	27.01	9.000	N	9.6
2.706494	---	16.76	46.00	29.24	9.000	N	9.6
2.816667	25.88	---	56.00	30.12	9.000	N	9.6
4.176904	24.23	---	56.00	31.77	9.000	N	9.6
4.325306	---	16.12	46.00	29.88	9.000	N	9.6

2 - RADIATED EMISSIONS

Measurement Uncertainty

Compliance or non- compliance with a disturbance limit shall be determined in the following manner：

If U_{lab} is less than or equal to U_{cispr} of Table 1, then:
-Compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
-Non - compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.
If U_{lab} is greater than U_{cispr} of Table 1, then:
-Compliance is deemed to occur if no measured disturbance level, increased by (U_{lab}− U_{cispr}), exceeds the disturbance limit;
-Non - compliance is deemed to occur if any measured disturbance level, increased by (U_{lab} − U_{cispr}), exceeds the disturbance limit.

Based on CISPR 16-4-2:2011, measurement uncertainty of radiated emission at a distance of 10m at Bay Area Compliance Laboratories Corp. (Dongguan) is:30M~200MHz: 4.55 dB for Horizontal, 4.57 dB for Vertical; 200M~1GHz: 4.66 dB for Horizontal, 4.56 dB for Vertical; measurement uncertainty of radiated emission at a distance of 3m at Bay Area Compliance Laboratories Corp. (Dongguan) is:30M~200MHz: 4.58 dB for Horizontal, 4.59 dB for Vertical; 200M~1GHz: 4.83 dB for Horizontal, 5.85 dB for Vertical 1G~6GHz: 4.45 dB, 6G~18GHz: 5.23 dB.

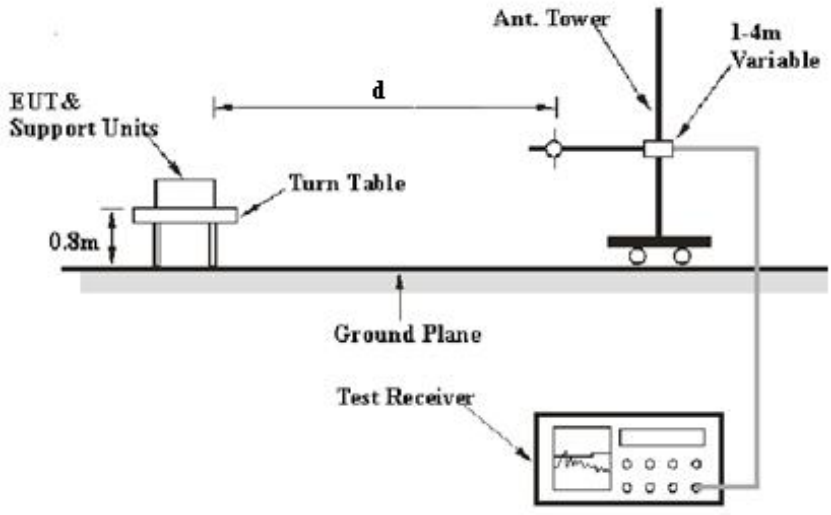
Table 1 - Values of U_{cispr}

Measurement	U_{cispr}
Radiated disturbance(electric field strength at an OATS or in a SAC) (30 MHz to 1000 MHz)	6.3 dB
Radiated disturbance (electric field strength in a FAR) (1 GHz to 6 GHz)	5.2 dB
Radiated disturbance (electric field strength in a FAR) (6 GHz to 18 GHz)	5.5 dB

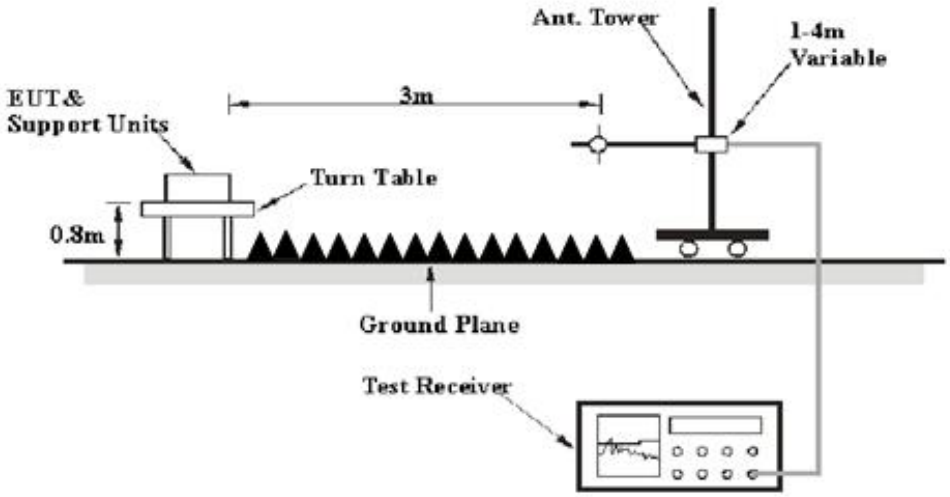
Note: Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty. The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.

Test System Setup

Below 1GHz:



Above 1GHz:



The radiated emission tests below 1GHz were performed in 3 meters, above 1GHz were performed in the 3 meters, using the setup accordance with the CISPR 16-1-1:2010+A1:2010+A2:2014, CISPR 16-1-4:2010 + A1:2012, CISPR 16-2-3:2010+A1:2010+A2:2014. The specification used was EN 55032 Class B limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40cm long in the middle.

The spacing between the peripherals was 10cm.

EMI Test Receiver and Spectrum Analyzer Setup

The system was investigated from 30 MHz to 6 GHz.

During the radiated emission test, the EMI test receiver (Below 1GHz) and Spectrum Analyzer (Above 1GHz) were set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Measurement
30 MHz - 1000 MHz	120 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1 MHz	3 MHz	/	Peak
	1 MHz	10Hz	/	Ave.

Test Procedure

During the radiated emissions, maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

If the maximized peak measured value complies with under the QP limit more than 6dB, it is unnecessary to perform QP measurement.

Corrected Amplitude & Margin Calculation

The basic equation is as follows:

Result = Meter Reading+ Corrected

Note:
Corrected = Antenna Factor + Cable Loss - Amplifier Gain
Or
Corrected = Antenna Factor + Cable Loss + Insertion loss of attenuator - Amplifier Gain

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit for Class B. The equation for margin calculation is as follows:

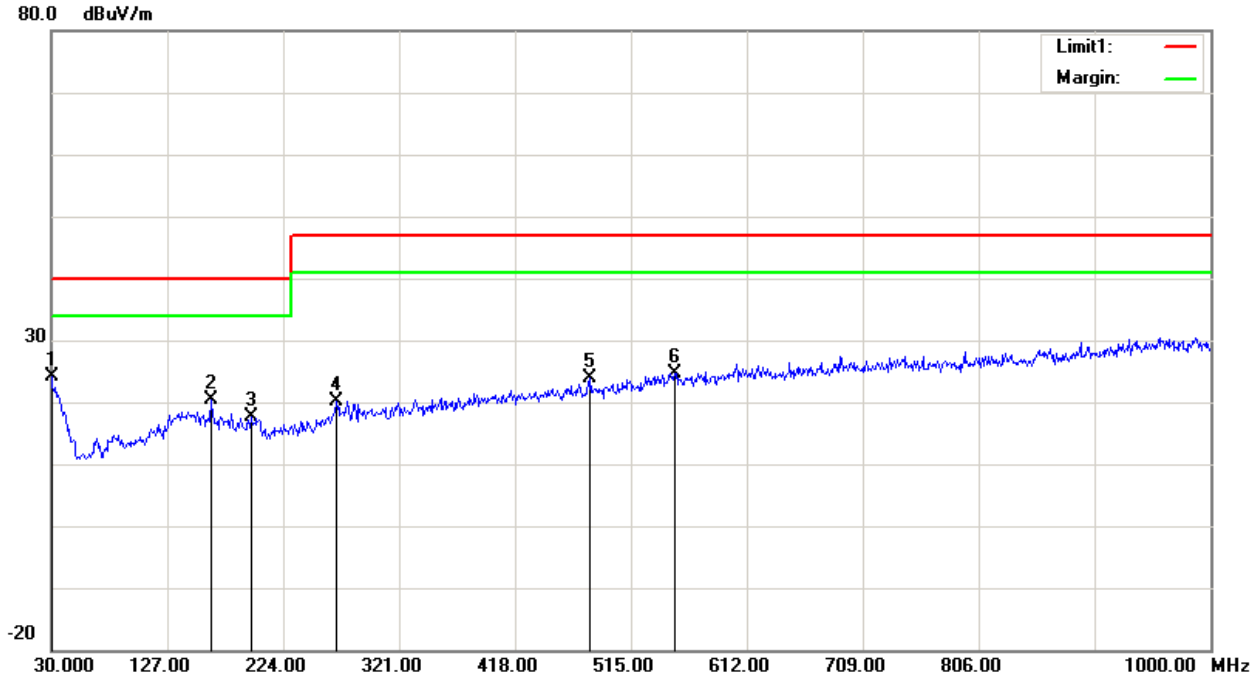
Margin = Limit -Result

Test Data

Please refer to following table and plots:

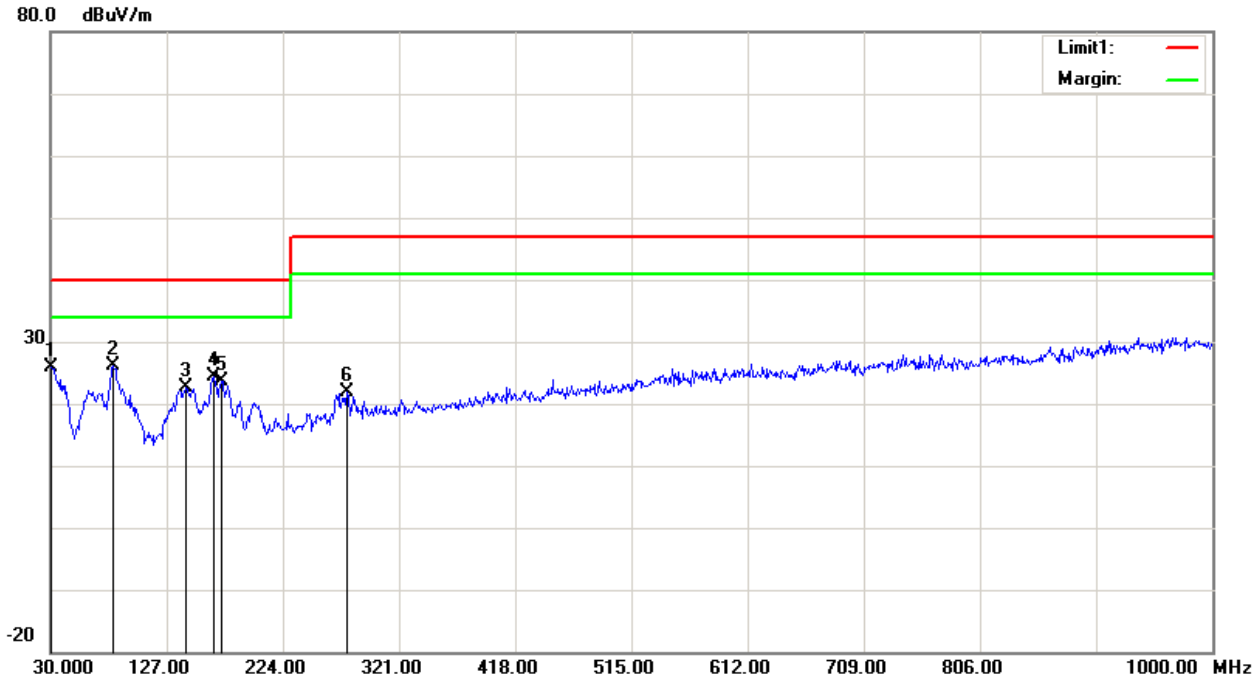
Below 1GHz:

Condition:	EN 55032 Class B	**Polarization:**	Horizontal
Test Mode:	M1	**Distance:**	3m



No.	Frequency (MHz)	Reading (dBµV)	Detector	Corrected (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
1	30.0000	27.89	peak	-3.88	24.01	40.00	15.99
2	163.8600	29.71	peak	-9.29	20.42	40.00	19.58
3	196.8400	27.57	peak	-9.95	17.62	40.00	22.38
4	268.6200	28.81	peak	-8.72	20.09	47.00	26.91
5	481.0500	27.60	peak	-3.82	23.78	47.00	23.22
6	551.8600	26.91	peak	-2.16	24.75	47.00	22.25

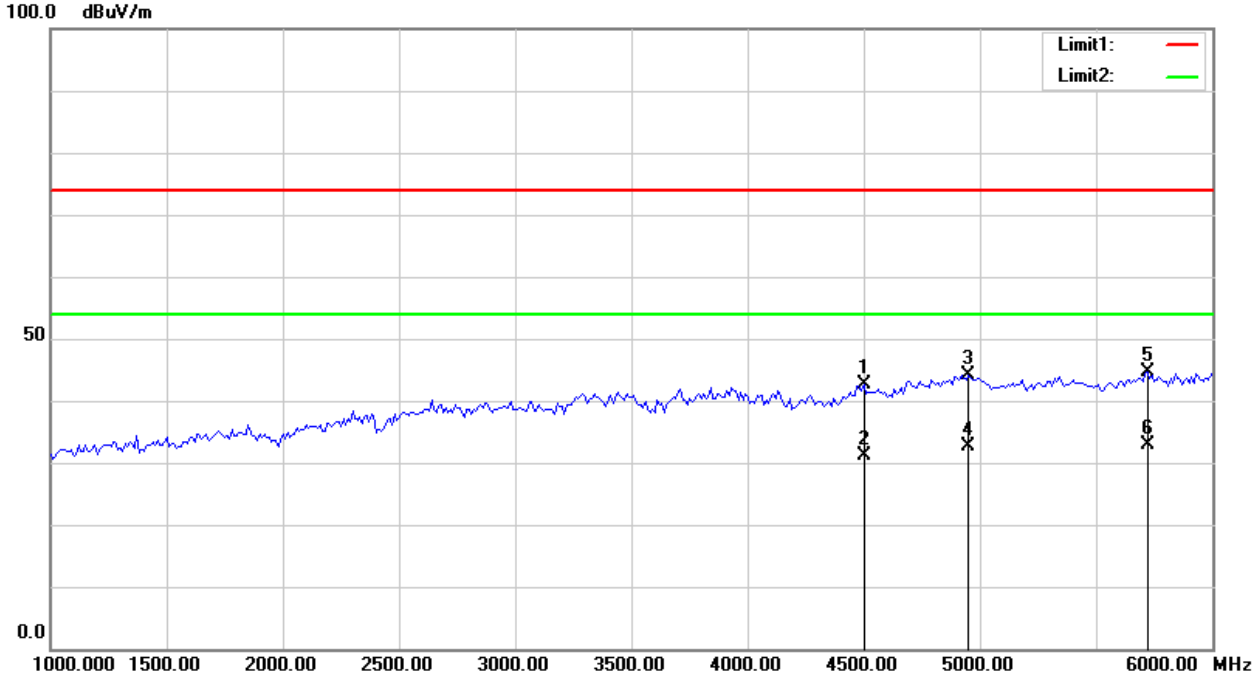
Condition: EN 55032 Class B **Polarization:** Vertical
Test Mode: M1 **Distance:** 3m



No.	Frequency (MHz)	Reading (dBµV)	Detector	Corrected (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
1	30.9700	30.43	peak	-4.46	25.97	40.00	14.03
2	82.3800	41.79	peak	-15.61	26.18	40.00	13.82
3	143.4900	31.79	peak	-9.12	22.67	40.00	17.33
4	165.8000	33.72	peak	-9.36	24.36	40.00	15.64
5	172.5900	32.93	peak	-9.26	23.67	40.00	16.33
6	277.3500	30.58	peak	-8.82	21.76	47.00	25.24

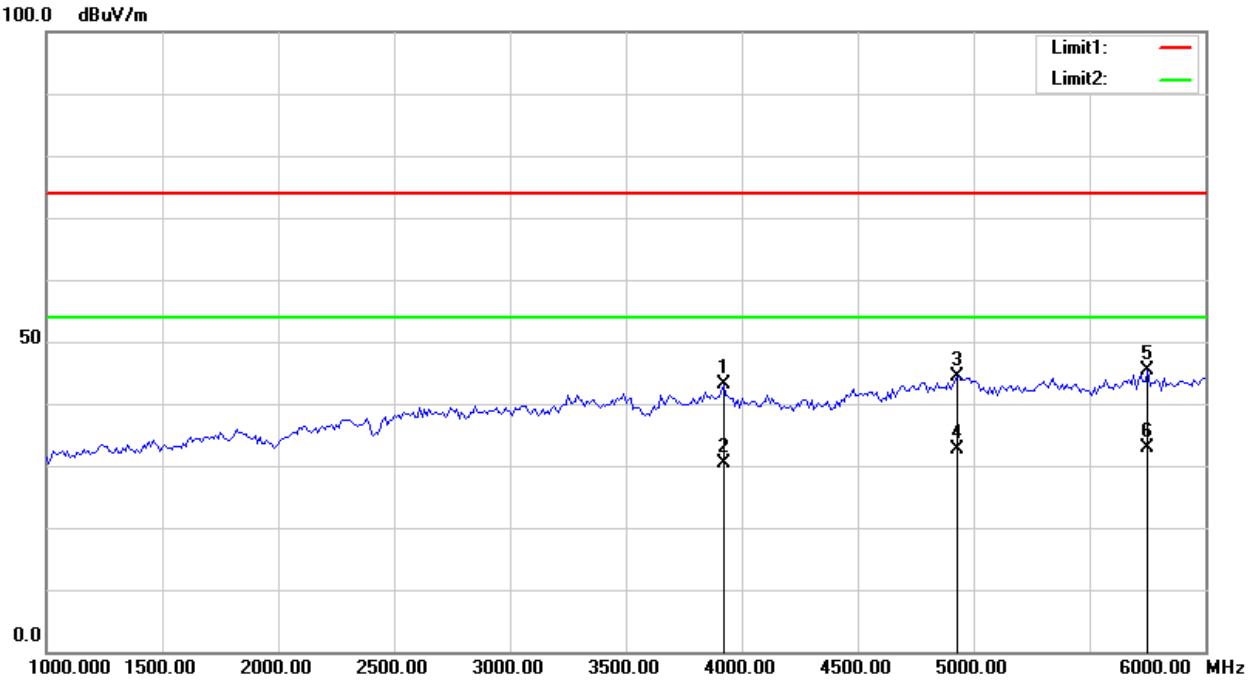
Above 1GHz:

Condition:	EN 55032 Class B	**Polarization:**	Horizontal
Test Mode:	M1	**Distance:**	3m



No.	Frequency (MHz)	Reading (dBµV)	Detector	Corrected (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
1	4500.000	51.53	peak	-8.97	42.56	74.00	31.44
2	4500.000	40.12	AVG	-8.97	31.15	54.00	22.85
3	4950.000	51.80	peak	-7.68	44.12	74.00	29.88
4	4950.000	40.31	AVG	-7.68	32.63	54.00	21.37
5	5720.000	51.91	peak	-7.24	44.67	74.00	29.33
6	5720.000	40.11	AVG	-7.24	32.87	54.00	21.13

Condition: EN 55032 Class B **Polarization:** Vertical
Test Mode: M1 **Distance:** 3m



No.	Frequency (MHz)	Reading (dBµV)	Detector	Corrected (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
1	3920.000	52.92	peak	-9.89	43.03	74.00	30.97
2	3920.000	40.31	AVG	-9.89	30.42	54.00	23.58
3	4930.000	52.19	peak	-7.73	44.46	74.00	29.54
4	4930.000	40.40	AVG	-7.73	32.67	54.00	21.33
5	5750.000	52.54	peak	-7.15	45.39	74.00	28.61
6	5750.000	40.05	AVG	-7.15	32.90	54.00	21.10

3 - ELECTROSTATIC DISCHARGES IEC 61000-4-2

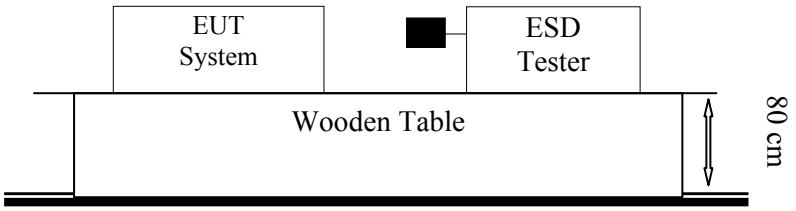
Measurement Uncertainty

U_{lab} (measurement uncertainty of lab) and U_{EN} (measurement uncertainty of EN 61000-4-2) please refer to the following:

Parameter	U_{EN}	U_{lab}
Rise time t_r	≤15%	15%
Peak current I_p	≤7%	6.3%
Current at 30 ns	≤7%	6.3%
Current at 60 ns	≤7%	6.3%

Note: Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty. The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.

Test System Setup



Remark: ■ is the tip of the electrode

IEC61000-4-2 specifies that a tabletop EUT shall be placed on a non-conducting table which is 80 centimeters above a ground reference plane and that floor mounted equipment shall be placed on an insulating support approximately 10 centimeters above a ground plane. During the tests, the EUT is positioned over a ground reference plane in conformance with this requirement.

For tabletop equipment, a 1.6 by 0.8-meter metal sheet (HCP) is placed on the table and connected to the ground plane via a metal strap with two 470 k Ohms resistors in series. The EUT and attached cables are isolated from this metal sheet by *0.5-millimeter* thick insulating material. A Vertical Coupling Plane (VCP) grounded on the ground plane through the same configuration as in the HCP is used.

Test Standard

EN 55035:2017+A11:2020(IEC 61000-4-2:2008)
Test level 3 for Air Discharge at ±8 kV
Test level 2 for Contact Discharge at ±4 kV

Test Level

Level	Test Voltage Contact Discharge (±kV)	Test Voltage Air Discharge (±kV)
1.	2	2
2.	4	4
3.	6	8
4.	8	15
X.	Special	Special

Performance criteria: B

Test Procedure

Air Discharge:

This test is done on a non-conductive surface. The round discharge tip of the discharge electrode shall be approached as fast as possible to touch the EUT. After each discharge, the discharge electrode shall be removed from the EUT. The generator is then re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed.

Contact Discharge:

All the procedure shall be same as Section 8.3.1of IEC 61000-4-2, except that the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

Indirect discharge for horizontal coupling plane:

At least 10 single discharges shall be applied to the horizontal coupling plane, at points on each side of the EUT. The discharge electrode positions vertically at a distance of 0.1m from the EUT and with the discharge electrode touching the coupling plane.

Indirect discharge for vertical coupling plane:

At least 10 single discharges shall be applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m×0.5m, is placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges shall be applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.

Test Data

Please refer to following tables:

Test Mode: M1
Note:

Table 1: Electrostatic Discharge Immunity (Air Discharge)

Test Points Location	Test Level							
	-2 kV	+2 kV	-4 kV	+4 kV	-8 kV	+8 kV	-15 kV	+15 kV
Non-metallic Shell	A	A	A	A	A	A	/	/
Type-c Port	A	A	A	A	A	A	/	/
Seam	A	A	A	A	A	A	/	/
Required Performance Criteria:B Description of Performance reduction: N/A								

Table 2: Electrostatic Discharge Immunity (Direct Contact)

Test Points Location	Test Level							
	-2 kV	+2 kV	-4 kV	+4 kV	-6 kV	+6 kV	-8 kV	+8 kV
/	/	/	/	/	/	/	/	/
Required Performance Criteria:B Description of Performance reduction: N/A								

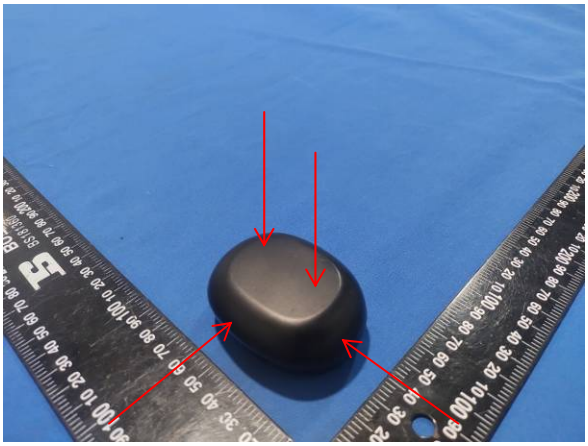
Table 3: Electrostatic Discharge Immunity (Indirect Contact HCP)

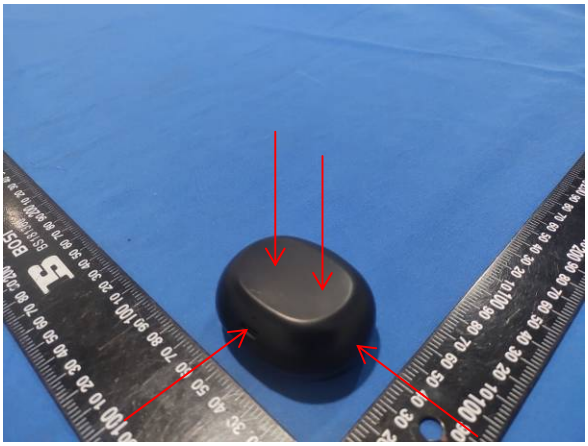
Test Points Location	Test Level							
	-2 kV	+2 kV	-4 kV	+4 kV	-6 kV	+6 kV	-8 kV	+8 kV
Front Side	A	A	A	A	/	/	/	/
Back Side	A	A	A	A	/	/	/	/
Left Side	A	A	A	A	/	/	/	/
Right Side	A	A	A	A	/	/	/	/
Top Side	A	A	A	A	/	/	/	/
Bottom Side	A	A	A	A	/	/	/	/
Required Performance Criteria:B Description of Performance reduction: N/A								

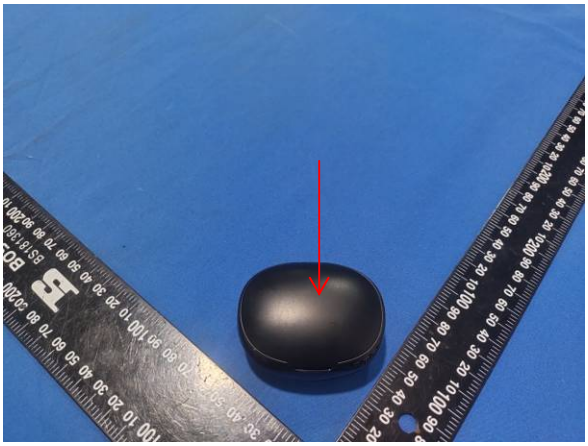
Table 4: Electrostatic Discharge Immunity (Indirect Contact VCP)

Test Points Location	Test Level							
	-2 kV	+2 kV	-4 kV	+4 kV	-6 kV	+6 kV	-8 kV	+8 kV
Front Side	A	A	A	A	/	/	/	/
Back Side	A	A	A	A	/	/	/	/
Left Side	A	A	A	A	/	/	/	/
Right Side	A	A	A	A	/	/	/	/
Required Performance Criteria:B Description of Performance reduction: N/A								

ESD Location Photo







Air Discharge: → Direct Contact: →

4 - CONTINUOUS RADIATED DISTURBANCES IEC 61000-4-3

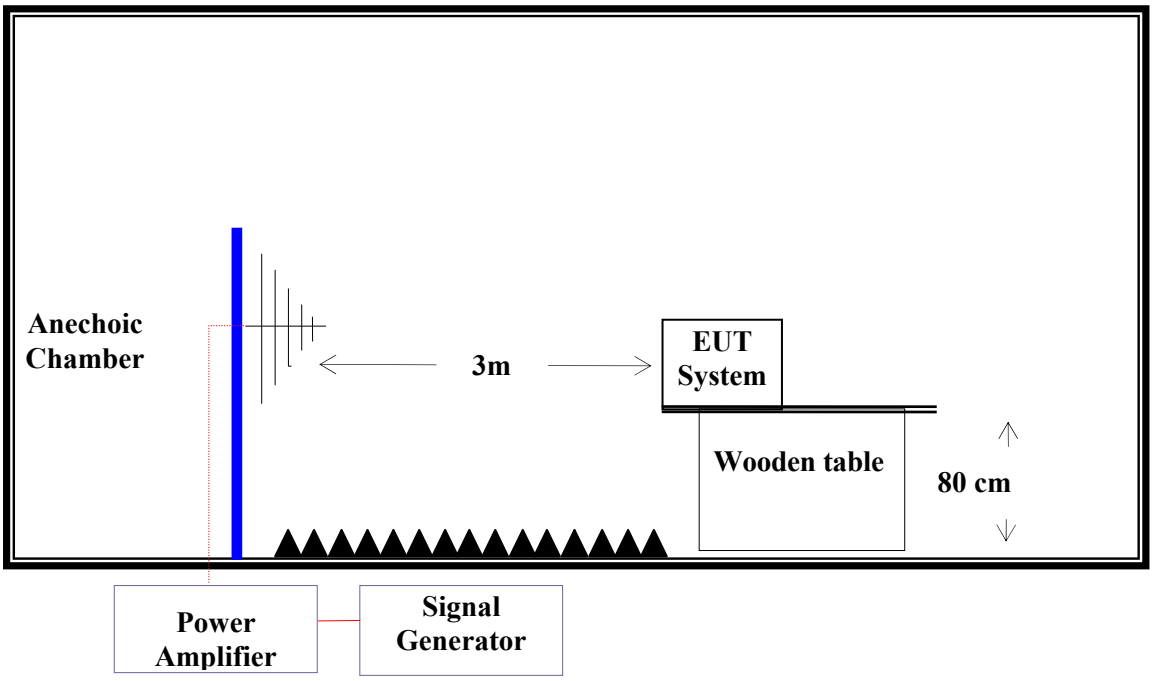
Measurement Uncertainty

U_{lab} (measurement uncertainty of lab) and U_{EN} (measurement uncertainty of EN 61000-4-3) please refer to the following:

Parameter	U_{EN}	U_{lab}
Calibration process	1.88 dB	1.88 dB
Level setting	2.19 dB	2.19 dB

Note: Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty. The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.

Test System Setup



Test Standard

EN 55035:2017+A11:2020 (IEC 61000-4-3:2006+A1:2007+A2:2010)
Test level 2 at 3V/ m (80MHz to 1GHz)
Test level 2 at 3V/ m (1.8GHz, 2.6GHz, 3.5GHz, 5GHz)

Test Level

Level	Field Strength V/m
1.	1
2.	3
3.	10
X.	Special

Performance criteria: A

A. The apparatus shall continue to operate as intended during and after the test. The manufacturer specifies some minimum performance level. The performance level may be specified by the manufacture as a permissible loss of performance.
B. The apparatus shall continue to operate as intended after the test. This indicates that the EUT does not need to function at normal performance levels during the test, but must recover. Again some minimal performance is defined by the manufacture. No change in operating state or loss or data is permitted.
C. Temporary loss of function is allowed. Operation of the EUT may stop as long as it is either automatically reset or can be manually restored by operation of the controls.
D. The apparatus is broken, cannot be normal operated.

Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above the ground. The EUT is set 3 meters away from the transmitting antenna which is mounted on an antenna tower. Both horizontal and vertical polarizations of the antenna are set on test. Each of the four sides of EUT must be faced this transmitting antenna and measured individually.
In order to judge the EUT performance, a CCD camera was used to monitor the EUT.

Test Data

Please refer to following tables:

Test Mode: M1
Note:

Condition of Test	Remarks
Field Strength	3V/m
RF Signal	1 kHz, 80% AM, sine wave
Sweep Frequency Step	1 %, logarithmic
Dwell Time	1 Sec

Table 1: Radiated RF-Electromagnetic Field Immunity, Swept Test

Frequency Range (MHz)	Front Side		Rear Side		Left Side		Right Side		Top Side		Bottom Side	
	VERT	HORI	VERT	HORI	VERT	HORI	VERT	HORI	VERT	HORI	VERT	HORI
80-1000	A	A	A	A	A	A	A	A	A	A	A	A
Required Performance Criteria: A Description of Performance reduction: N/A												

Table 2: Radiated RF-Electromagnetic Field Immunity, Spot Test

Spot Test Frequency (MHz)	Front Side		Rear Side		Left Side		Right Side		Top Side		Bottom Side	
	VERT	HORI	VERT	HORI	VERT	HORI	VERT	HORI	VERT	HORI	VERT	HORI
1800, 2600, 3500, 5000	A	A	A	A	A	A	A	A	A	A	A	A
Required Performance Criteria: A Description of Performance reduction: N/A												

5 - CONTINUOUS CONDUCTED DISTURBANCES IEC 61000-4-6

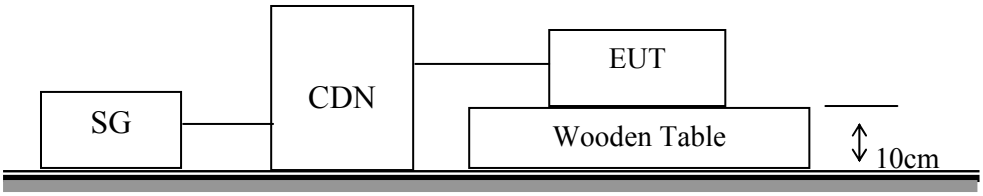
Measurement Uncertainty

U_{lab} (measurement uncertainty of lab) and U_{EN} (measurement uncertainty of EN 61000-4-6) please refer to the following:

Parameter	U_{EN}	U_{lab}
CDN calibration process	1.27 dB	1.27 dB
CDN test process	1.36 dB	1.36 dB

Note: Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty. The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.

Test Setup



Test Standard

EN 55035:2017+A11:2020 (IEC 61000-4-6:2008)
Test level 2 at 3 V (r.m.s.), 0.15MHz ~ 10MHz,
Test level 3-1 V (r.m.s.), 10MHz ~ 30MHz,
Test level 1 at 1 V (r.m.s.), 30MHz ~ 80MHz,

Test Level

Level	Voltage Level (r.m.s.) (V)
1	1
2	3
3	10
X	Special

Performance criteria: A

Test Procedure

1) Let the EUT work in test mode and test it.
2) The EUT are placed on an insulating support 0.1m high above a ground reference plane. CDN (coupling and decoupling device) is placed on the ground plane about 0.3m from EUT. Cables between CDN and EUT are as short as possible, and their height above the ground reference plane shall be between 30 and 50 mm (where possible).
3) The disturbance signal described below is injected to EUT through CDN.
4) The EUT operates within its operational mode(s) under intended climatic conditions after power on.
5) The frequency range is swept from 150 kHz to 80MHz using 3V signal level, and with the disturbance signal 80% amplitude modulated with a 1 kHz sine wave.
6) Where the frequency is swept incrementally, the step size shall not exceed 1 % of the preceding frequency value. The dwell time of the amplitude modulated carrier at each frequency shall not be less than the time necessary for the EUT to be exercised and to respond, but shall in no case be less than 0.5 s.
7) Recording the EUT operating situation during compliance testing and decide the EUT immunity criterion.

Test Data

Please refer to following tables:

Test Mode: M1
Note:

Table 1: AC mains power input port

Signal Type	Frequency Range (MHz)	Voltage Level (r.m.s.)	Perform Criterion
Modulation: Amplitude 80%, 1kHz sine wave Dwell Time 1 Sec	0.15-10	3V	A
	10-30	3V-1V	A
	30-80	1V	A
Required Performance Criteria: A Description of Performance reduction: N/A			

7 - ELECTRICAL FAST TRANSIENTS/BURST IEC 61000-4-4

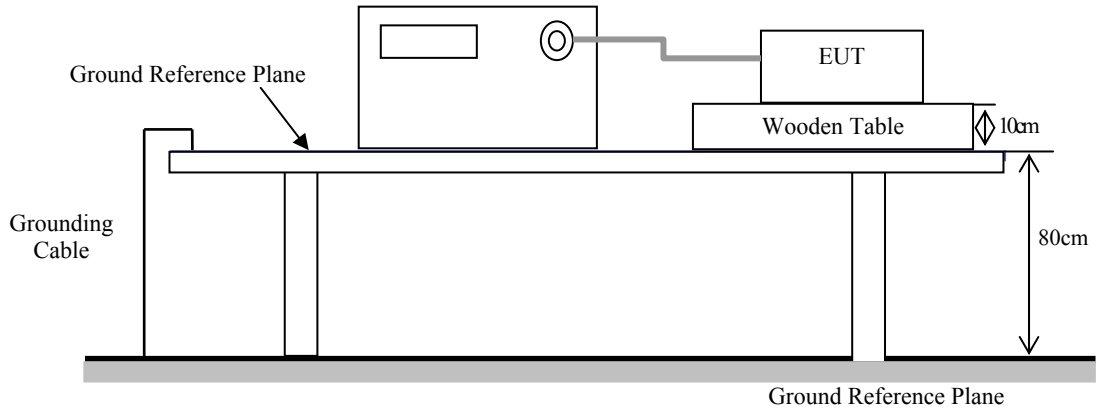
Measurement Uncertainty

U_{lab} (measurement uncertainty of lab) and U_{EN} (measurement uncertainty of EN 61000-4-4) please refer to the following:

Parameter	U_{EN}	U_{lab}
Rise time t_r	6.20%	6.20%
Peak voltage value V_p	8.60%	8.60%
Voltage pulse width t_w	5.90%	5.90%

Note: Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty. The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.

Test System Setup



Test Standard

EN 55035:2017+A11:2020 (IEC 61000-4-4:2012)
AC mains: Test level 2 at 1 kV
Signal port: Test level 2 at 0.5 kV

Test Level

Open Circuit Output Test Voltage ±10%		
Level	**On Power Supply Lines**	**On I/O (Input/Output) Signal data and control lines**
1	0.5 kV	0.25 kV
2	1 kV	0.5 kV
3	2 kV	1 kV
4	4 kV	2 kV
X	Special	Special

Performance criteria: B

Test Procedure

The EUT was arranged for Power Line Coupling and for I/O Line Coupling through a capacitive clamp, where applicable. (Note: The I/O coupling test using a capacitive clamp is performed on the I/O interface cables that are longer in length than 3 meters.) A metal ground plane 2.4 meter by 2.0 meter was placed between the floor and the table and is connected to the earth by a 2.0 meter ground rod. The ground rod is connected to the test facility's electrical earth.

Test Data

Please refer to following tables:

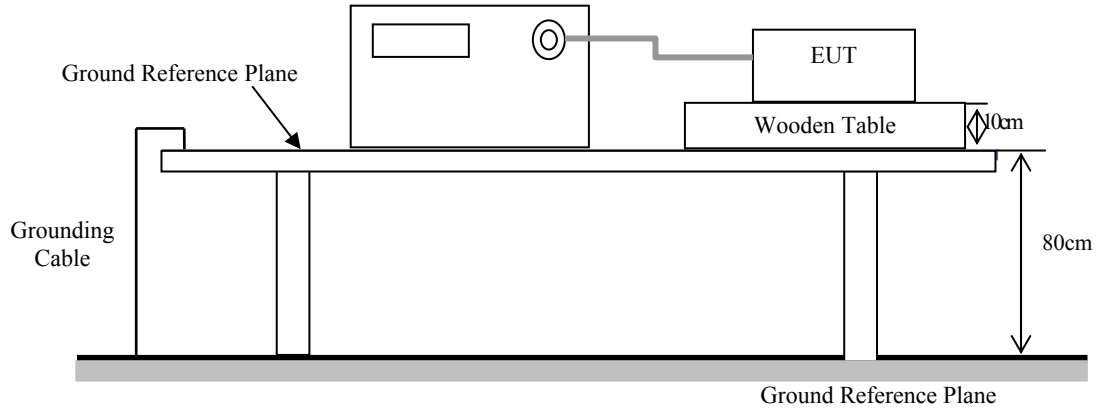
Test Mode: M1
Note:

AC Mains Power Input Ports

Test Ports	Test Level (kV)							
	+0.5	-0.5	+1.0	-1.0	+2.0	-2.0	+4.0	-4.0
L	A	A	A	A	/	/	/	/
N	A	A	A	A	/	/	/	/
Earth	/	/	/	/	/	/	/	/
L+N	A	A	A	A	/	/	/	/
L + Earth	/	/	/	/	/	/	/	/
N + Earth	/	/	/	/	/	/	/	/
L+N+Earth	/	/	/	/	/	/	/	/
Required Performance Criteria: B Description of Performance reduction: N/A								

8 - SURGES IEC 61000-4-5

Test System Setup



Test Standard

EN 55035:2017+A11:2020 (IEC 61000-4-5:2005)
AC Mains: Line-to-line: Test level 3 at 1 kV;
Line-to-ground: Test level 3 at 2 kV
Signal port: Test level 2 at 1 kV

Test Level

Level	Open-circuit test voltage ±10% kV	
	Line-to-line	Line-to-ground
1	N/A	0.5
2	0.5	1
3	1	2
4	2	4
X	Special	Special

Performance criteria: B

Test Procedure

1) Provide disturbance signal described below is injected to EUT.
2) At least 5 positive and 5 negative (polarity) tests with a maximum 1/min repetition rate are conducted during test.
3) Different phase angles are done individually.
4) Record the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test.

Test Data

Please refer to following tables:

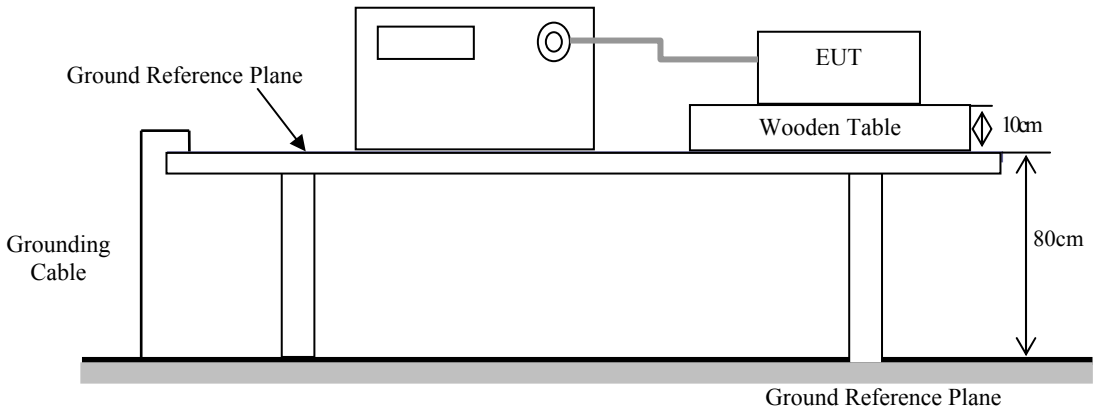
Test Mode: M1
Note:

Table 1: AC mains power input port

Level	Voltage	Poll	Path	Phase Angle	Perform Criterion
1	0.5kV	+	L- N	90	A
1	0.5kV	-	L- N	270	A
2	1kV	+	L- N	90	A
2	1kV	-	L- N	270	A
Required Performance Criteria: B Description of Performance reduction: N/A					

9 -VOLTAGE DIPS AND SHORT INTERRUPTIONS IEC 61000-4-11

Test Setup



Test Standard

EN 55035:2017+A11:2020 (IEC 61000-4-11:2004)
Test levels and Performance Criterion

Test Level

Test Level	Residual Voltage (%)	Duration (Periods)	Performance Criteria
1	<5	0.5	B
2	70	25	C
3	<5	250	C

Test Procedure

1) The interruption is introduced at selected phase angles with specified duration.
2) Record any degradation of performance.

Test Data

Please refer to following tables:

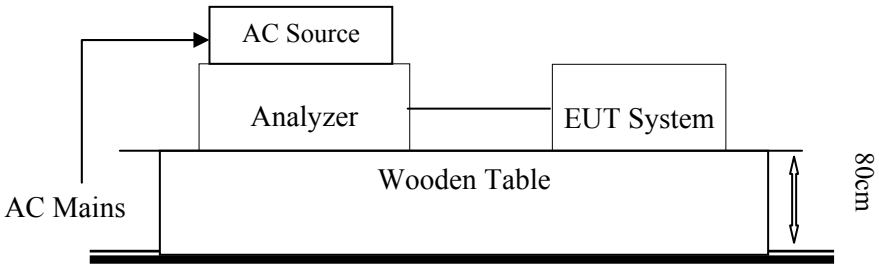
Test Mode: M1
Note:

Table 1: Voltage Dips/Interruptions Test

Residual Voltage (%)	Td (Number of cycles)	Phase Angle (°)	N	Result	Required Performance Criteria
<5	0.5	0/90/180/270	3	A	B
70	25	0/90/180/270	3	A	C
<5	250	0/90/180/270	3	B	C
Description of Performance reduction: B indicates that EUT charging was interrupted during the test, but it can automatically resume normal use after the test.					

11 -VOLTAGE FLUCTUATIONS AND FLICKER

Test System Setup



Test Standard

EN 61000-3-3:2013+A1:2019+A2:2021

Flicker Test Limits:

The limits shall be applicable to voltage fluctuations and flicker at the supply terminals of the equipment under test, measured or calculated according to clause 4 under test conditions described in clause 6 and annex A. Tests made to prove compliance with the limits are considered to be type tests.
The following limits apply:
- the value of Pst shall not be greater than 1,0;
- the value of Plt shall not be greater than 0,65;
- the value of d(t) during a voltage change shall not exceed 3,3 % for more than 500 ms;
- the relative steady-state voltage change, dc, shall not exceed 3,3 %;
- the maximum relative voltage change dmax, shall not exceed
a) 4 % without additional conditions;
b) 6 % for equipment which is:

- Switched manually, or
- Switched automatically more frequently than twice per day, and also has either a delayed restart (the delay being not less than a few tens of seconds), or manual restart, after a power supply interruption.

Note: The cycling frequency will be further limited by the Pst and Plt limit. For example: a dmax of 6 % producing a rectangular voltage change characteristic twice per hour will give a Plt of about 0,65.

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

In the case of equipment having several separately controlled circuits in accordance with 6.6,limits b) and c) shall apply only if there is delayed or manual restart after a power supply interruption; for all equipment with automatic switching which is energized immediately on restoration of supply after a power supply interruption, limits a) shall apply; for all equipment with manual switching, limits b) or c) shall apply depending on the rate of switching. Pst and Plt requirements shall not be applied to voltage changes caused by manual switching. The limits shall not be applied to voltage changes associated with emergency switching or emergency interruptions.

Test Data

Please refer to following tables:

Short time (Pst):	10 min
Observation time:	120 min(12 Flicker measurement)
Test Mode:	M1
Power Source:	AC 230V/50Hz
Test Result	PASS

Maximum Flicker results

	EUT values	Limit	Result
Pst	0.028	1.00	PASS
Plt	0.028	0.65	PASS
dc [%]	0.010	3.30	PASS
dmax [%]	0.279	4.00	PASS
dt [s]	0.000	0.50	PASS

EXHIBITA - EUT PHOTOGRAPHS

For photos in this section, please refer to report No.: SSH1230804-45338E-02 EXHIBIT A.

EXHIBITB - TEST SETUP PHOTOGRAPHS

Conducted emissions

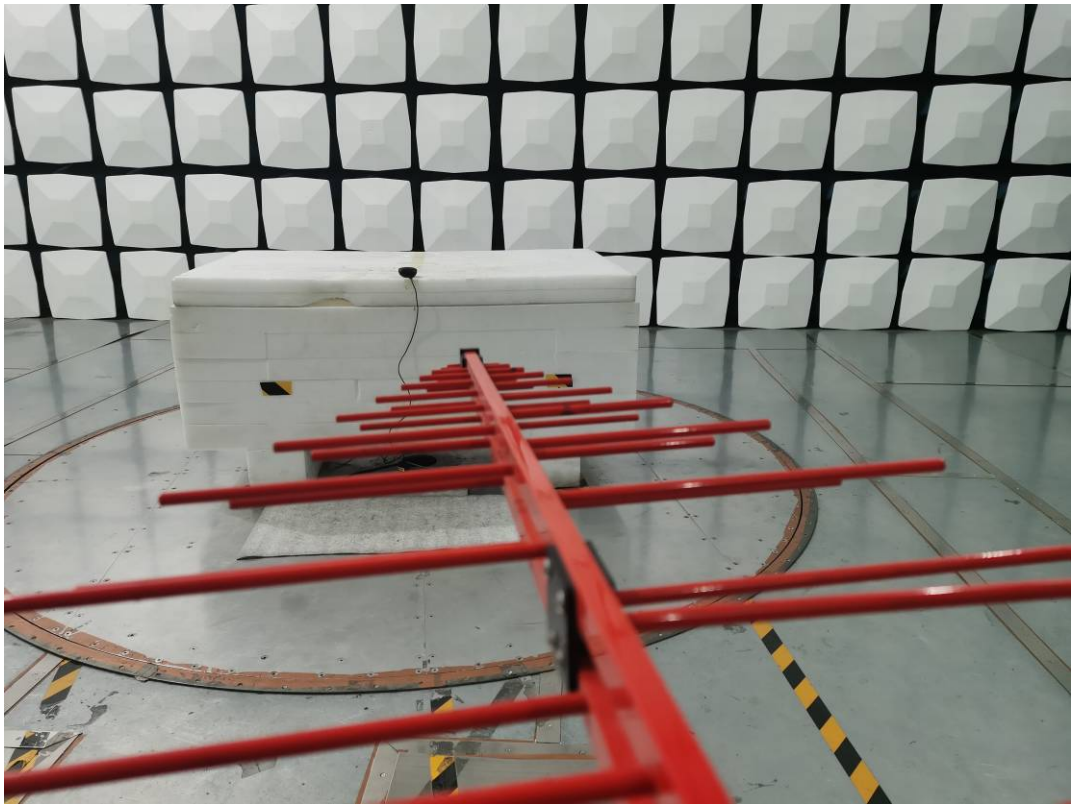
Conducted emissions front View

Conducted emissions side View

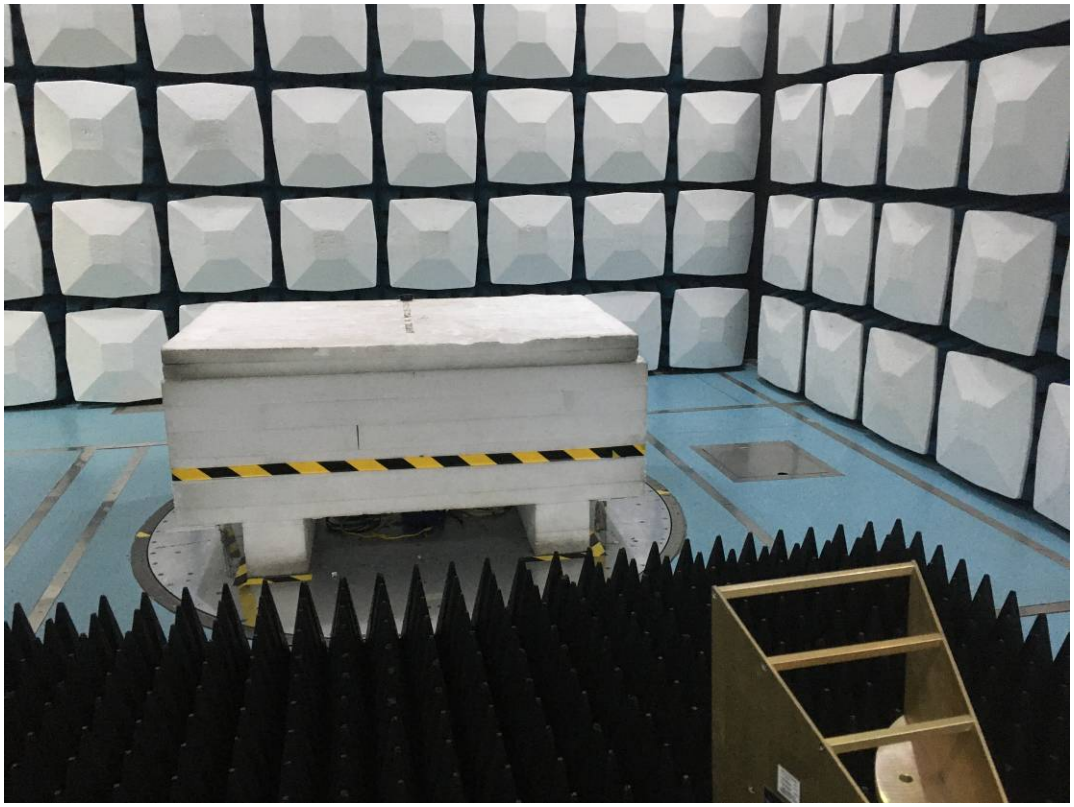
Radiated Emissions

Radiated Emissions Below 1GHz front View

Radiated Emissions Below 1GHz rear View



Radiated Emissions Above 1GHz front View



Radiated Emissions Above 1GHz rear View

ESD

Test Setup Photo View

RS

Test Setup Photo View

EFT

Test Setup Photo View

Dips

Test Setup Photo View

CS

Test Setup Photo View

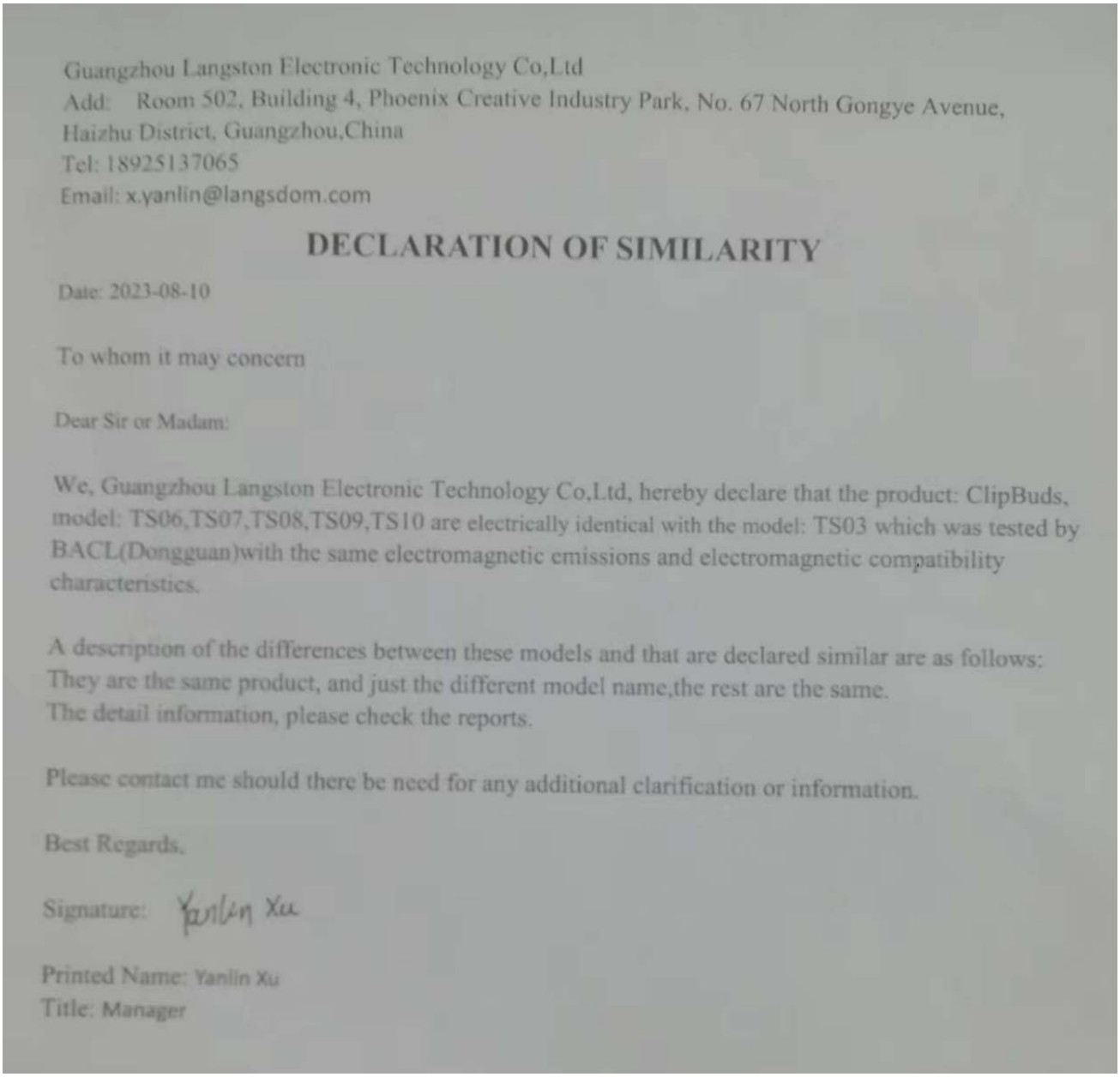
Flicker

Test Setup Photo View

Surge

Test Setup Photo View

DECLARATION OF SIMILARITY LETTER



Guangzhou Langston Electronic Technology Co,Ltd
Add: Room 502, Building 4, Phoenix Creative Industry Park, No. 67 North Gongye Avenue, Haizhu District, Guangzhou,China
Tel: 18925137065
Email: x.yanlin@langsdom.com

DECLARATION OF SIMILARITY

Date: 2023-08-10

To whom it may concern

Dear Sir or Madam:

We, Guangzhou Langston Electronic Technology Co,Ltd, hereby declare that the product: ClipBuds, model: TS06,TS07,TS08,TS09,TS10 are electrically identical with the model: TS03 which was tested by BACL(Dongguan)with the same electromagnetic emissions and electromagnetic compatibility characteristics.

A description of the differences between these models and that are declared similar are as follows:
They are the same product, and just the different model name,the rest are the same.
The detail information, please check the reports.

Please contact me should there be need for any additional clarification or information.

Best Regards,

Signature: Yanlin Xu

Printed Name: Yanlin Xu
Title: Manager

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

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

TEST REPORT

For

Guangzhou Langston Electronic Technology Co,Ltd

Room 502, Building 4, Phoenix Creative Industry Park, No. 67 North Gongye Avenue, Haizhu District, Guangzhou

Tested Model: TS03
Multiple Models: TS06,TS07,TS08,TS09,TS10

Report Type: Original Report	**Product Type:** ClipBuds
Report Number:	SSH1230804-45338E-02
Report Date:	2023/9/5
Reviewed By:	Rocky Xiao RF Engineer
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Dongguan) No.12, Pulong East 1st Road, Tangxia Town, Dongguan, Guangdong, China Tel: +86-769-86858888 Fax: +86-769-86858891 www.baclcorp.com.cn

TABLE OF CONTENTS

DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
1.0	SSH1230804-45338E-02	Original Report	2023/9/5

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

EUT Name:	ClipBuds
EUT Model:	TS03
Multiple Model:	TS06,TS07,TS08,TS09,TS10
Model Difference:	Please refer to the DoS
Rated Input Voltage:	DC 5V from charging case or 3.7V from battery
Serial Number:	29FJ-1
EUT Received Date:	2023/8/7
EUT Received Status:	Good

Objective

This report is prepared on behalf of ***Guangzhou Langston Electronic Technology Co,Ltd*** in accordance with ETSI EN 301 489-1 V2.2.3 (2019-11) ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Harmonised Standard for ElectroMagnetic Compatibility;

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;

The objective is to determine the compliance of EUT with: ETSI EN 301 489-1 V2.2.3 (2019-11), ETSI EN 301 489-17 V3.2.4 (2020-09).

Test Methodology

All measurements contained in this report were conducted with ETSI EN 301 489-1 V2.2.3 (2019-11) ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Harmonised Standard for ElectroMagnetic Compatibility.

Declarations

BACL is not responsible for the authenticity of any test data provided by the applicant. Data included from the applicant that may affect test results are marked with a triangle symbol "▲". Customer model name, addresses, names, trademarks etc. are not considered data.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.

This report cannot be reproduced except in full, without prior written approval of the Company.

Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.

This report is valid only with a valid digital signature. The digital signature may be available only under the Adobe software above version 7.0.

This report may contain data that are not covered by the accreditation scope and shall be marked with an asterisk "★".

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in a typical fashion (as normally used by a typical user).

Test mode:
M1: Bluetooth link (working and monitoring with phone)

Equipment Modifications

No modification was made to the EUT.

EUT Exercise Software

No software was used.

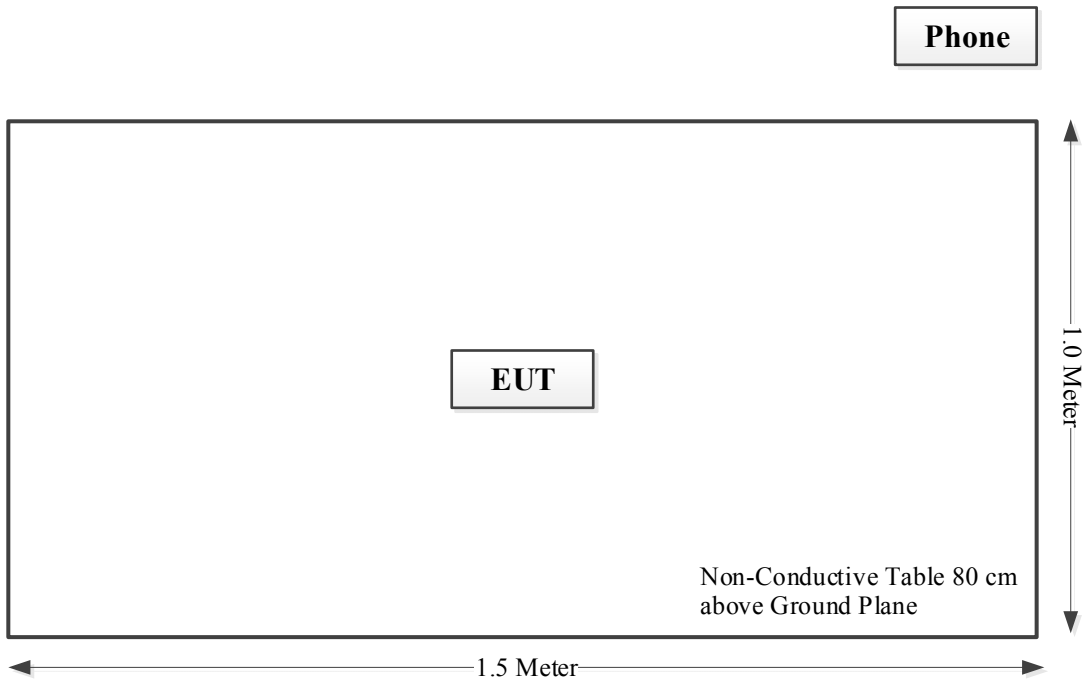
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Huawei	Phone	EVR-AL00	A000009E3F501E

Support Cable List and Details

Cable Description	Shielding Cable	Ferrite Core	Length (m)	From Port	To
/	/	/	/	/	/

Block Diagram of Test Setup



Test Equipment List

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated emissions below 1GHz					
Sunol Sciences	Hybrid Antenna	JB3	A060611-2	2020/8/25	2023/8/24
Narda	Attenuator	757C-6dB	34010	2023/8/1	2024/7/31
Unknown	Coaxial Cable	C-NJNJ-50	C-1000-01	2023/8/1	2024/7/31
Unknown	Coaxial Cable	C-NJNJ-50	C-0400-04	2023/8/1	2024/7/31
Unknown	Coaxial Cable	C-NJNJ-50	C-0530-01	2023/8/1	2024/7/31
Sonoma	Amplifier	310N	185914	2023/8/1	2024/7/31
R&S	EMI Test Receiver	ESCI	100224	2022/11/18	2023/11/17
Farad	Test Software	EZ-EMC	V1.1.4.2	N/A	N/A
Radiated emissions above 1GHz					
AH	Horn Antenna	SAS-571	1394	2023/2/22	2026/2/21
HUBER+SUHNER	Coaxial Cable	SUCOFLEX 126EA	MY369/26/26EA	2022/10/13	2023/10/13
Unknown	Coaxial Cable	C-NJNJ-50	C-0200-02	2022/9/4	2023/9/3
AH	Preamplifier	PAM-0118P	530	2023/11/18	2024/11/17
R&S	Spectrum Analyzer	FSP 38	100478	2022/11/22	2023/11/21
E-Microwave	Band Rejection Filter	OBSF-2400-2483.5-S	OE01601525	2023/6/16	2024/6/15
Farad	Test Software	EZ-EMC	V1.1.4.2	N/A	N/A
ESD					
TESEQ	ESD Generator	NSG 438	1019	2022/11/16	2023/11/15
RS					
AR	Antenna	ATL80M1G	0351400	N/A	N/A
AR	Antenna	ATT700M12G	0349410	N/A	N/A
HP	Signal Generator	8665B	3438a00584	2022/11/18	2023/11/17
AR	Power Amplifier	500W1000C	0353561	N/A	N/A
AR	Power Amplifier	60S1G6	0348711	N/A	N/A
PASTERNACK	Dual Directional Coupler	PE2239-30	1711	2023/7/15	2024/7/14
Agilent	Power Meter	E4419B	MY45103907	2022/11/18	2023/11/17
Agilent	E-Series Avg Power Sensor	E9301A	MY41497625	2022/11/22	2023/11/21
Agilent	E-Series Avg Power Sensor	E9301A	MY41497628	2022/11/22	2023/11/21

* Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Environmental Conditions

Test Item:	Radiated emissions below 1GHz	Radiated emissions above 1GHz	EMS
Temperature:	26.8℃	28.1℃	24.7~26.5℃
Relative Humidity:	47%	40%	52~59%
ATM Pressure:	100.1kPa	100.0kPa	100.0kPa
Tester:	Charlwin Zhang	Leo Yuan	Joe Li
Test Date:	2023/8/15	2023/8/26	2023/8/21

SUMMARY OF TEST RESULTS

SN	Rule and Clause	Description of Test	Test Result
1	EN 301 489-1 Clause 8.2	Enclosure of ancillary equipment measured on a stand alone basis	Compliant
2	EN 301 489-1 Clause 8.3	DC power input/output ports	Not applicable
3	EN 301 489-1 Clause 8.4	AC mains power input/output ports	Not applicable
4	EN 301 489-1 Clause 8.5	Harmonic current emissions (AC mains input port)	Not applicable
5	EN 301 489-1 Clause 8.6	Voltage fluctuations and flicker (AC mains input port)	Not applicable
6	EN 301 489-1 Clause 8.7	Wired network ports	Not applicable
7	EN 301 489-1 Clause 9.2	Radio frequency electromagnetic fields (80 MHz to 6 000 MHz)	Compliant
8	EN 301 489-1 Clause 9.3	Electrostatic discharges	Compliant
9	EN 301 489-1 Clause 9.4	Fast transients, common mode	Not applicable
10	EN 301 489-1 Clause 9.5	Radio frequency, common mode	Not applicable
11	EN 301 489-1 Clause 9.6	Transients and surges in the vehicular environment	Not applicable
12	EN 301 489-1 Clause 9.7	Voltage dips and short interruptions	Not applicable
13	EN 301 489-1 Clause 9.8	Surges	Not applicable

Note:
Not Applicable: Please refer to Applicability overview tables in sections 7.1 and 7.2 of EN 301 489-1 requirements for Radio and ancillary equipment.

1 - ENCLOSURE OF ANCILLARY EQUIPMENT MEASURED ON A STAND ALONE BASIS

Measurement Uncertainty

Compliance or non- compliance with a disturbance limit shall be determined in the following manner:

If U_{lab} is less than or equal to U_{cispr} of Table 1, then:
−compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
−non - compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.
If U_{lab} is greater than U_{cispr} of Table 1, then:
−compliance is deemed to occur if no measured disturbance level, increased by ($U_{lab} - U_{cispr}$), exceeds the disturbance limit;
−non - compliance is deemed to occur if any measured disturbance level, increased by ($U_{lab} - U_{cispr}$), exceeds the disturbance limit.

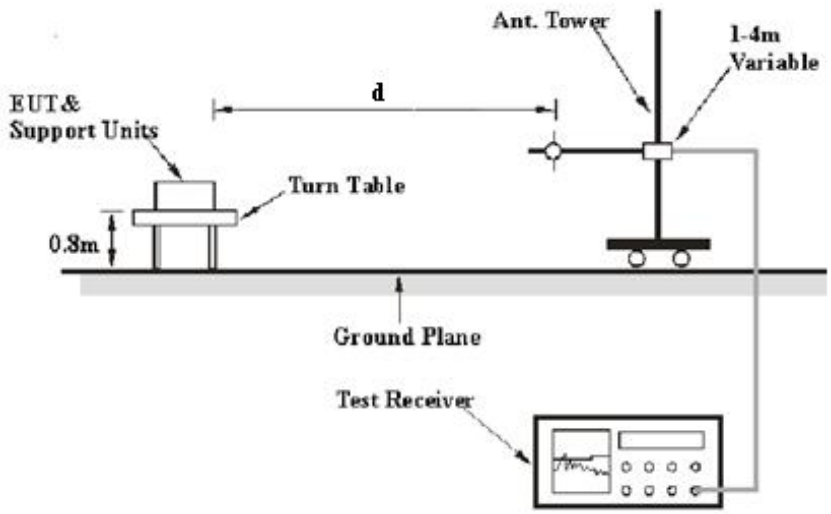
Based on CISPR 16-4-2: 2011, measurement uncertainty of radiated emission at a distance of 10m at Bay Area Compliance Laboratories Corp. (Dongguan) is:30M~200MHz: 4.55 dB for Horizontal, 4.57 dB for Vertical; 200M~1GHz: 4.66 dB for Horizontal, 4.56 dB for Vertical; measurement uncertainty of radiated emission at a distance of 3m at Bay Area Compliance Laboratories Corp. (Dongguan) is:30M~200MHz: 4.58 dB for Horizontal, 4.59 dB for Vertical; 200M~1GHz: 4.83 dB for Horizontal, 5.85 dB for Vertical; 1G~6GHz: 4.45 dB, 6G~18GHz: 5.23 dB

Table 1 - Values of U_{cispr}

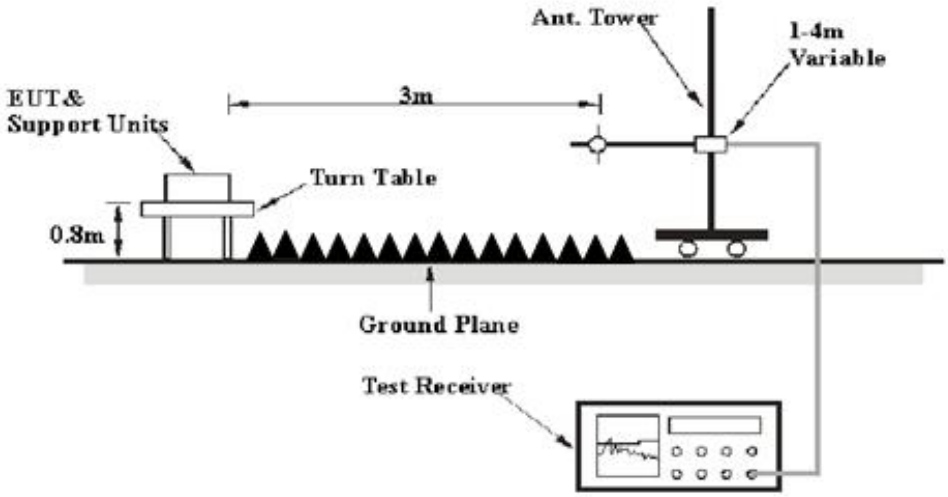
Measurement	U_{cispr}
Radiated disturbance (electric field strength at an OATS or in a SAC)(30 MHz to 1000 MHz)	6.3 dB
Radiated disturbance (electric field strength in a FAR)(1 GHz to 6 GHz)	5.2 dB
Radiated disturbance (electric field strength in a FAR)(6 GHz to 18 GHz)	5.5 dB

Test System Setup

Below 1GHz:



Above 1GHz:



The radiated emission tests below 1GHz were performed in 3 meters, above 1GHz were performed in the 3 meters. The specification used was EN 55032 Class B limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40cm long in the middle. The spacing between the peripherals was 10cm.

EMI Test Receiver and Spectrum Analyzer Setup

The system was investigated from 30 MHz to 6 GHz.

During the radiated emission test, the EMI test receiver(Below 1GHz) and Spectrum Analyzer(Above 1GHz) were set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Detector
30MHz - 1000 MHz	120 kHz	300 kHz	120kHz	QP
Above 1 GHz	1MHz	3 MHz	/	Peak
	1MHz	10Hz	/	Average

If the maximized peak measured value complies with under the QP/Average limit more than 6dB, then it is unnecessary to perform an QP/Average measurement.

Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

All data was recorded in the Quasi-peak detection mode from 30MHz to 1GHz, Peak and average detection mode above 1GHz.

Corrected Amplitude & Margin Calculation

The basic equation is as follows: Result = Meter Reading+ Corrected
Note:
Corrected = Antenna Factor + Cable Loss - Amplifier Gain, or
Corrected = Antenna Factor + Cable Loss + Insertion loss of attenuator - Amplifier Gain

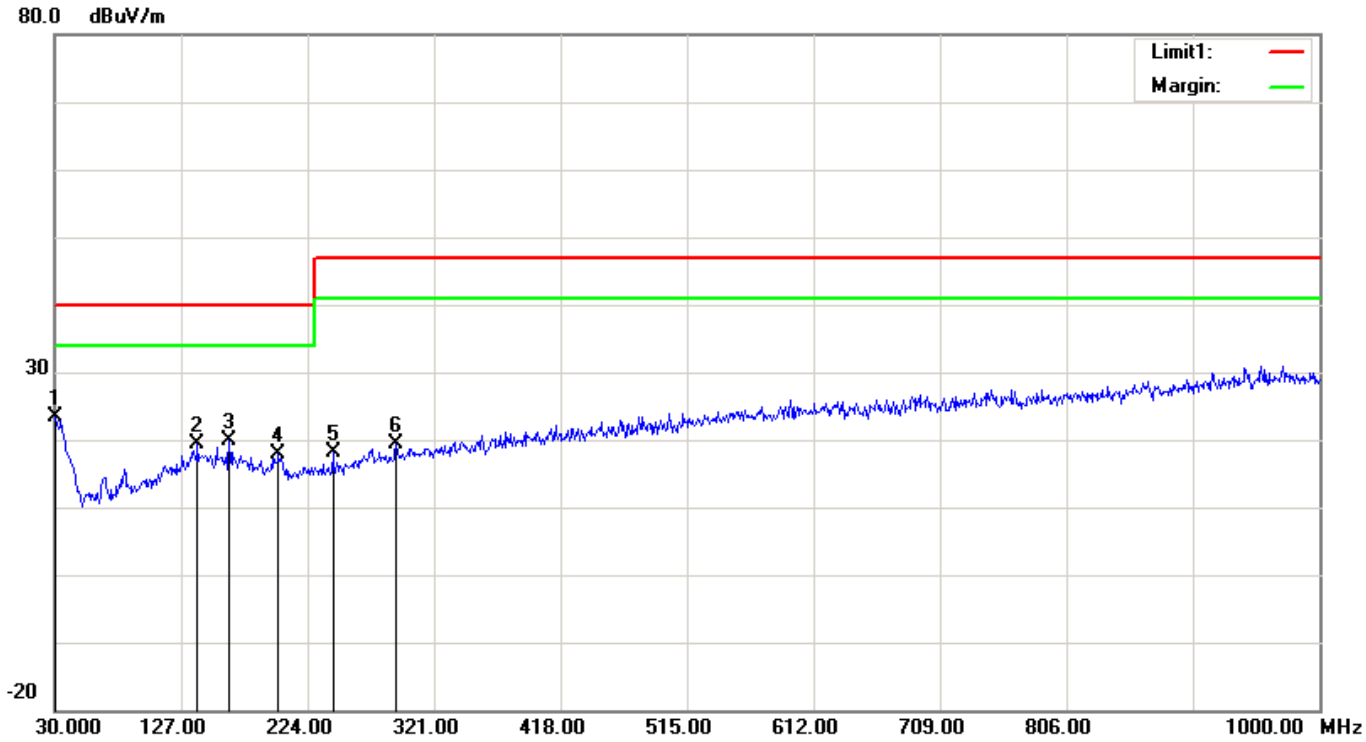
The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows: Margin = Limit-Result

Test Data

Please refer to following table and plots:

Below 1G

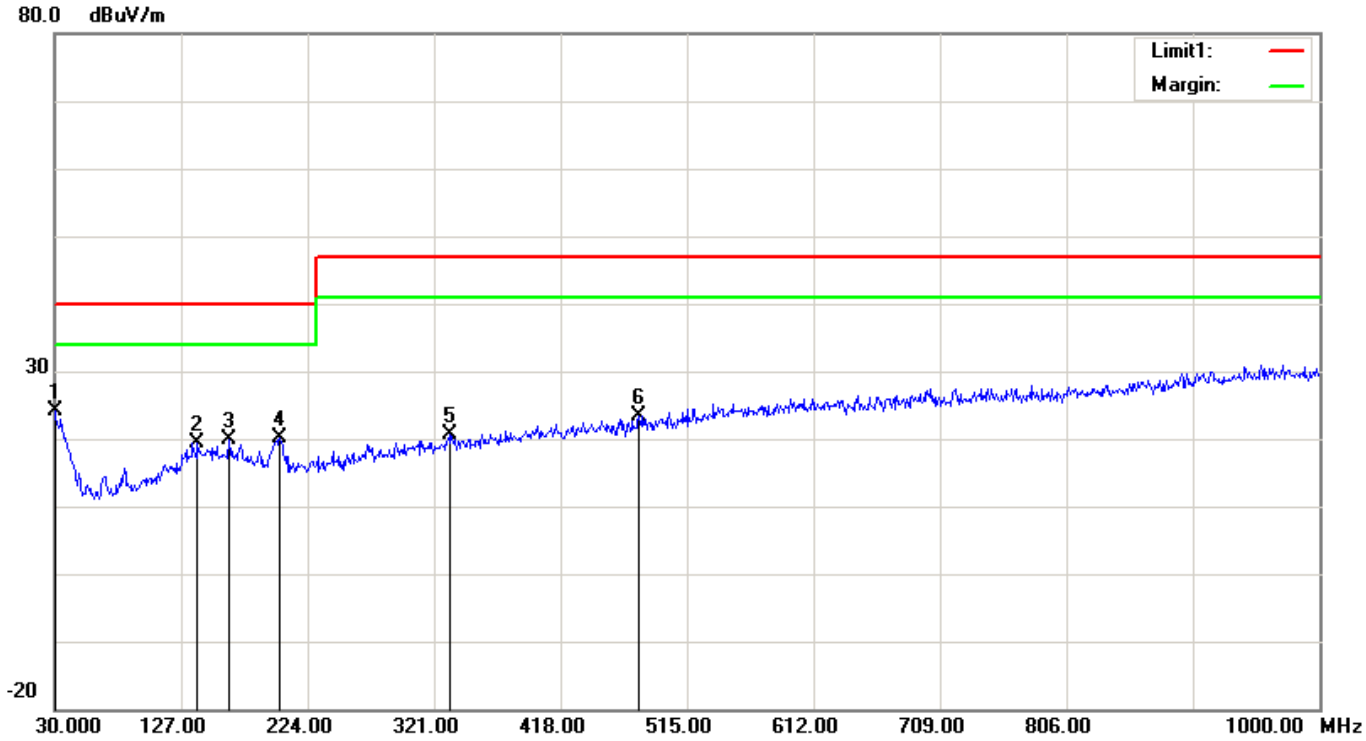
Condition:	EN 301 489 Class B 3m Radiation	**Polarization:**	Horizontal
Test Mode:	M1	**Distance:**	3m
Note:			



No.	Frequency (MHz)	Reading (dBµV)	Detector	Corrected (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
1	30.9700	27.77	peak	-4.46	23.31	40.00	16.69
2	139.6100	28.57	peak	-9.08	19.49	40.00	20.51
3	163.8600	29.28	peak	-9.29	19.99	40.00	20.01
4	201.6900	27.73	peak	-9.82	17.91	40.00	22.09
5	243.4000	28.35	peak	-10.16	18.19	47.00	28.81
6	291.9000	27.52	peak	-8.18	19.34	47.00	27.66

Condition: EN 301 489 Class B 3m Radiation
Test Mode: M1
Note:

Polarization: Vertical
Distance: 3m

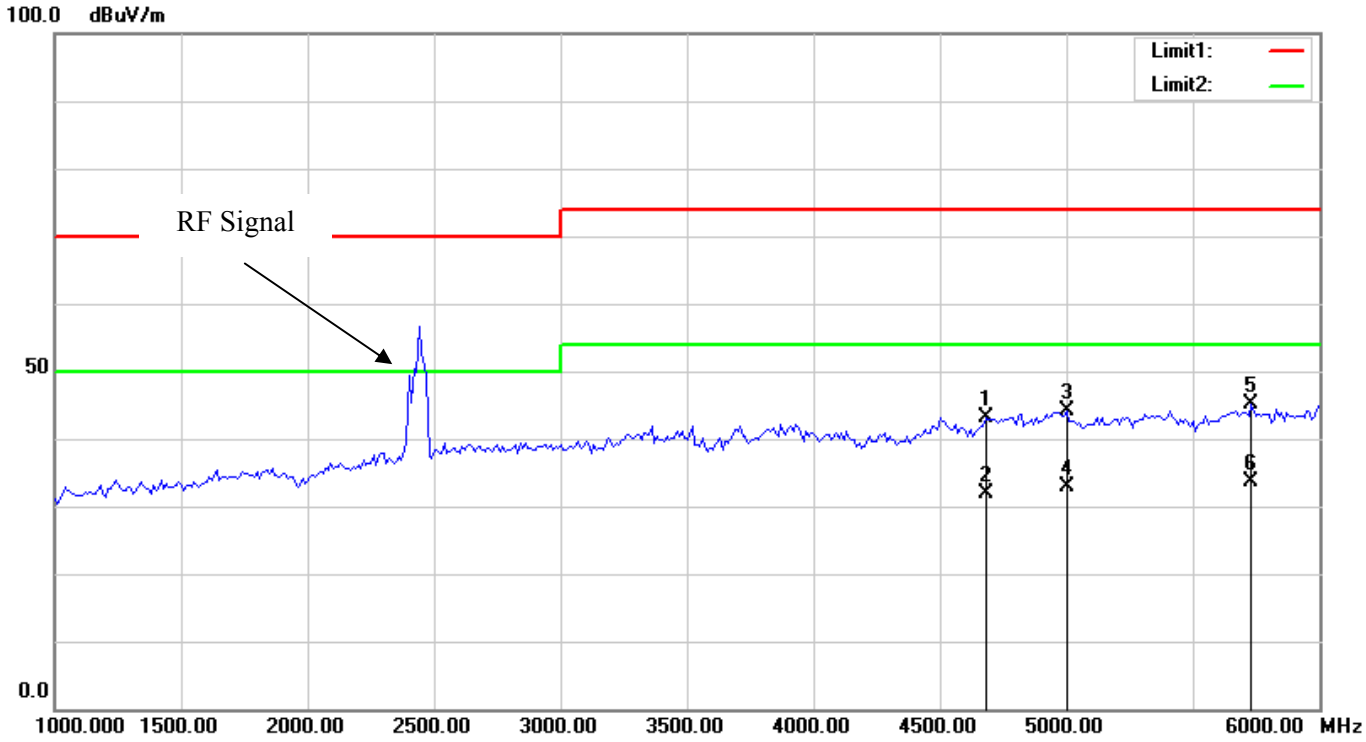


No.	Frequency (MHz)	Reading (dBµV)	Detector	Corrected (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
1	30.0000	27.90	peak	-3.88	24.02	40.00	15.98
2	139.6100	28.57	peak	-9.08	19.49	40.00	20.51
3	163.8600	29.28	peak	-9.29	19.99	40.00	20.01
4	202.6600	30.22	peak	-10.04	20.18	40.00	19.82
5	332.6400	27.65	peak	-7.02	20.63	47.00	26.37
6	478.1400	27.29	peak	-3.94	23.35	47.00	23.65

Above 1G

Condition: EN 301 489 Class B
Test Mode: M1
Note:

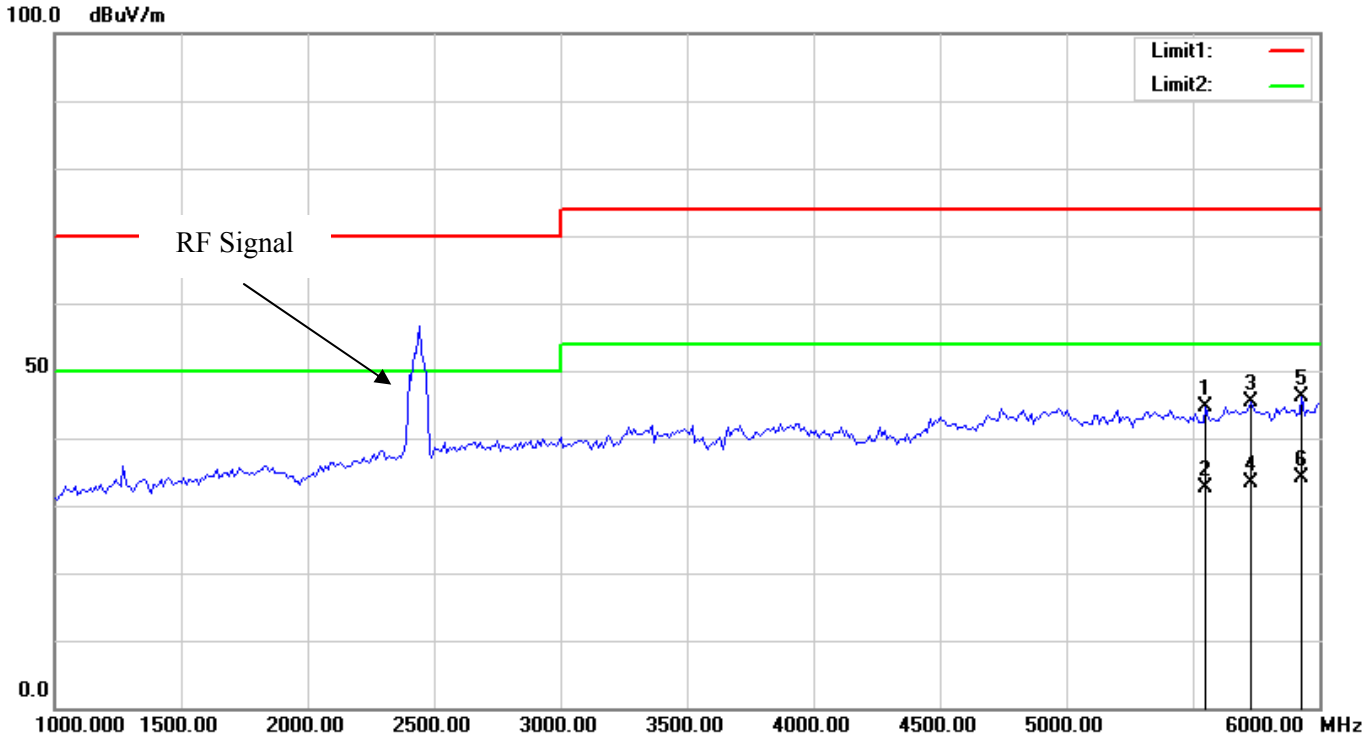
Polarization: Horizontal
Distance: 3m



No.	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
	(MHz)	(dBµV)		(dB/m)	(dBµV/m)	(dBµV/m)	(dB)
1	4680.000	51.34	peak	-8.29	43.05	74.00	30.95
2	4680.000	40.10	AVG	-8.29	31.81	54.00	22.19
3	5000.000	51.57	peak	-7.46	44.11	74.00	29.89
4	5000.000	40.32	AVG	-7.46	32.86	54.00	21.14
5	5730.000	52.26	peak	-7.21	45.05	74.00	28.95
6	5730.000	40.87	AVG	-7.21	33.66	54.00	20.34

Condition: EN 301 489 Class B
Test Mode: M1
Note:

Polarization: Vertical
Distance: 3m



No.	Frequency (MHz)	Reading (dBµV)	Detector	Corrected (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
1	5550.000	52.23	peak	-7.63	44.60	74.00	29.40
2	5550.000	40.14	AVG	-7.63	32.51	54.00	21.49
3	5730.000	52.68	peak	-7.21	45.47	74.00	28.53
4	5730.000	40.52	AVG	-7.21	33.31	54.00	20.69
5	5930.000	52.62	peak	-6.58	46.04	74.00	27.96
6	5930.000	40.66	AVG	-6.58	34.08	54.00	19.92

7 - RADIO FREQUENCY ELECTROMAGNETIC FIELDS (80 MHZ TO 6 000 MHZ)

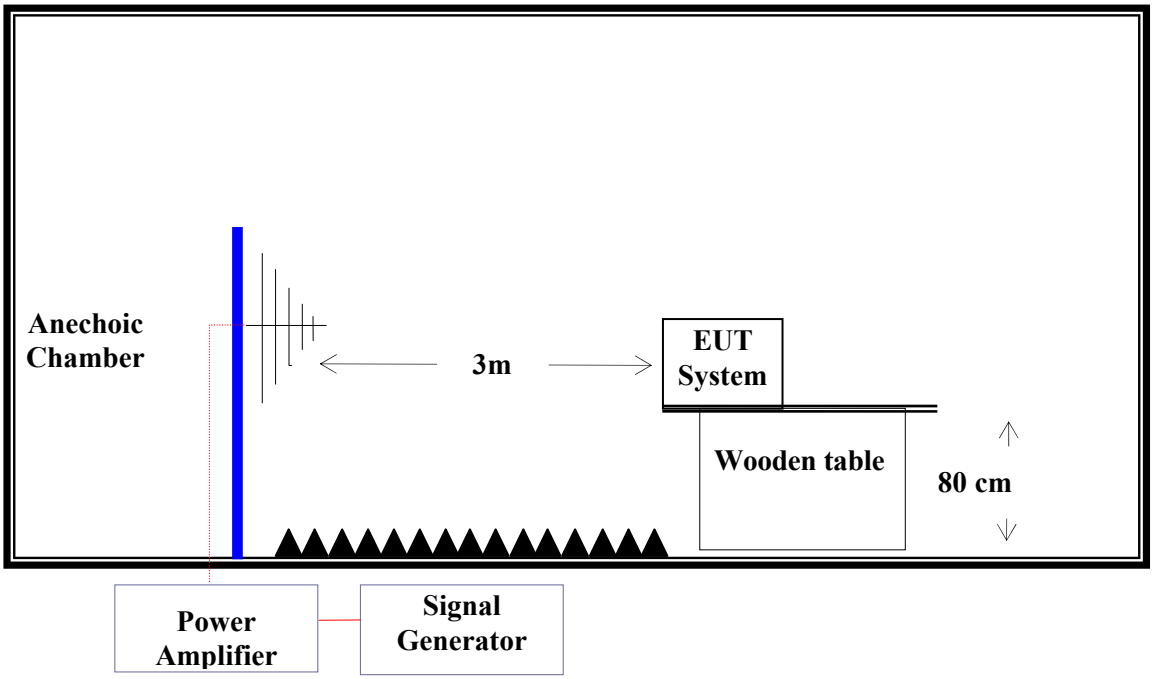
Measurement Uncertainty

U_{lab} (measurement uncertainty of lab) and U_{EN} (measurement uncertainty of EN 61000-4-3) please refer to the following:

Parameter	U_{EN}	U_{lab}
Calibration process	1.88 dB	1.88 dB
Level setting	2.19 dB	2.19 dB

Note: Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty. The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.

Test System Setup



Test Level

Level	Field Strength V/m
1.	1
2.	3
3.	10
X.	Special

Performance Criterion: A

General Performance Criteria:

A. The apparatus shall continue to operate as intended during and after the test. The manufacturer specifies some minimum performance level. The performance level may be specified by the manufacture as a permissible loss of performance.

B. The apparatus shall continue to operate as intended after the test. This indicates that the EUT does not need to function at normal performance levels during the test, but must recover. Again some minimal performance is defined by the manufacture. No change in operating state or loss or data is permitted.
C. Temporary loss of function is allowed. Operation of the EUT may stop as long as it is either automatically reset or can be manually restored by operation of the controls.
D. The apparatus is broken, cannot be normal operated.

Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above the ground. The EUT is set 3 meters away from the antenna which is mounted on an antenna tower. Both horizontal and vertical polarizations of the antenna are set on test. Each of the four sides of EUT must be faced this antenna and measured individually.
In order to judge the EUT performance, a CCD camera and Smartphone were used to monitor the EUT.

Test Data

Please refer to following tables:

Condition of Test	Remarks
Field Strength	3 V/m
RF Signal	1 kHz, 80% AM, sine wave
Sweep Frequency Step	1 %, logarithmic
Dwell Time	1 Sec

Table 1: Radiated RF-Electromagnetic Field Immunity, Swept Test

Frequency Range (MHz)	Front Side		Rear Side		Left Side		Right Side		Top Side		Bottom Side	
	VERT	HORI	VERT	HORI	VERT	HORI	VERT	HORI	VERT	HORI	VERT	HORI
80-1000	A	A	A	A	A	A	A	A	A	A	A	A
1000-6000	A	A	A	A	A	A	A	A	A	A	A	A
Required Performance Criteria: A Description of Performance reduction: N/A												

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

8 - ELECTROSTATIC DISCHARGES

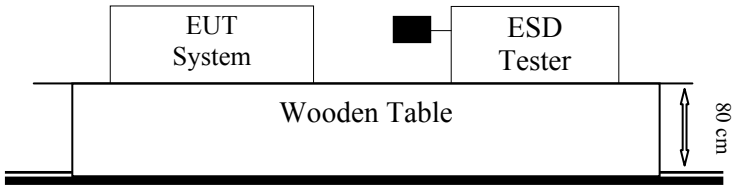
Measurement Uncertainty

U_{lab} (measurement uncertainty of lab) and U_{EN} (measurement uncertainty of EN 61000-4-2) please refer to the following:

Parameter	U_{EN}	U_{lab}
Rise time t_r	≤15%	15%
Peak current I_p	≤7%	6.3%
Current at 30 ns	≤7%	6.3%
Current at 60 ns	≤7%	6.3%

Note: Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty. The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.

Test System Setup



Remark: ■ is the tip of the electrode

EN61000-4-2 specifies that a tabletop EUT shall be placed on a non-conducting table which is 80 centimeters above a ground reference plane and that floor mounted equipment shall be placed on a insulating support approximately 10 centimeters above a ground plane. During the tests, the EUT is positioned over a ground reference plane in conformance with this requirement.

For tabletop equipment, a 1.6 by 0.8-meter metal sheet (HCP) is placed on the table and connected to the ground plane via a metal strap with two 470 k Ohms resistors in series. The EUT and attached cables are isolated from this metal sheet by *0.5-millimeter* thick insulating material. A Vertical Coupling Plane (VCP) grounded on the ground plane through the same configuration as in the HCP is used.

Test Level

Level	Test Voltage Contact Discharge (±kV)	Test Voltage Air Discharge (±kV)
1.	2	2
2.	4	4
3.	6	8
4.	8	15
X.	Special	Special

Performance criterion: B

Test Procedure

Air Discharge:

This test is done on a non-conductive surface. The round discharge tip of the discharge electrode shall be approached as fast as possible to touch the EUT. After each discharge, the discharge electrode shall be removed from the EUT. The generator is then re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed.

Contact Discharge:

All the procedure shall be same as Section 8.3.1of IEC 61000-4-2, except that the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

Indirect discharge for horizontal coupling plane:

At least 10 single discharges shall be applied to the horizontal coupling plane, at points on each side of the EUT. The discharge electrode positions vertically at a distance of 0.1m from the EUT and with the discharge electrode touching the coupling plane.

Indirect discharge for vertical coupling plane:

At least 10 single discharges shall be applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m×0.5m, is placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges shall be applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.

Test Data

Please refer to following tables:

Test Mode: M1
Note:

Table 1: Electrostatic Discharge Immunity (Air Discharge)

Test Points Location	Test Level							
	-2 kV	+2 kV	-4 kV	+4 kV	-8 kV	+8 kV	-15 kV	+15 kV
Non-metallic Shell	A	A	A	A	A	A	/	/
Seam	A	A	A	A	A	A	/	/
Required Performance Criteria:B Description of Performance reduction: N/A								

Table 2: Electrostatic Discharge Immunity (Direct Contact)

Test Points Location	Test Level							
	-2 kV	+2 kV	-4 kV	+4 kV	-6 kV	+6 kV	-8 kV	+8 kV
Metal shell	/	/	/	/	/	/	/	/
Required Performance Criteria:B Description of Performance reduction: N/A								

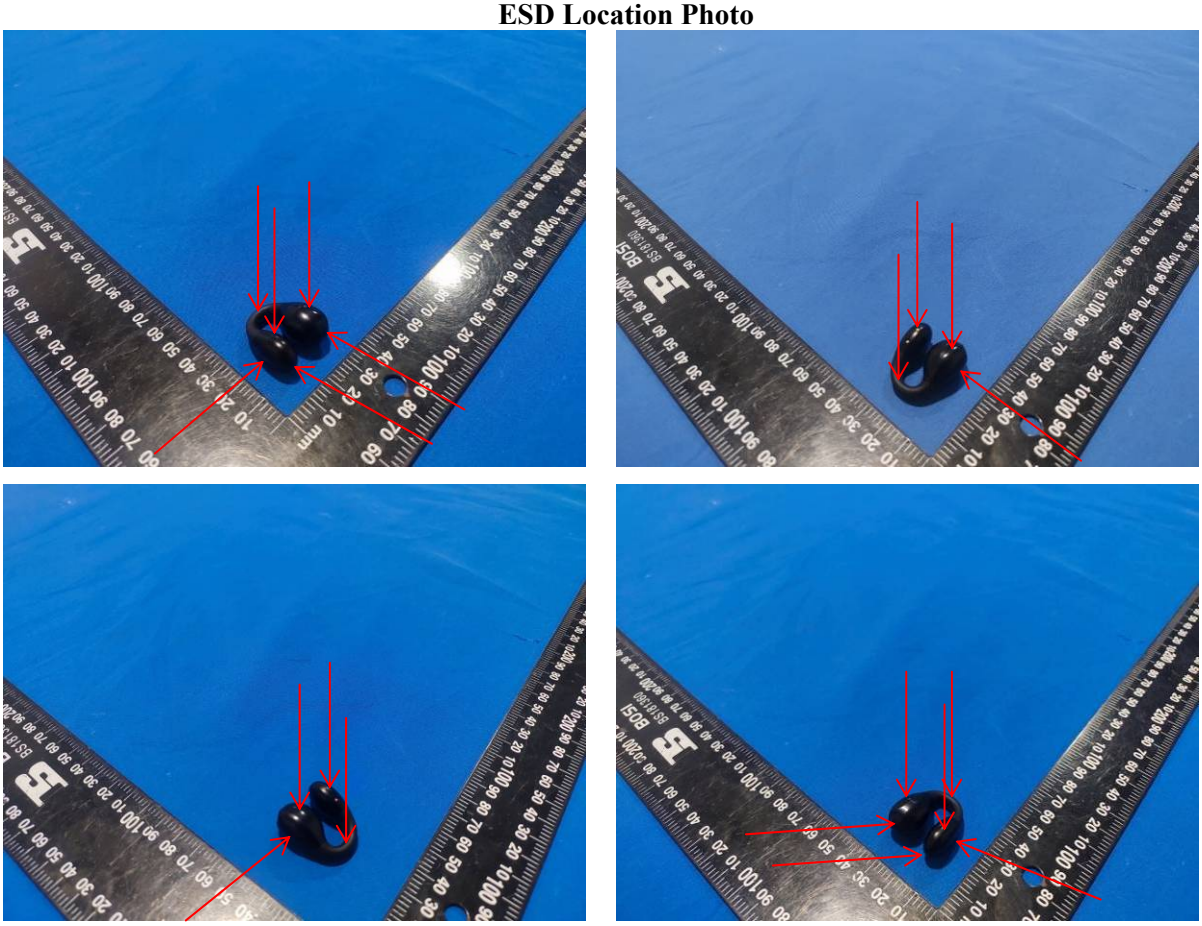
Table 3: Electrostatic Discharge Immunity (Indirect Contact HCP)

Test Points Location	Test Level							
	-2 kV	+2 kV	-4 kV	+4 kV	-6 kV	+6 kV	-8 kV	+8 kV
Front Side	A	A	A	A	/	/	/	/
Back Side	A	A	A	A	/	/	/	/
Left Side	A	A	A	A	/	/	/	/
Right Side	A	A	A	A	/	/	/	/
Top Side	A	A	A	A	/	/	/	/
Bottom Side	A	A	A	A	/	/	/	/
Required Performance Criteria:B Description of Performance reduction: N/A								

Table 4: Electrostatic Discharge Immunity (Indirect Contact VCP)

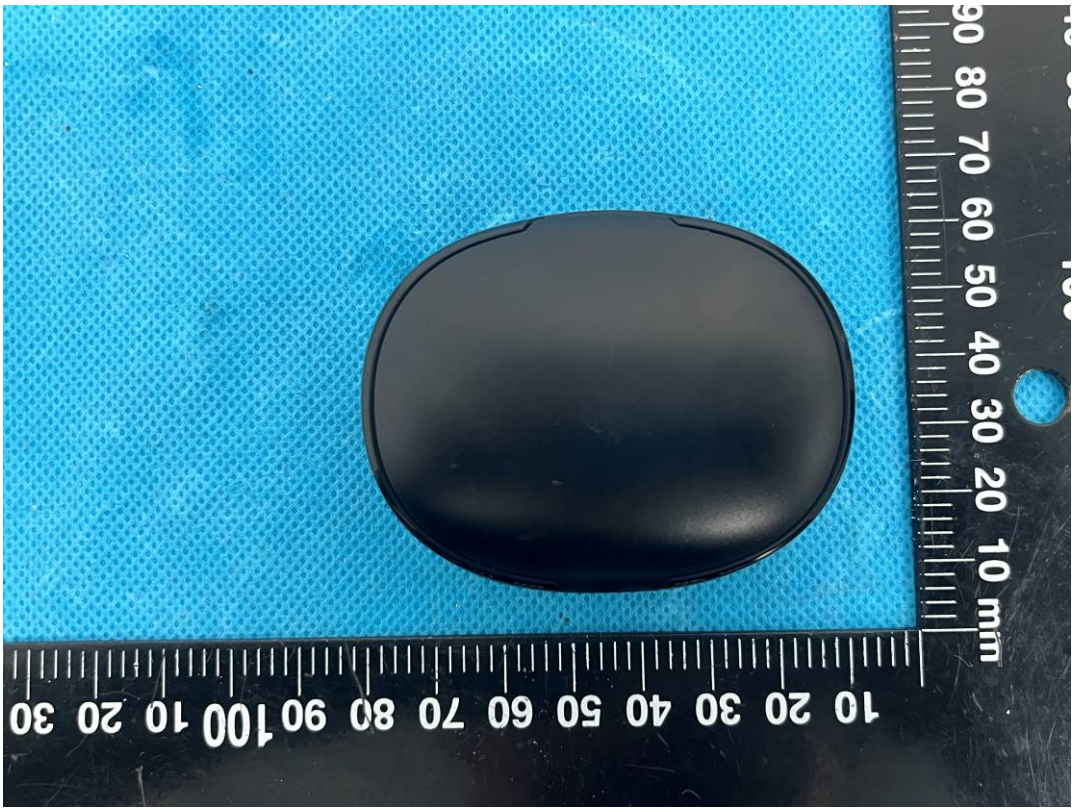
Test Points Location	Test Level							
	-2 kV	+2 kV	-4 kV	+4 kV	-6 kV	+6 kV	-8 kV	+8 kV
Front Side	A	A	A	A	/	/	/	/
Back Side	A	A	A	A	/	/	/	/
Left Side	A	A	A	A	/	/	/	/
Right Side	A	A	A	A	/	/	/	/
Required Performance Criteria:B Description of Performance reduction: N/A								

ESD Location Photo

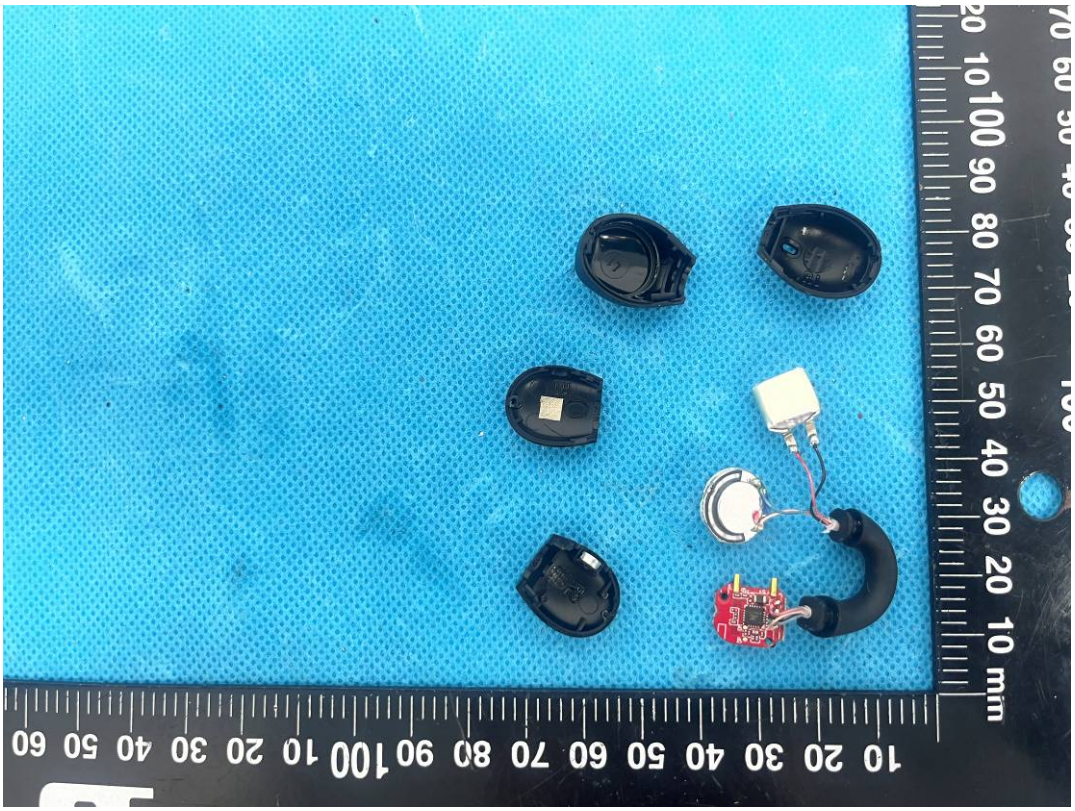


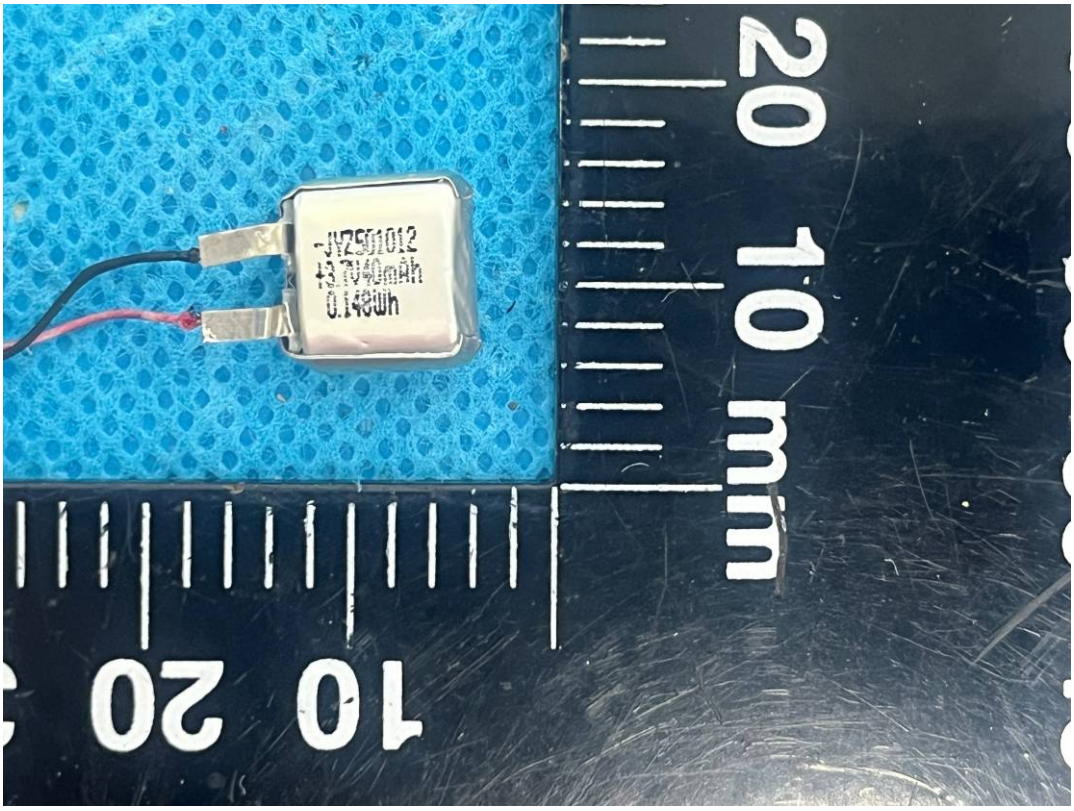
Air Discharge: → Direct Contact: →

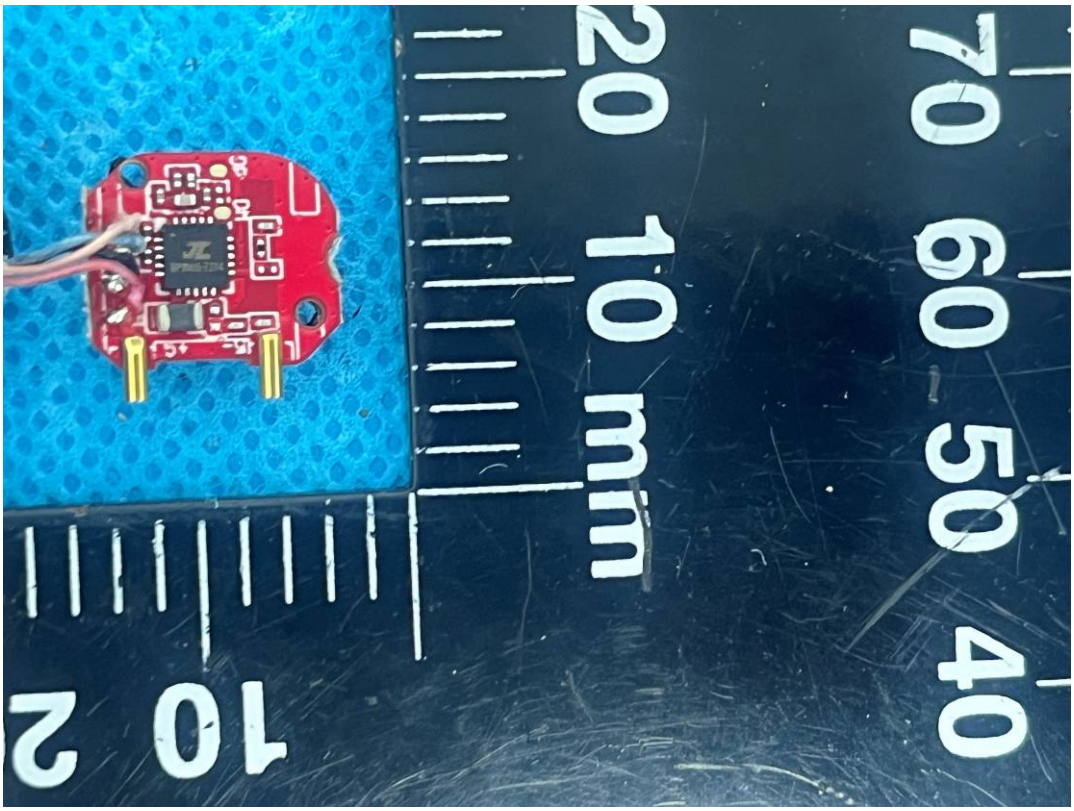
EXHIBITA - EUT PHOTOGRAPHS

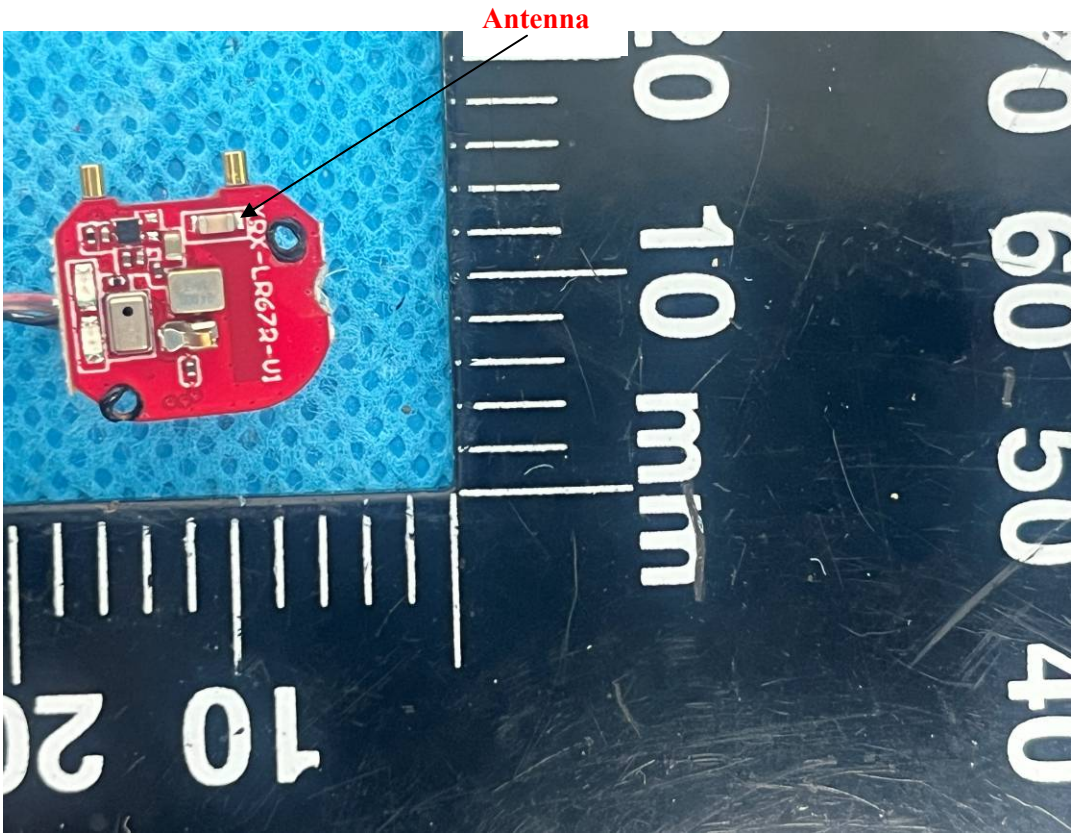


Right Unit

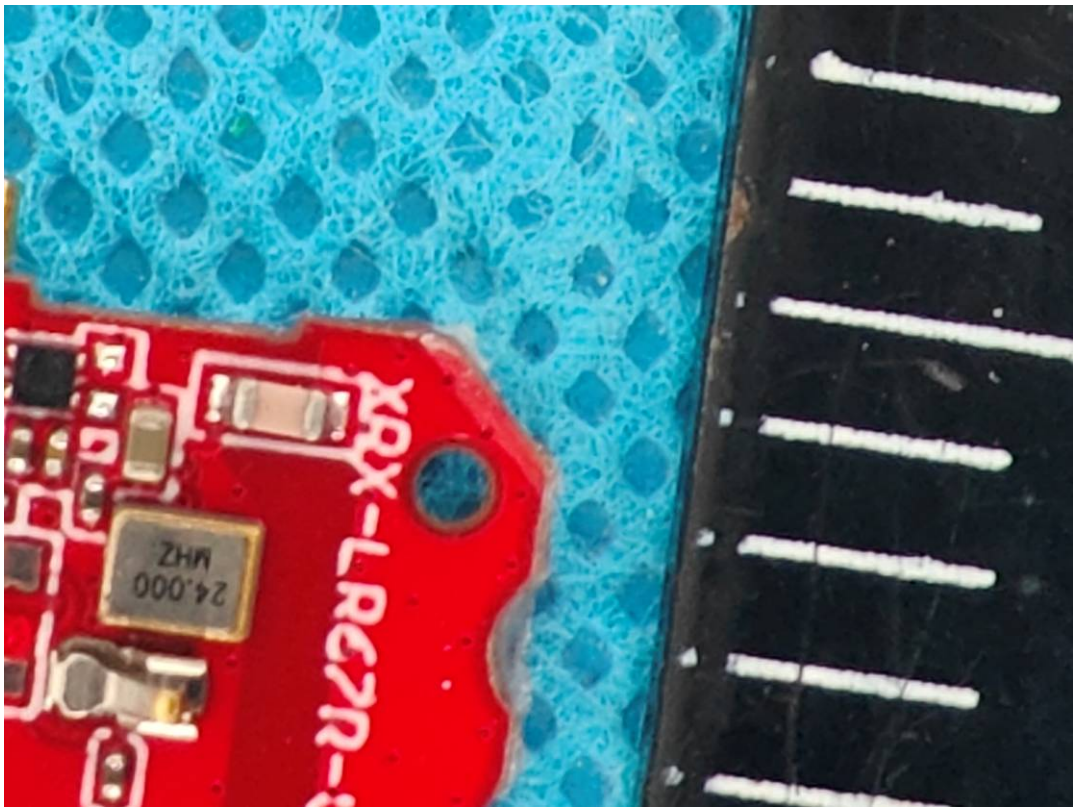



20
10 mm
10 20

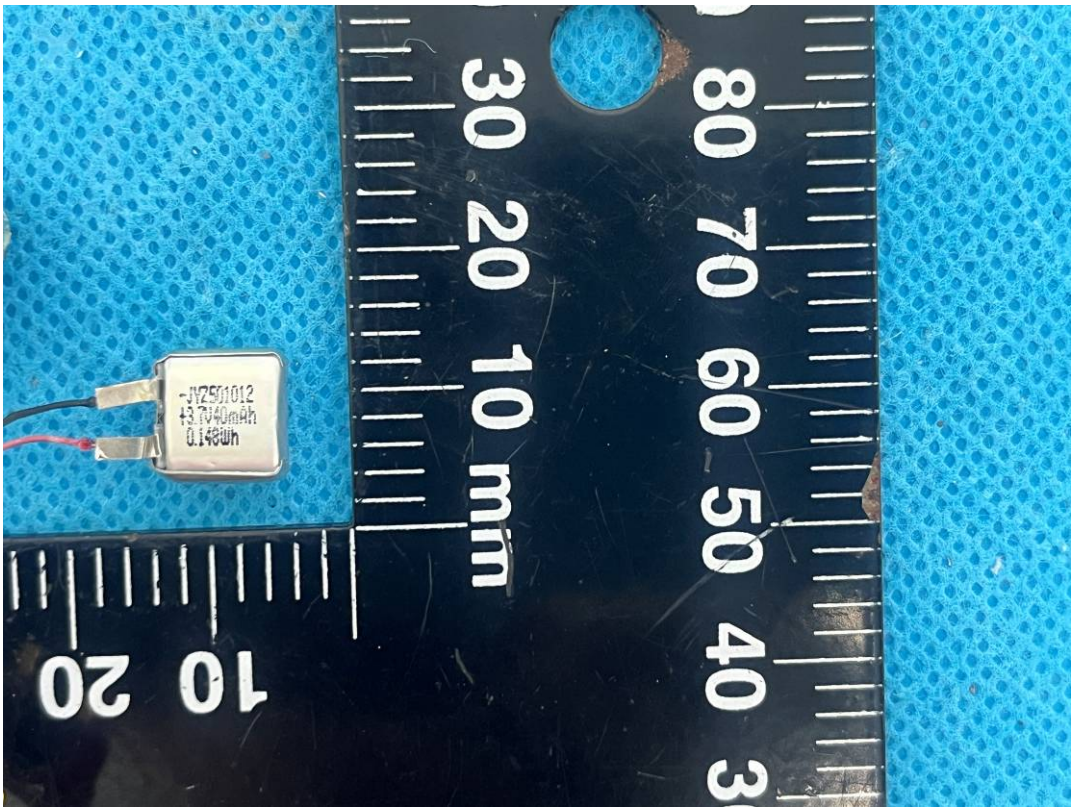

20
10 mm
70
60
50
40
10 2



Antenna



Left Unit



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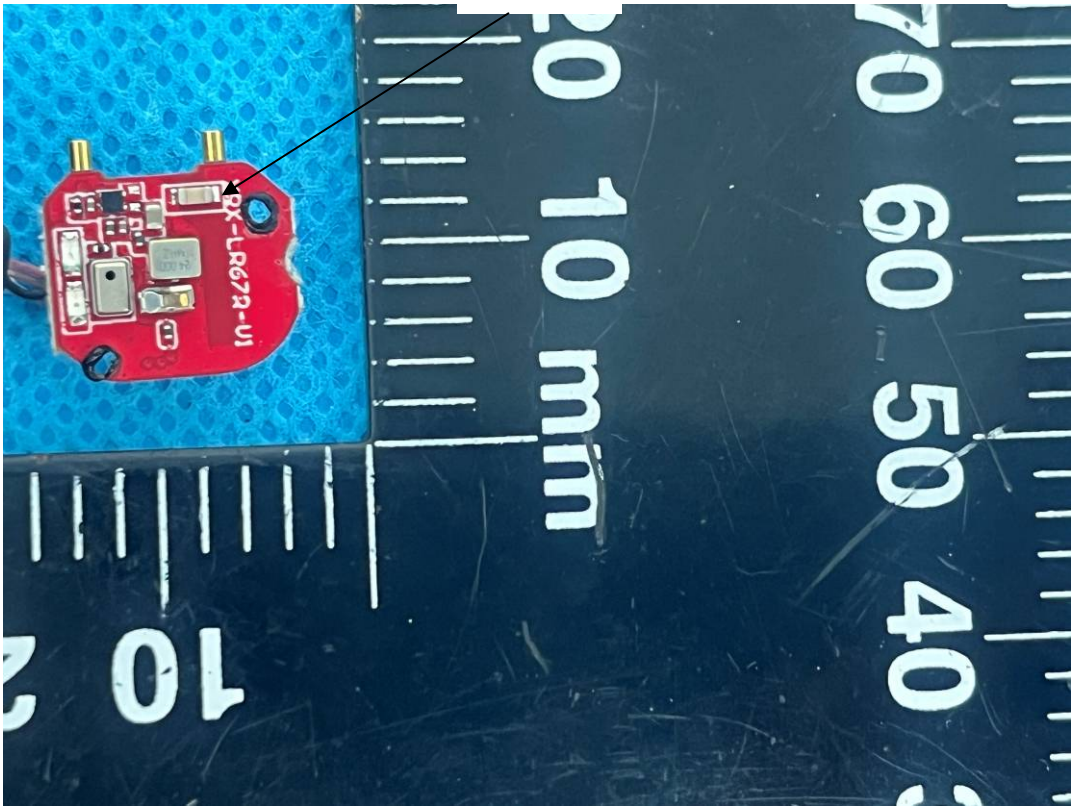
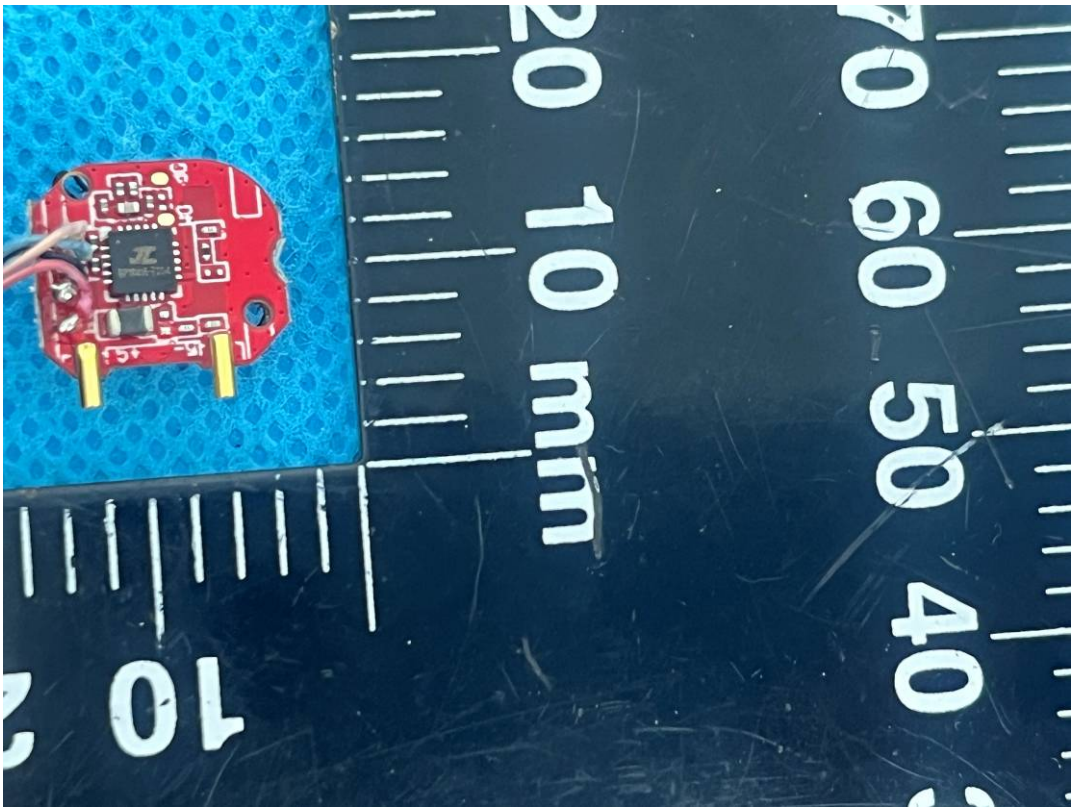
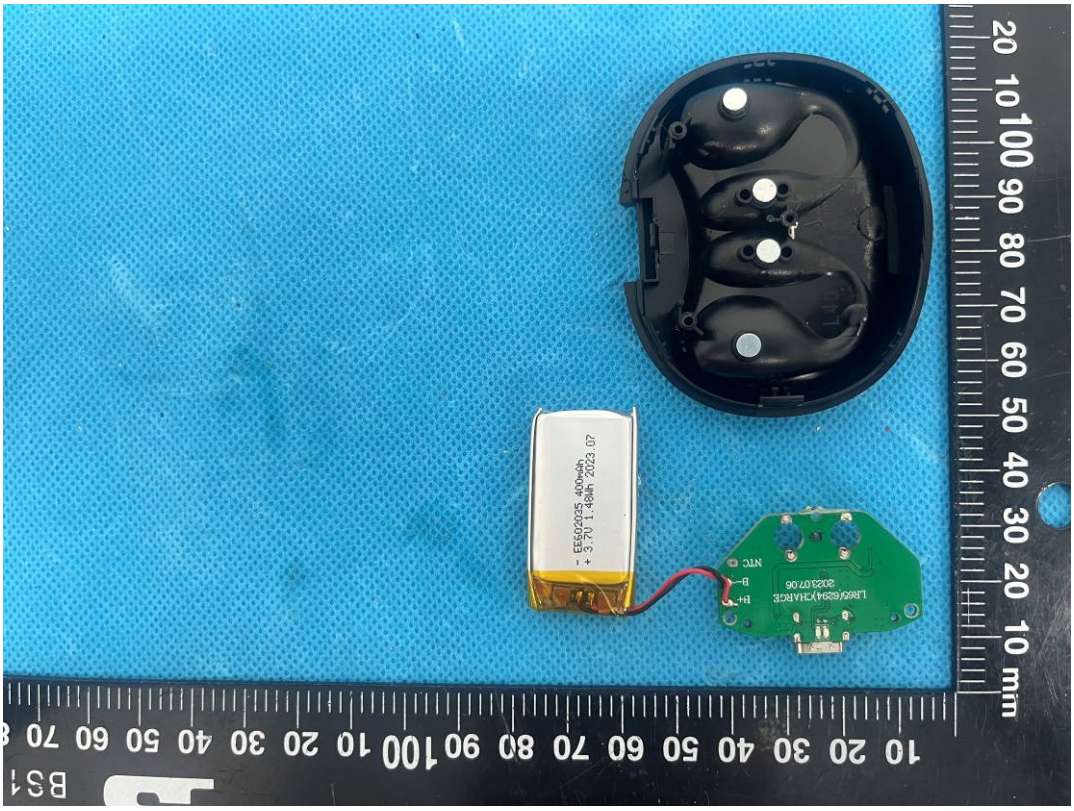


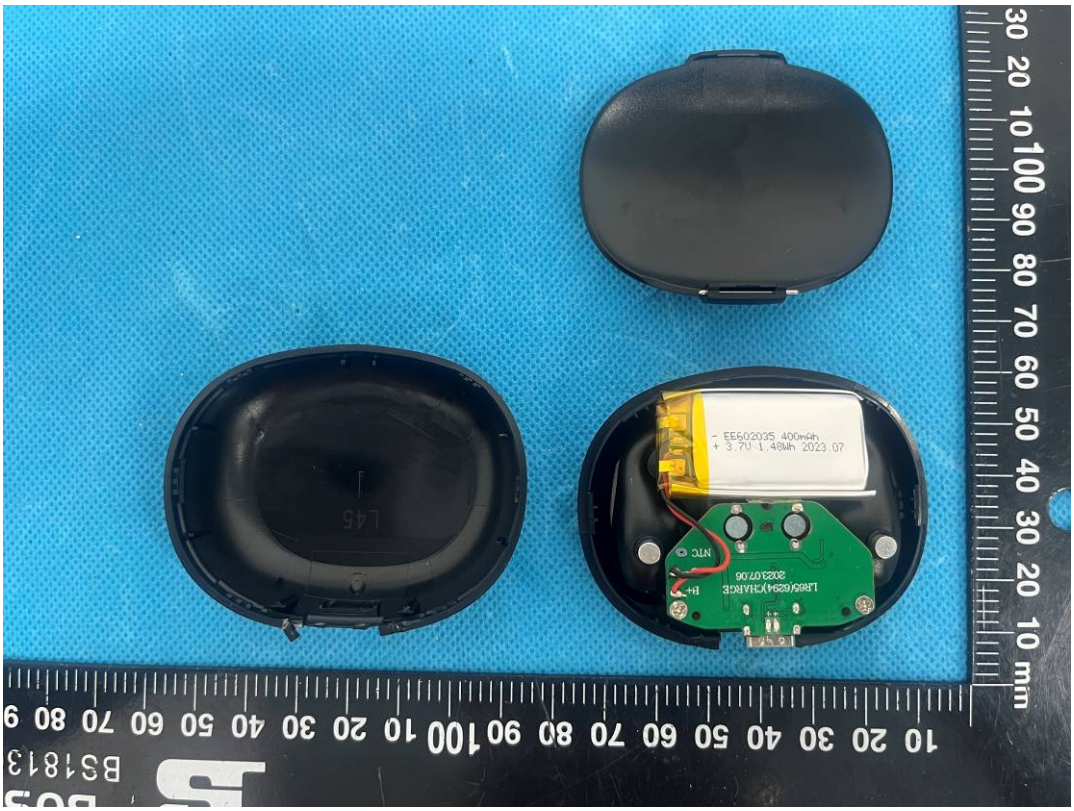


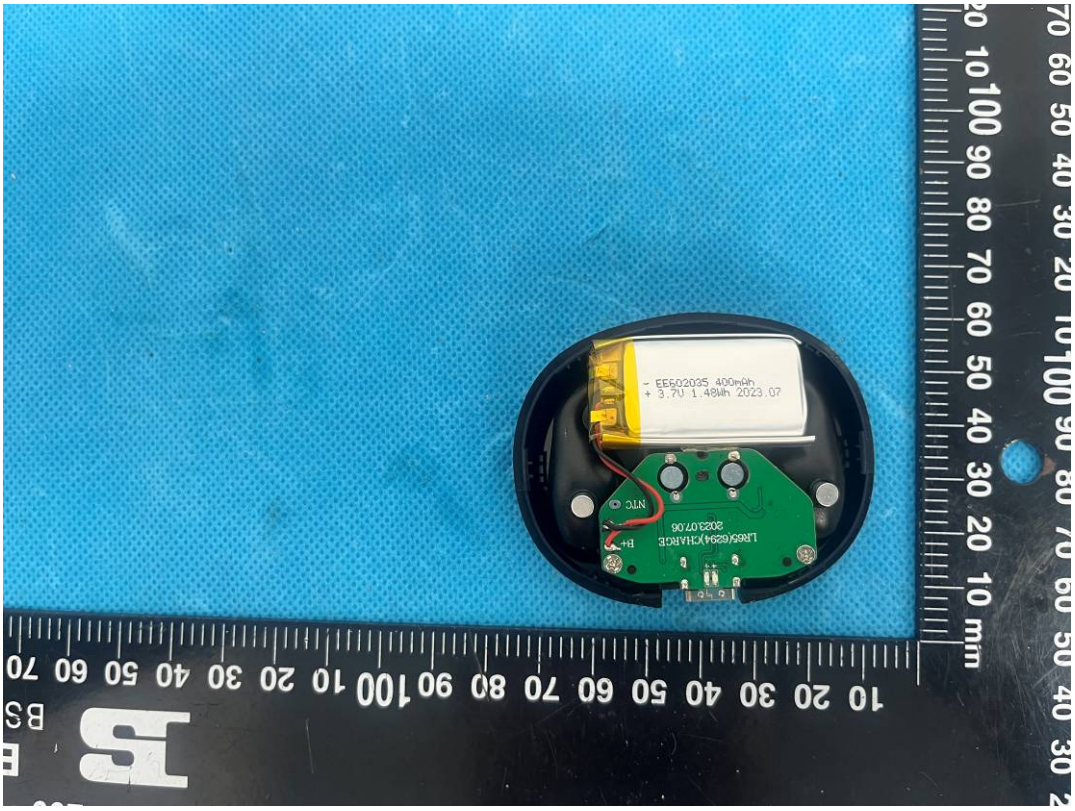
Antenna

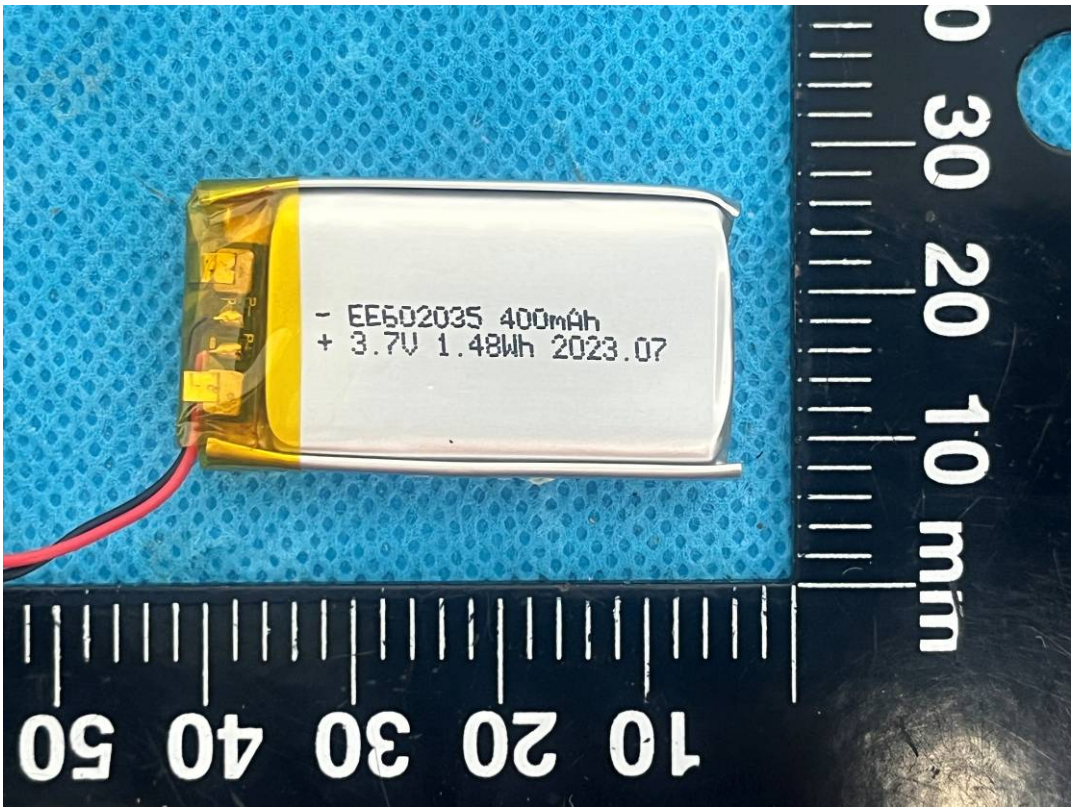
Port

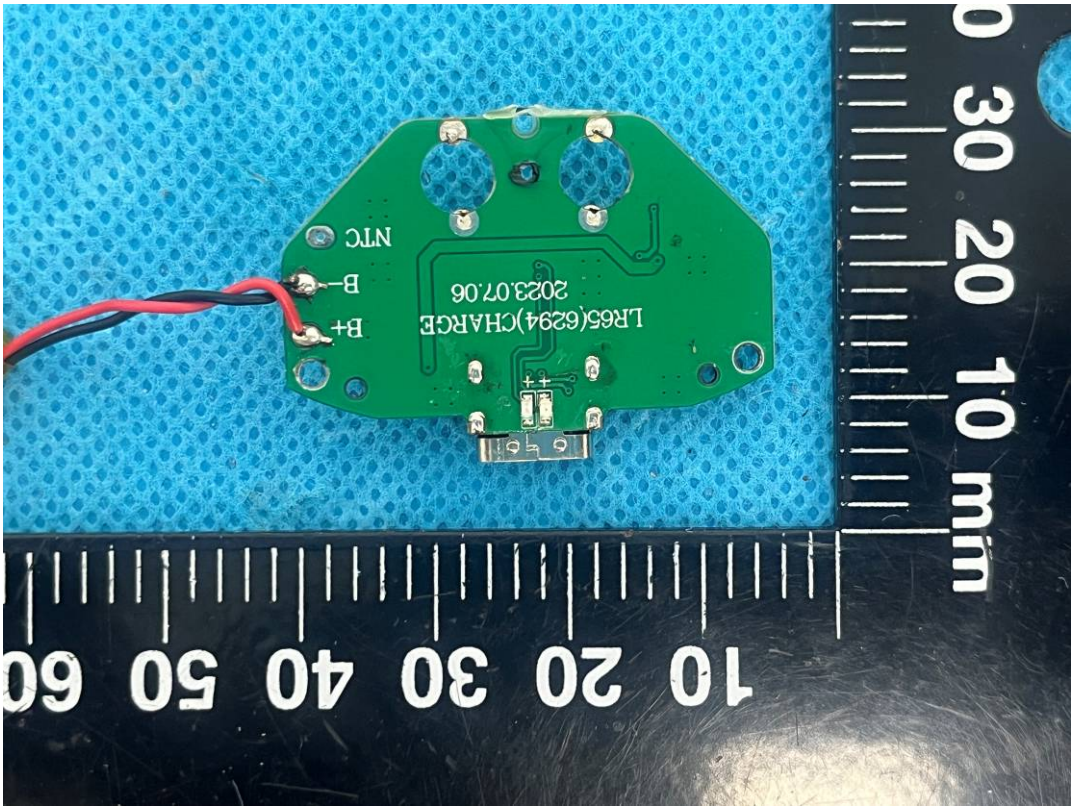
Uncover


EE602035 400mAh
3.7V 1.48Wh 2023.07
NTC
B-
B+
LR65(6234)CHARGE
20230706


EE602035 400mAh
3.7V 1.48Wh 2023.07
NTC
B+
LR65(6234)CHARGE
20230706


- EE502035 400mAh
+ 3.7V 1.48Wh 2023.07


- EE502035 400mAh
+ 3.7V 1.48Wh 2023.07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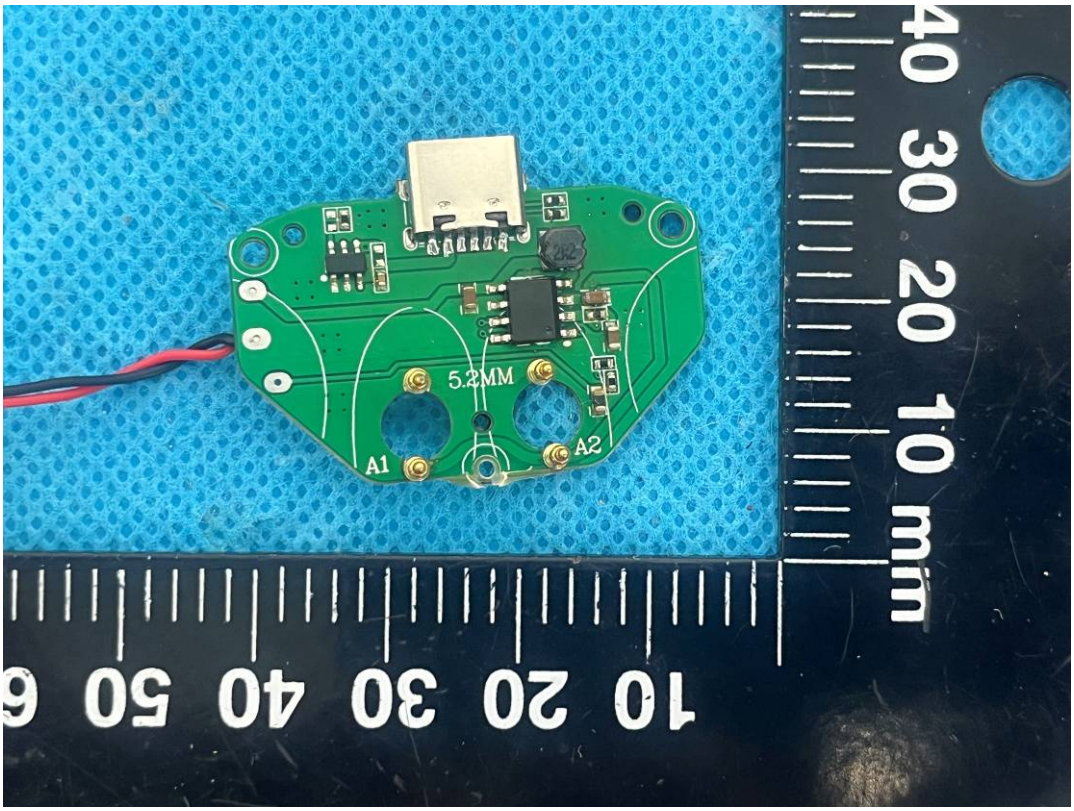
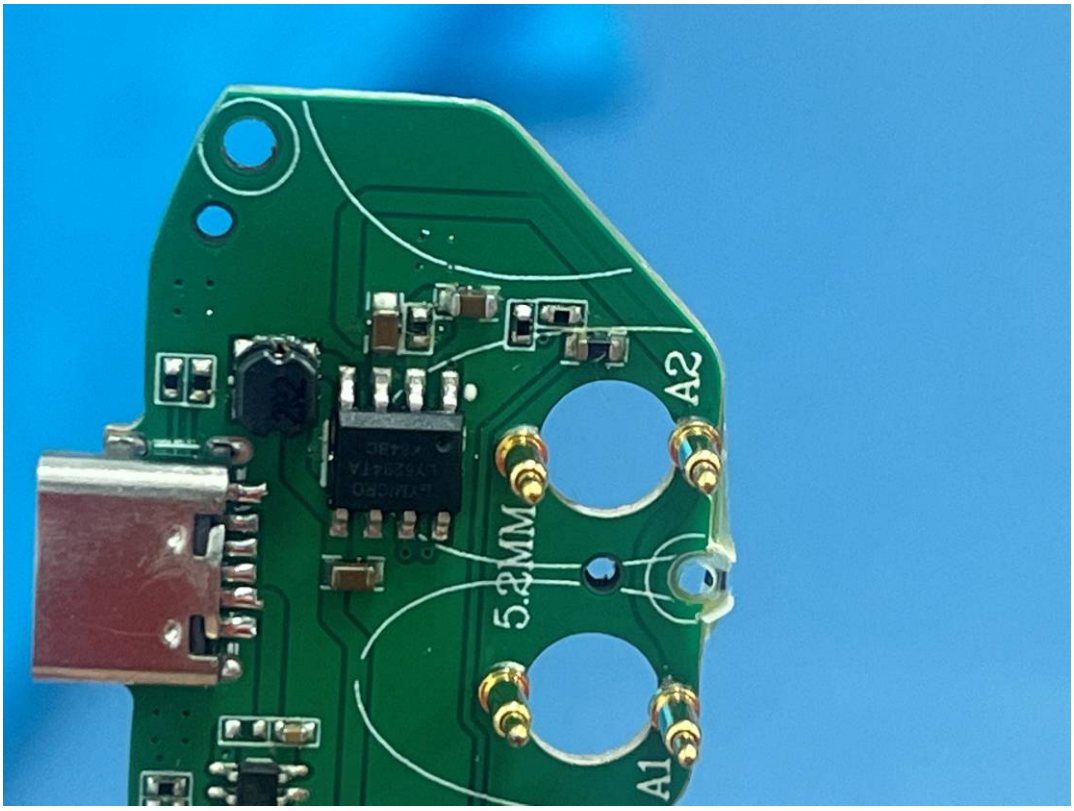
B-
B+
LR65(6294)CHARGE
2023.07.06
0 30 20 10 mm
10 20 30 40 50 60

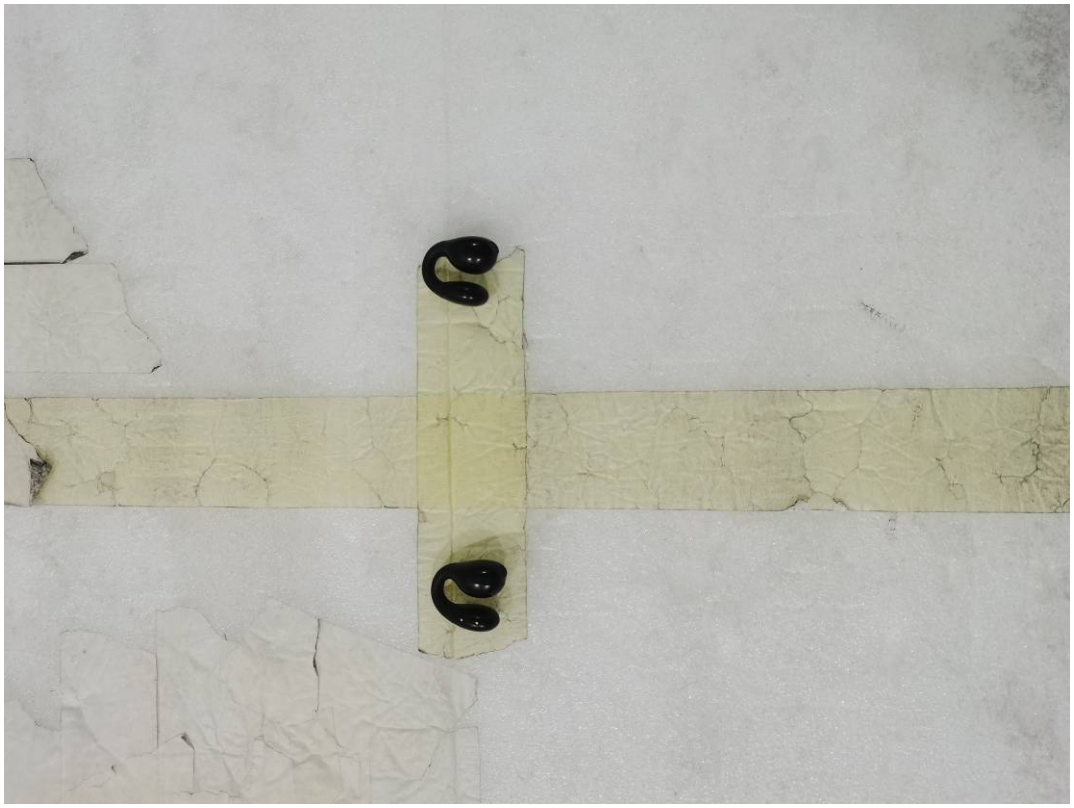

5.2MM
A1
A2
40 30 20 10 mm
10 20 30 40 50 6


5.2MM
A2
A1

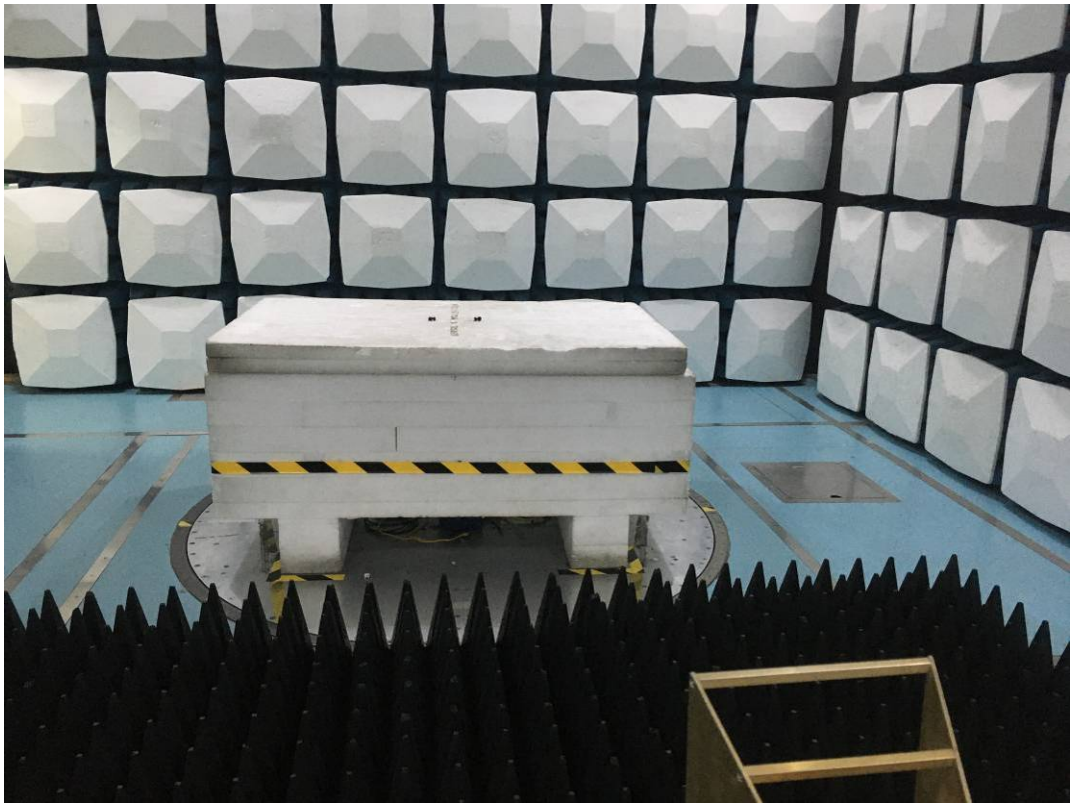
EXHIBITB - TEST SETUP PHOTOGRAPHS

RE

RE Below 1GHz View



RE Above 1GHz View



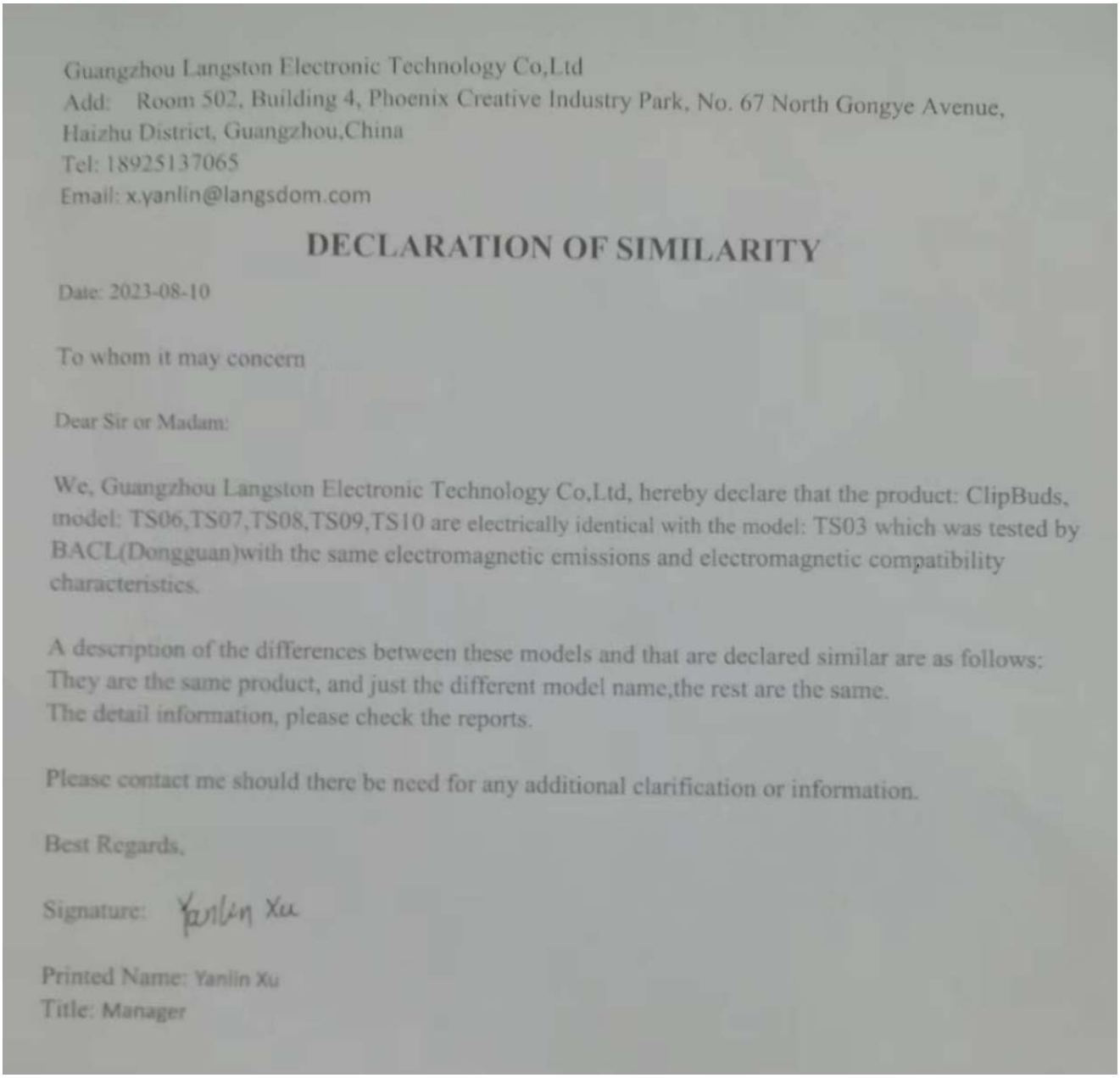
RS

Test Setup Photo View

ESD

Test Setup Photo View

DECLARATION OF SIMILARITY LETTER



Guangzhou Langston Electronic Technology Co,Ltd
Add: Room 502, Building 4, Phoenix Creative Industry Park, No. 67 North Gongye Avenue, Haizhu District, Guangzhou,China
Tel: 18925137065
Email: x.yanlin@langsdom.com

DECLARATION OF SIMILARITY

Date: 2023-08-10

To whom it may concern

Dear Sir or Madam:

We, Guangzhou Langston Electronic Technology Co,Ltd, hereby declare that the product: ClipBuds, model: TS06,TS07,TS08,TS09,TS10 are electrically identical with the model: TS03 which was tested by BACL(Dongguan)with the same electromagnetic emissions and electromagnetic compatibility characteristics.

A description of the differences between these models and that are declared similar are as follows:
They are the same product, and just the different model name,the rest are the same.
The detail information, please check the reports.

Please contact me should there be need for any additional clarification or information.

Best Regards,

Signature: Yanlin Xu

Printed Name: Yanlin Xu
Title: Manager

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

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

TEST REPORT

For

Guangzhou Langston Electronic Technology Co,Ltd

Room 502, Building 4, Phoenix Creative Industry Park, No. 67 North Gongye Avenue, Haizhu District, Guangzhou

Tested Model: TS03
Multiple Models: TS06,TS07,TS08,TS09,TS10

Report Type: Original Report	**Product Type:** ClipBuds
Report Number:	SSH1230804-45338E-22
Report Date:	2023/9/5
Reviewed By:	Rocky Xiao RF Engineer
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Dongguan) No.12, Pulong East 1st Road, Tangxia Town, Dongguan, Guangdong, China Tel: +86-769-86858888 Fax: +86-769-86858891 www.baclcorp.com.cn

TABLE OF CONTENTS

DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
1.0	SSH1230804-45338E-22	Original Report	2023/9/5

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

EUT Name:	ClipBuds
EUT Model:	TS03
Multiple Model:	TS06,TS07,TS08,TS09,TS10
Model Difference:	Please refer to the DoS
Rated Input Voltage:	DC 5V from charging case or 3.7V from battery
Serial Number:	29FJ-1
EUT Received Date:	2023/8/7
EUT Received Status:	Good

Technical Specification

Operation Frequency Range (MHz):	2402-2480
Max. RF Output Power (EIRP) (dBm):	1.45
Antenna Gain (dBi)▲:	3
Modulation Type:	GFSK, π/4-DQPSK

Objective

This report is prepared on behalf of ***Guangzhou Langston Electronic Technology Co,Ltd*** in accordance with 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.

The objective is to determine the compliance of EUT with: ETSI EN 300 328 V2.2.2 (2019-07).

Test Methodology

All measurements contained in this report were conducted with ETSI EN 300 328 V2.2.2 (2019-07).

Measurement Uncertainty

Parameter	Flab	Maximum allow uncertainty
Occupied Channel Bandwidth	±5 %	±5 %
RF output power, conducted	±0.61dB	±1,5 dB
Power Spectral Density, conducted	±3 dB	±3 dB
Unwanted Emissions, conducted	±2.47dB	±3 dB
All emissions, radiated	±3.62dB	±6 dB
Temperature	±1℃	±3℃
Supply voltages	±0.4%	±3 %
Time	1%	±5 %

Note: Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty. The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.

Declarations

BACL is not responsible for the authenticity of any test data provided by the applicant. Data included from the applicant that may affect test results are marked with a triangle symbol "▲". Customer model name, addresses, names, trademarks etc. are not considered data.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.

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This report may contain data that are not covered by the accreditation scope and shall be marked with an asterisk "★".

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in engineering mode, which was provided by manufacturer. 79 channels are provided as below table:

Channel	Frequency(MHz)
0	2402
1	2403
…	…
…	…
39	2441
…	…
…	…
77	2479
78	2480

For lowest, middle and highest channel, EUT was tested with channel 0, 39 and 78.

The extreme temperature test conditions which were declared by the manufacturer and the normal conditions are as below:

NT: Normal Temperature +25℃
LT: Low Temperature 0℃
HT: High Temperature +45℃

Note: The Left Unit and Right Unit are same in circuit and RF setting, thus, only one of them (Left Unit) was selected for full test.

EUT Exercise Software

Software " FCC Assist 1.0.2.2▲" was used for setting device works in engineering mode, and the maximum power level was configured as following setting, which was provided by manufacturer▲:

Mode	Channel	Frequency (MHz)	Power Level
GFSK	Low	2402	10
	Middle	2441	10
	High	2480	10
π/4-DQPSK	Low	2402	10
	Middle	2441	10
	High	2480	10

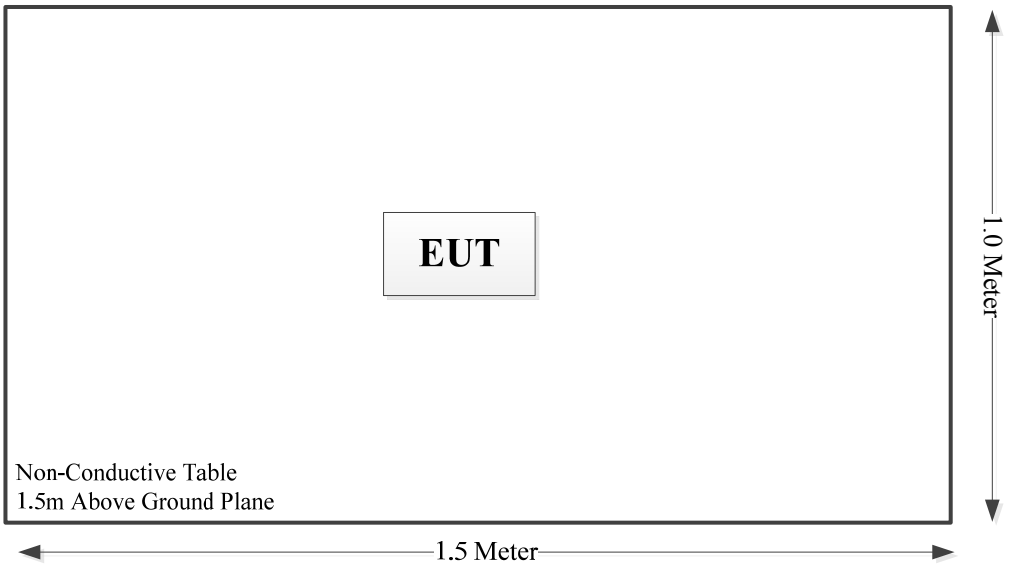
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
/	/	/	/

Support Cable List and Details

Cable Description	Shielding Cable	Ferrite Core	Length (m)	From Port	To
/	/	/	/	/	/

Block Diagram of Test Setup



Test Equipment List

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated emissions below 1GHz					
Sunol Sciences	Hybrid Antenna	JB3	A060611-2	2020/8/25	2023/8/24
Narda	Attenuator	757C-6dB	34010	2023/8/1	2024/7/31
Unknown	Coaxial Cable	C-NJNJ-50	C-1000-01	2023/8/1	2024/7/31
Unknown	Coaxial Cable	C-NJNJ-50	C-0400-04	2023/8/1	2024/7/31
Unknown	Coaxial Cable	C-NJNJ-50	C-0530-01	2023/8/1	2024/7/31
Sonoma	Amplifier	310N	185914	2023/8/1	2024/7/31
R&S	EMI Test Receiver	ESCI	100224	2022/11/18	2023/11/17
EMCO	Adjustable Dipole Antenna	3121C	9109-753	N/A	N/A
Unknown	Coaxial Cable	C-NJNJ-50	C-0200-02	2022/9/4	2023/9/3
Agilent	Signal Generator	E8247C	MY43321350	2022/11/18	2023/11/17
Radiated emissions above 1GHz					
AH	Horn Antenna	SAS-571	1394	2023/2/22	2026/2/21
ETS-Lindgren	Horn Antenna	3115	000 527 35	2021/10/12	2024/10/11
HUBER+SUHNER	Coaxial Cable	SUCOFLEX 126EA	MY369/26/26EA	2022/10/13	2023/10/13
Unknown	Coaxial Cable	C-NJNJ-50	C-0200-02	2022/9/4	2023/9/3
AH	Preamplifier	PAM-0118P	530	2023/11/18	2024/11/17
R&S	Spectrum Analyzer	FSP 38	100478	2022/11/22	2023/11/21
E-Microwave	Band Rejection Filter	OBSF-2400-2483.5-S	OE01601525	2023/6/16	2024/6/15
Agilent	Signal Generator	E8247C	MY43321350	2022/11/18	2023/11/17
RF conducted					
R&S	Spectrum Analyzer	FSU 26	200160/026	2022/11/16	2023/11/15
Agilent	USB Wideband Power Sensor	U2021XA	MY54080014	2022/11/22	2023/11/21
yzjingcheng	Coaxial Cable	KTRFBU-141-50	41005011	2022/9/4	2023/9/3
E-Microwave	Coaxial Attenuators	EMCA10-5RN-6	OE01203239	2022/9/4	2023/9/3
R&S	Wideband Radio Communication Tester	CMW500	149216	2022/11/18	2023/11/17
BACL	TEMP&HUMI Test Chamber	BTH-150-40	30173	2022/11/16	2023/11/15
Agilent	MXG Vector Signal Generator	N5182B	MY51350142	2022/11/18	2023/11/17
Keysight	MXA Signal Analyzer	N9020A	MY48490137	2022/11/16	2023/11/15
Tonscend	RF Control Unit	JS0806-2	19G8060171	2022/11/16	2023/11/15

* Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Environmental Conditions

Test Site:	Radiated emissions below 1GHz	Radiated emissions above 1GHz	RF conducted
Temperature:	26.8 ℃	25.8 ℃	25.1℃
Relative Humidity:	47.0 %	37.0 %	46%
ATM Pressure:	99.7 kPa	100.0 kPa	100.2kPa
Tester:	Charlwin Zhang	Leo Yuan	Jojo Zhou
Test Date:	2023/8/15	2023/8/26	2023/8/30

SUMMARY OF TEST RESULTS

SN	Rule and Clause	Description of Test	Test Result
1	EN 300 328 Clause 4.3.1.2	RF output power	Compliant
2	EN 300 328 Clause 4.3.1.3	Duty Cycle, Tx-sequence, Tx-gap	Not applicable*
3	EN 300 328 Clause 4.3.1.4	Accumulated Transmit Time, Frequency Occupation and Hopping Sequence	Compliant
4	EN 300 328 Clause 4.3.1.5	Hopping Frequency Separation	Compliant
5	EN 300 328 Clause 4.3.1.6	Medium Utilisation (MU) factor	Not applicable*
6	EN 300 328 Clause 4.3.1.7	Adaptivity	Not applicable**
7	EN 300 328 Clause 4.3.1.8	Occupied Channel Bandwidth	Compliant
8	EN 300 328 Clause 4.3.1.9	Transmitter unwanted emissions in the out-of-band domain	Compliant
9	EN 300 328 Clause 4.3.1.10	Transmitter unwanted emissions in the spurious domain	Compliant
10	EN 300 328 Clause 4.3.1.11	Receiver spurious emissions	Compliant
11	EN 300 328 Clause 4.3.1.12	Receiver Blocking	Compliant
12	EN 300 328 Clause 4.3.1.13	Geo-location capability	Not applicable***

Note:
The applicant declared that the equipment is adaptive equipment.
Not applicable*: The test is not applicable for adaptive equipment.
Not applicable**: The test is not applicable for adaptive equipment output power less than10mW.
Not applicable***: The manufacturer declared the device without Geo-location capability.

1 – RF OUTPUT POWER

Applicable Standard

This requirement applies to all types of Frequency Hopping equipment.

The RF output power is defined as the mean equivalent isotropically radiated power (e.i.r.p.) of the equipment during a transmission burst.

Limit

The maximum RF output power for adaptive Frequency Hopping equipment shall be equal to or less than 20 dBm.

The maximum RF output power for non-adaptive Frequency Hopping equipment shall be declared by the manufacturer. See clause 5.4.1 m). The maximum RF output power for this equipment shall be equal to or less than the value declared by the manufacturer. This declared value shall be equal to or less than 20 dBm.

This limit shall apply for any combination of power level and intended antenna assembly.

Test Procedure

The conformance tests for this requirement are defined in ETSI EN 300 328 V2.2.2 (2019-07) clause 5.4.2 and specifically in clause 5.4.2.

Test Data

Test Result: *Compliant. Please refer to following tables.*

Mode	Channel	Conducted output power (dBm)			Result (dBm)			Limit (dBm)
		LT	NT	HT	LT	NT	HT	
GFSK	Hopping	-1.55	-1.72	-1.94	1.45	1.28	1.06	≤ 20
π/4-DQPSK	Hopping	-1.63	-1.80	-2.02	1.37	1.20	0.98	

Note: The antenna gain was added into the result.

3 – ACCUMULATED TRANSMIT TIME, FREQUENCY OCCUPATION AND HOPPING SEQUENCE

Applicable Standard

The Accumulated Transmit Time is the total of the transmitter 'on' times, during an observation period, on a particular hopping frequency.

The Frequency Occupation is the number of times that each hopping frequency is occupied within a given period. A hopping frequency is considered to be occupied when the equipment selects that frequency from the hopping sequence. The equipment may be transmitting, receiving or stay idle during the Dwell Time spent on that hopping frequency.

The Hopping Sequence of frequency hopping equipment is the unrepeated pattern of the hopping frequencies used by the equipment.

Limit

For Non-adaptive frequency hopping systems:

The Accumulated Transmit Time on any hopping frequency shall not be greater than 15 ms within any observation period of 15 ms multiplied by the minimum number of hopping frequencies (N) that have to be used.

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) × 25 %) and 77 % where U is the number of hopping frequencies in use.

The hopping sequence(s) shall contain at least N hopping frequencies where N is either 5 or the result of 15 MHz divided by the minimum Hopping Frequency Separation in MHz, whichever is the greater. According to clause 4.3.1.5.3.1 the minimum Hopping Frequency Separation for non-adaptive equipment is equal to the Occupied Channel Bandwidth with a minimum of 100 kHz.

For adaptive frequency hopping systems:

Adaptive Frequency Hopping equipment shall be capable of operating over a minimum of 70 % of the band specified in table 1.

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.

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) × 25 %) and 77 % where U is the number of hopping frequencies in use.
The hopping sequence(s) shall contain at least N hopping frequencies at all times, where N is either 15 or the result of15 MHz divided by the minimum Hopping Frequency Separation in MHz, whichever is the greater.

Other Requirements:

For non-Adaptive Frequency Hopping equipment, from the N hopping frequencies defined in clause 4.3.1.4.3.1 above, the equipment shall transmit on at least one hopping frequency while other hopping frequencies are blacklisted.

For equipment that blacklists one or more hopping frequencies, these blacklisted frequencies are considered as active transmitting for the calculation of the MU factor of the equipment. See also clause 5.4.2.2.1.3, step 4, first bullet item and clause 5.4.2.2.1.4, step 3, first bullet item, second paragraph.

For Adaptive Frequency Hopping equipment, from the N hopping frequencies defined in clause 4.3.1.4.3.2 above, the equipment shall consider at least one hopping frequency for its transmissions. Providing that there is no interference present on this hopping frequency with a level above the detection threshold defined in clause 4.3.1.7.2.2, point 5 or clause 4.3.1.7.3.2, point 5, then the equipment shall have transmissions on this hopping frequency.

For non-Adaptive Frequency Hopping equipment, when not transmitting on a hopping frequency, the equipment has to occupy that frequency for the duration of the typical dwell time (see also definition for blacklisted frequency in clause 3.1).

For Adaptive Frequency Hopping equipment using LBT based DAA, if a signal is detected during the CCA, the equipment may jump immediately to the next frequency in the hopping sequence (see clause 4.3.1.7.2.2, point 2)provided the limit for maximum dwell time is respected.

Test Procedure

The conformance tests for this requirement are defined in ETSI EN 300 328 V2.2.2 (2019-07) clause 5.4.4. Alternatively, for demonstrating compliance with the Accumulated Transmit Time requirement, the manufacturer may provide a statistical analysis to demonstrate that the requirement can be met with a probability of 95 %. See clause 5.4.1.

For equipment implementing Option 1 in clause 4.3.1.4.3.1 or Option 1 in clause 4.3.1.4.3.2, in case compliance cannot be proven via measurements in clause 5.4.4.2.1, step 5 (as the Frequency Occupation in receive and idle modes cannot be measured), the manufacturer shall provide a statistical analysis to demonstrate compliance with the Frequency Occupation requirement. This statistical analysis may be performed by simulation or mathematical analysis.

For equipment using Option 2 in clause 4.3.1.4.3.1 or Option 2 in clause 4.3.1.4.3.2, the manufacturer shall provide a statistical analysis to demonstrate compliance with this requirement. This statistical analysis may be performed by simulation or mathematical analysis.

Test Data

Test Result: *Compliant. Please refer to following tables.*

Accumulated transmit time

Mode	Channel	Real observed period (s)	Occupancy time for single hop (ms)	Hops in Observed Period	Accumulated transmit time (s)	Limit (s)
2DH5	Low	31.6	3.096	91	0.282	≤ 0.4
	High	31.6	2.952	102	0.301	≤ 0.4
	Note: Observed Period=79*400ms=31.6s					

Frequency occupation

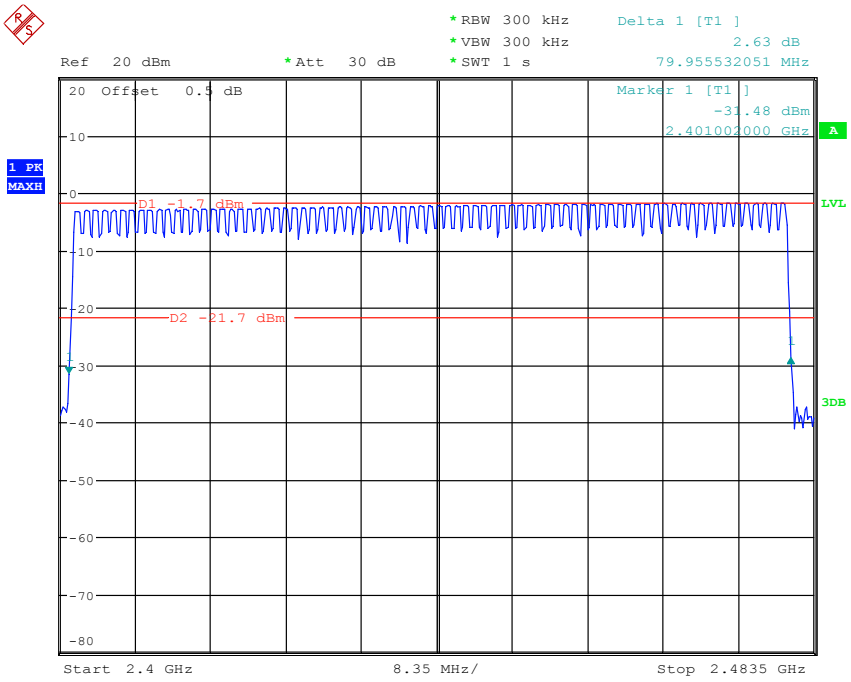
Mode	Channel	Dwell time (ms)	Real Observed Period (ms)	Hops in Observed Period	Limit
2DH5	Low	3.779	1194	2	≥ 1
	High	3.755	1187	2	≥ 1
	Note: Observed Period=Dwell time per hop*79*4				

Hopping sequence

Mode	Frequency Range (MHz)	Number of hopping channel	Limit	20dB Occupied Bandwidth (MHz)	Limit (MHz)
GFSK	2400-2483.5	79	≥15	79.956	≥ 58.45
π/4-DQPSK		79		80.223	

Please refer to following plots:

GFSK



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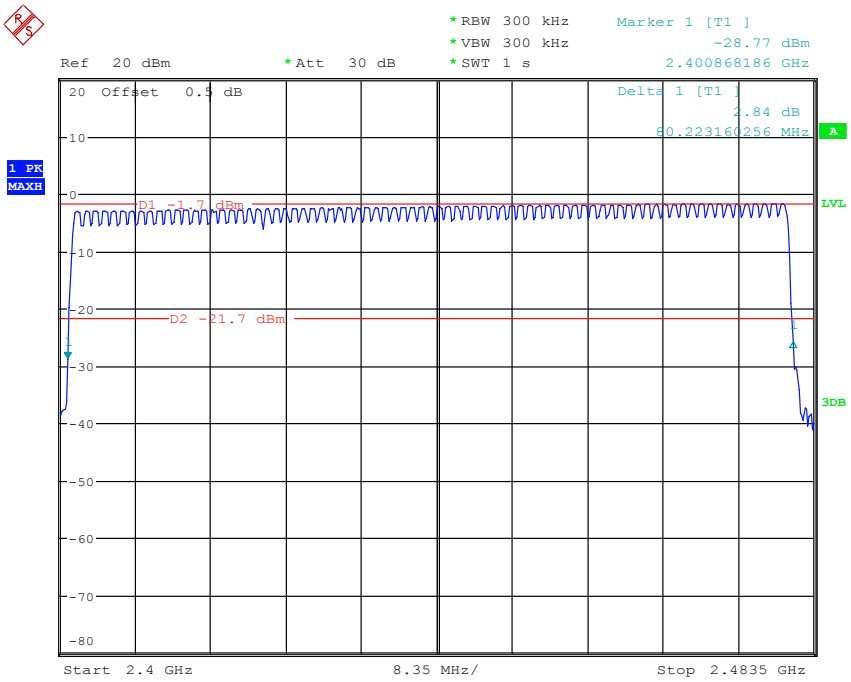
π/4-DQPSK



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4 – HOPPING FREQUENCY SEPARATION

Definition

The Hopping Frequency Separation is the frequency separation between two adjacent hopping frequencies.

Limit

For Non-adaptive frequency hopping systems

For non-adaptive Frequency Hopping equipment, the Hopping Frequency Separation shall be equal or greater than the Occupied Channel Bandwidth (see clause 4.3.1.8), with a minimum separation of 100 kHz.
For equipment with a maximum declared RF Output power level of less than 10 dBm e.i.r.p. or for non-adaptive Frequency Hopping equipment operating in a mode where the RF Output power is less than 10 dBm e.i.r.p. only the minimum Hopping Frequency Separation of 100 kHz applies.

For Adaptive frequency hopping systems

The minimum Hopping Frequency Separation shall be 100 kHz.

Adaptive Frequency Hopping equipment, which for one or more hopping frequencies, has switched to a non-adaptive mode because interference was detected on all these hopping positions with a level above the threshold level defined in clause 4.3.1.7.2.2 or clause 4.3.1.7.3.2, is allowed to continue to operate with a minimum Hopping Frequency Separation of 100 kHz on these hopping frequencies as long as the interference is present on these frequencies. The equipment shall continue to operate in an adaptive mode on other hopping frequencies.

Adaptive Frequency Hopping equipment which decided to operate in a non-adaptive mode on one or more hopping frequencies without the presence of interference, shall comply with the limit in clause 4.3.1.5.3.1 for these hopping frequencies as well as with all other requirements applicable to non-adaptive frequency hopping equipment.

Test Procedure

Option 1, the test procedure shall be as follows:

Step 1:

•The output of the transmitter shall be connected to a spectrum analyzer or equivalent.
•The analyzer shall be set as follows:
- Centre Frequency: Centre of the two adjacent hopping frequencies
- Frequency Span: Sufficient to see the complete power envelope of both hopping frequencies
- RBW: 1 % of the Span
- VBW: 3 × RBW
- Detector Mode: Max Peak
- Trace Mode: Max Hold
- Sweep time: Auto

Step 2:

•Wait for the trace to stabilize.

•Use the marker function of the analyser to define the frequencies corresponding to the lower -20 dBr point and the upper -20 dBr point for both hopping frequencies F1 and F2. This will result in $F1_L$ and $F1_H$ for hopping frequency F1 and in $F2_L$ and $F2_H$ for hopping frequency F2. These values shall be recorded in the report.

Step 3:

•Calculate the centre frequencies $F1_C$ and $F2_C$ for both hopping frequencies using the formulas below. These values shall be recorded in the report.

$$F1_C = \frac{F1_L + F1_H}{2} \quad F2_C = \frac{F2_L + F2_H}{2}$$

•Calculate the -20 dBr channel bandwidth (BW_{CHAN}) using the formula below. This value shall be recorded in the report.

$$BW_{CHAN} = F1_H - F1_L$$

•Calculate the Hopping Frequency Separation (F_{HS}) using the formula below. This value shall be recorded in the report.

$$F_{HS} = F2_C - F1_C$$

•Compare the measured Hopping Frequency Separation with the limit defined in clause 4.3.1.5.3. In addition, for non-Adaptive Frequency Hopping equipment, the Hopping Frequency Separation shall be equal to or greater than the Occupied Channel Bandwidth as defined in clause 4.3.1.8 or:

$$F_{HS} \geq \text{Occupied Channel Bandwidth}$$

•See figure 4:

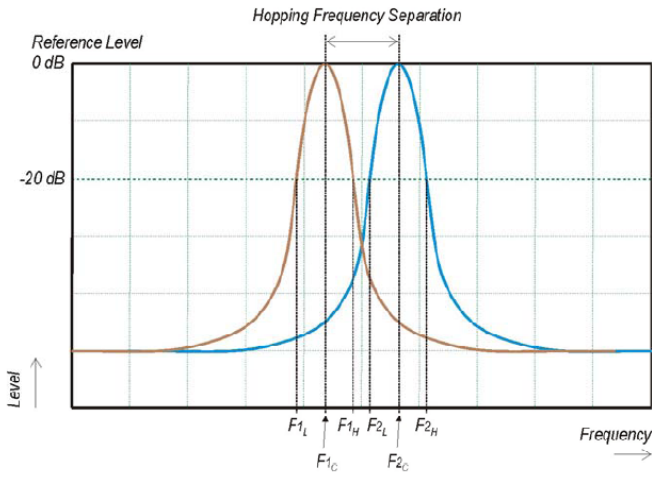


Figure 4: Hopping Frequency Separation

For adaptive systems, in case of overlapping channels which will prevent the definition of the -20 dBr reference pointsF1_H and F2_L, a higher reference level (e.g. -10 dBr or - 6 dBr) may be chosen to define the reference points F1_L; F1_H;F2_L and F2_H.

Alternatively, special test software may be used to:

•force the UUT to hop or transmit on a single Hopping Frequency by which the -20 dBr reference points can be measured separately for the two adjacent Hopping Frequencies; and/or;

•force the UUT to operate without modulation by which the centre frequencies F1C and F2C can be measured directly.

The method used to measure the Hopping Frequency Separation shall be documented in the test report.

Option 2, the test procedure shall be as follows:

Step 1:

•The output of the transmitter shall be connected to a spectrum analyzer or equivalent.
•The analyzer shall be set as follows:
- Centre Frequency: Centre of the two adjacent hopping frequencies
- Frequency Span: Sufficient to see the complete power envelope of both hopping frequencies
- RBW: 1 % of the Span
- VBW: 3 × RBW
- Detector Mode: Max Peak
- Trace Mode: Max Hold
- Sweep Time: Auto

Step 2:

•Wait for the trace to stabilize.
•Use the marker-delta function to determine the Hopping Frequency Separation between the centres of the two adjacent hopping frequencies (e.g. by identifying peaks or notches at the centre of the power envelope for the two adjacent signals). This value shall be compared with the limits defined in clause 4.3.1.5.3 and shall be recorded in the test report.

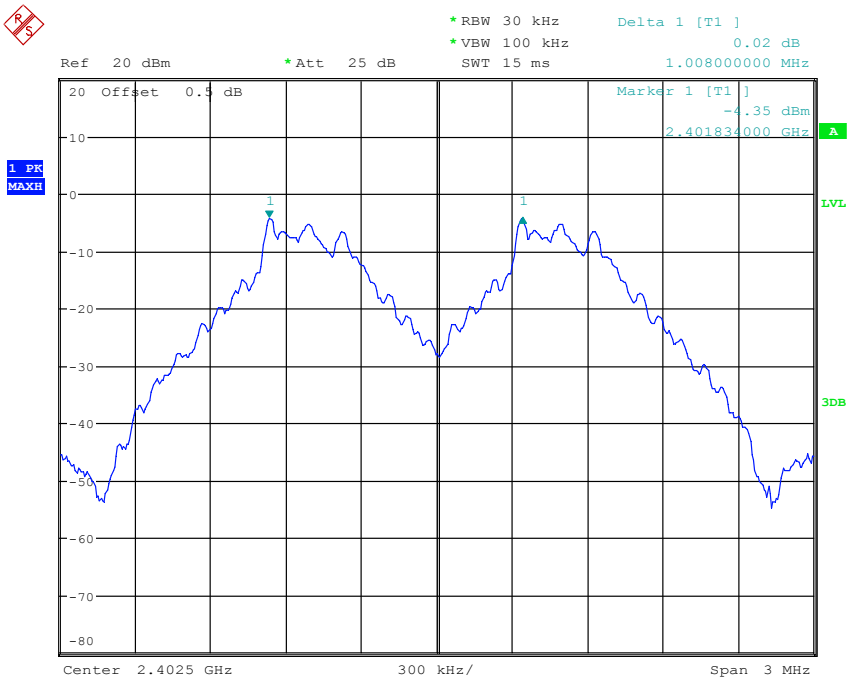
Test Data

Test Result: *Compliant. Please refer to following tables.*

Mode	Channel	Channel frequency (MHz)	Result (MHz)	Limit (MHz)
GFSK	Low	2402-2403	1.008	≥ 0.1
	Middle	2441-2442	1.002	
	High	2480-2479	1.002	
π/4-DQPSK	Low	2402-2403	1.008	
	Middle	2441-2442	1.002	
	High	2480-2479	1.002	

Please refer to following plots

GFSK-Low



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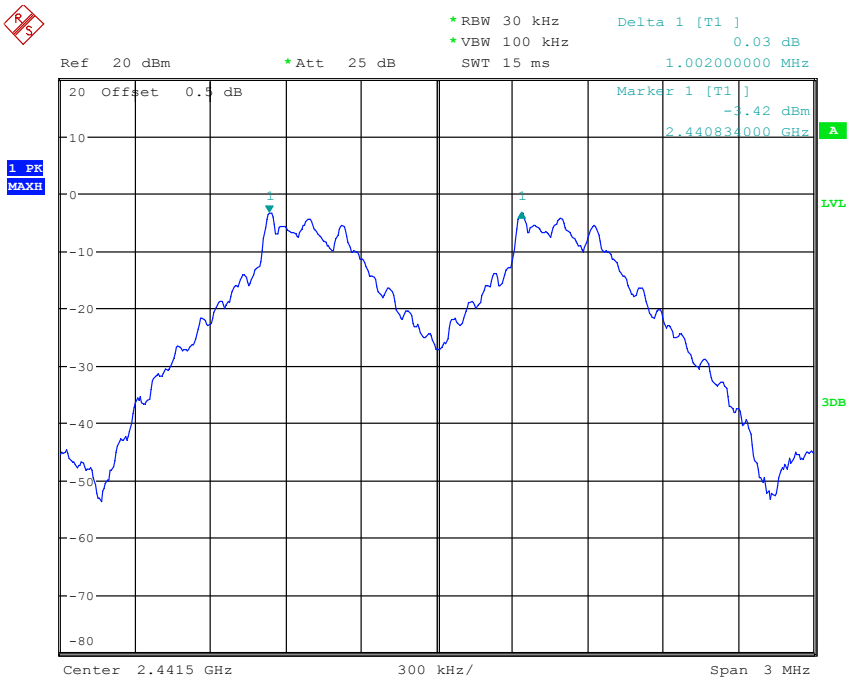
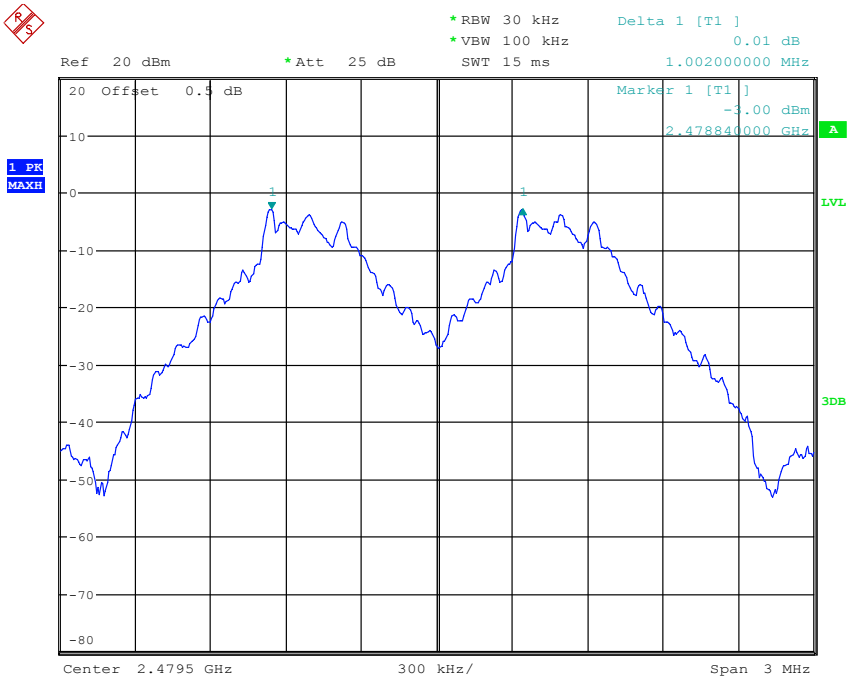
GFSK-Middle



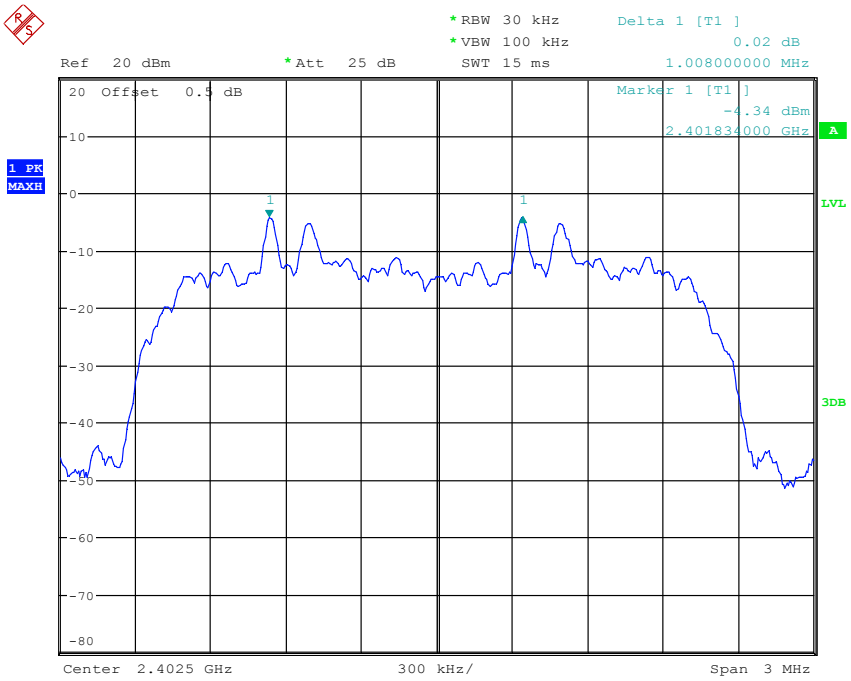
Date: 30.AUG.2023 10:37:17

GFSK-High



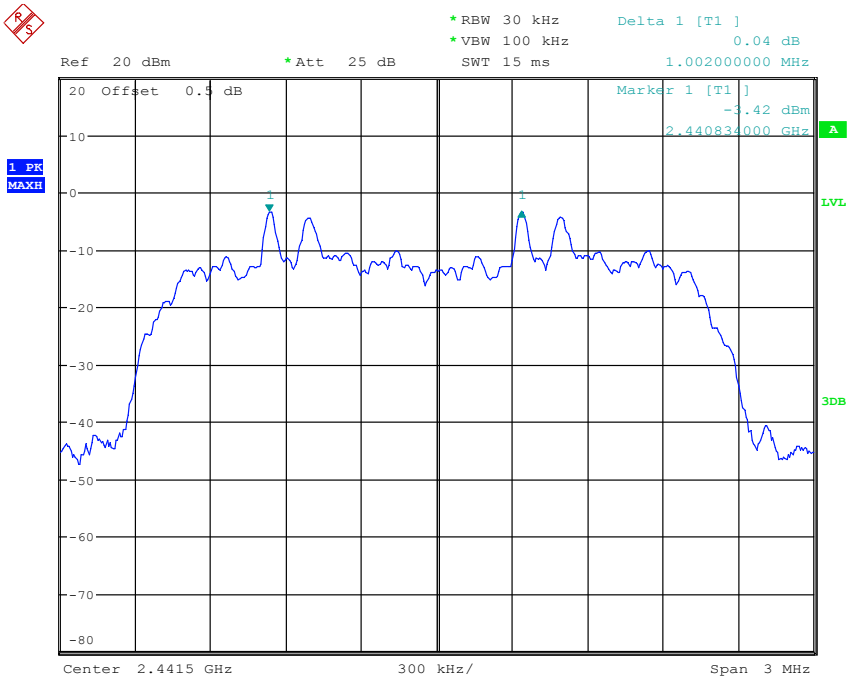
Date: 30.AUG.2023 10:38:43

π/4-DQPSK-Low



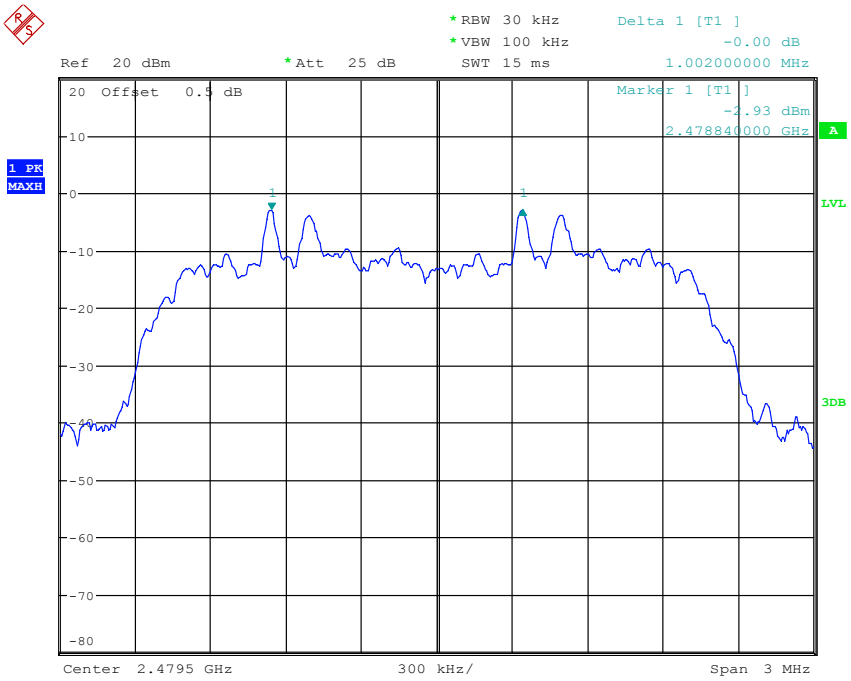
Date: 30.AUG.2023 10:40:18

π/4-DQPSK-Middle



Date: 30.AUG.2023 10:41:50

π/4-DQPSK-High



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7 – OCCUPIED CHANNEL BANDWIDTH

Definition

The Occupied Channel Bandwidth is the bandwidth that contains 99 % of the power of the signal.

Limit

The Occupied Channel Bandwidth for each hopping frequency shall fall completely within the band given in clause 1.

For non-adaptive Frequency Hopping 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 the Nominal Channel Bandwidth declared by the supplier. See clause 5.3.1 j). This declared value shall not be greater than 5 MHz.

Test Procedure

The measurement procedure shall be as follows:

Step 1:

Connect the UUT to the spectrum analyser and use the following settings:

- Centre Frequency: The centre frequency of the channel under test
- Resolution BW: ~ 1 % of the span without going below 1 %
- Video BW: 3 × RBW
- Frequency Span:2 × Nominal Channel Bandwidth
- Detector Mode: RMS
- Trace Mode: Max Hold
- Sweep time: 1 s

Step 2:

Wait for the trace to stabilize.
Find the peak value of the trace and place the analyser marker on this peak.

Step 3:

Use the 99 % bandwidth function of the spectrum analyser to measure the Occupied Channel Bandwidth of the UUT. This value shall be recorded.

NOTE: Make sure that the power envelope is sufficiently above the noise floor of the analyser to avoid the noise signals left and right from the power envelope being taken into account by this measurement.

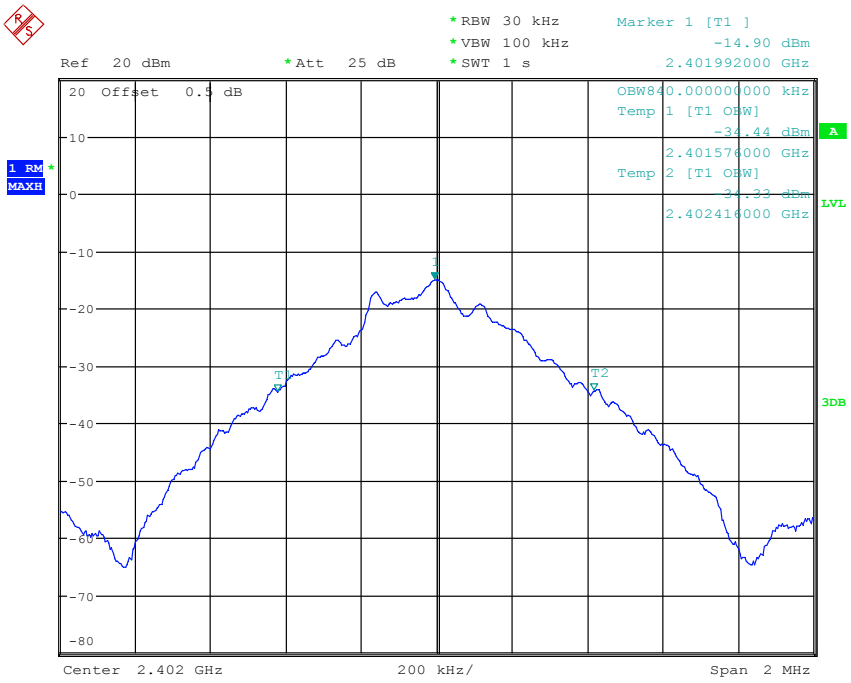
Test Data

Test Result: *Compliant. Please refer to following tables.*

Mode	Channel	Frequency (MHz)	Result (MHz)
GFSK	Low	2402	0.840
	High	2480	0.840
π/4-DQPSK	Low	2402	1.156
	High	2480	1.168

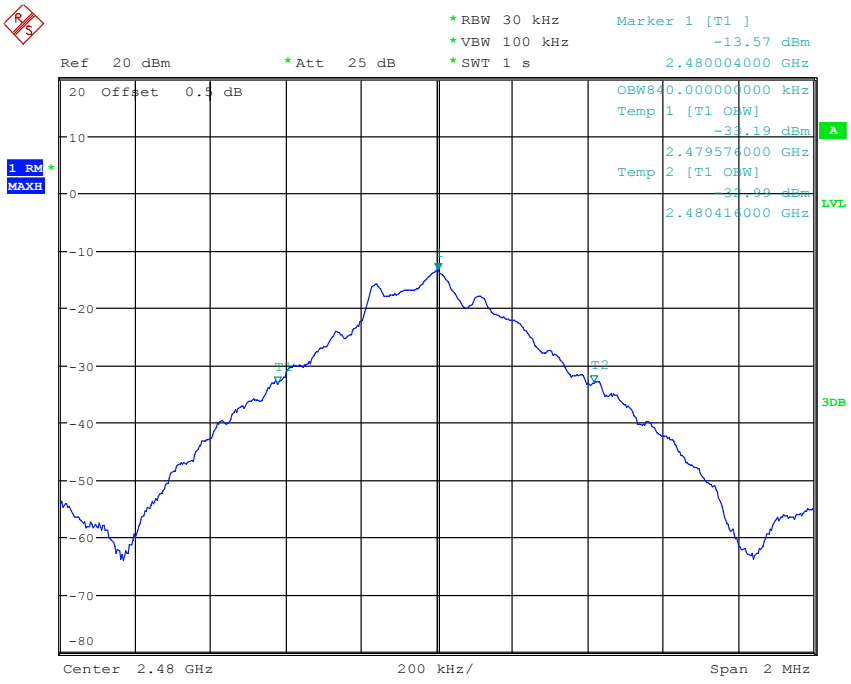
Please refer to following plots:

GFSK-Low



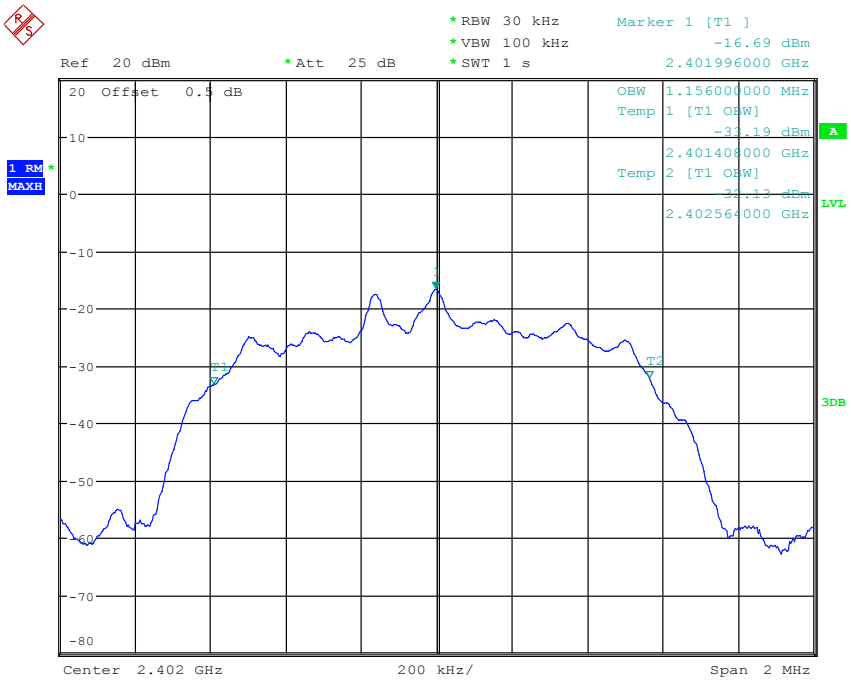
Date: 30.AUG.2023 10:34:16

GFSK-High



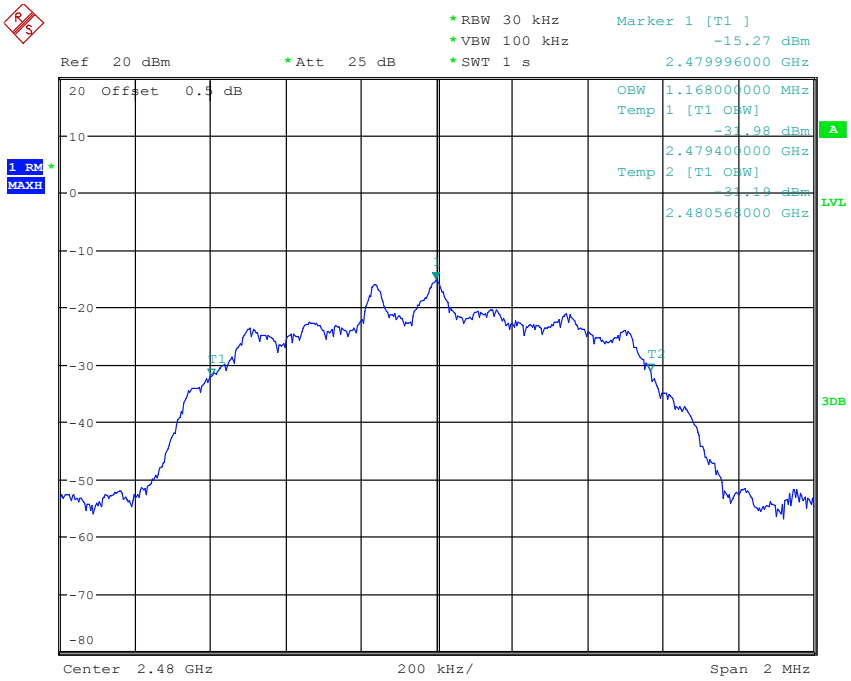
Date: 30.AUG.2023 10:37:47

π/4-DQPSK-Low



Date: 30.AUG.2023 10:39:21

π/4-DQPSK-High



Date: 30.AUG.2023 10:42:16

8 – TRANSMITTER UNWANTED EMISSIONS IN THE OUT-OF-BAND DOMAIN

Definition

Transmitter unwanted emissions in the out-of-band domain are emissions when the equipment is in Transmit mode, on frequencies immediately outside the allocated band, but excluding unwanted emissions in the spurious domain.

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.

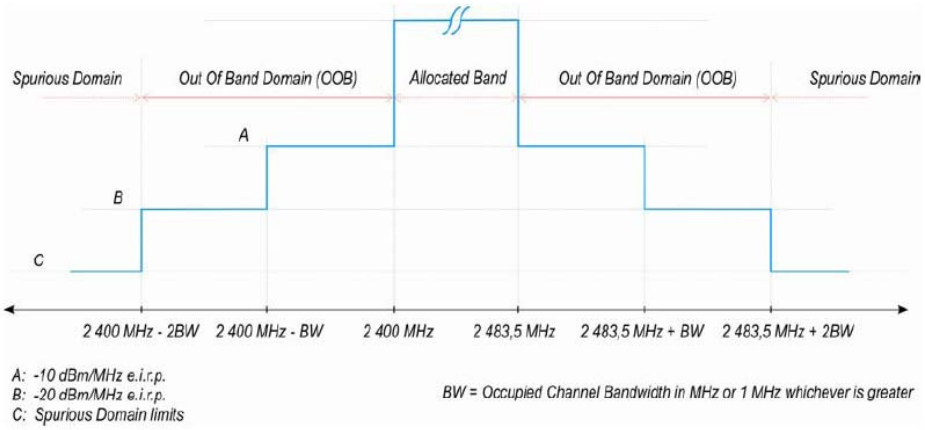


Figure 1: Transmit mask

Test Procedure

The conformance tests for this requirement are defined in ETSI EN 300 328 V2.2.2 (2019-07)clause 5.4.8.

Test Data

Test Result: *Compliant. Please refer to following tables.*

Mode	Channel	Frequency Segment	Reading (dBm/MHz)	Result (dBm/MHz)	Limit (dBm/MHz)
GFSK	Hopping	2400MHz-2BW~2400-BW	-58.58	-55.58	≤ -20
		2400MHz-BW~2400MHz	-55.25	-52.25	≤ -10
		2483.5MHz~2483.5MHz+BW	-60.06	-57.06	≤ -10
		2483.5MHz+BW~2483.5MHz+2BW	-57.96	-54.96	≤ -20
π/4-DQPSK	Hopping	2400MHz-2BW~2400-BW	-63.94	-60.94	≤ -20
		2400MHz-BW~2400MHz	-62.73	-59.73	≤ -10
		2483.5MHz~2483.5MHz+BW	-59.83	-56.83	≤ -10
		2483.5MHz+BW~2483.5MHz+2BW	-65.76	-62.76	≤ -20

Note: The antenna gain was added into the result.

9 – TRANSMITTER UNWANTED EMISSIONS IN THE SPURIOUS DOMAIN

Definition

Transmitter unwanted emissions in the spurious domain are emissions outside the allocated band and outside the out-of-band domain as indicated in figure 1 when the equipment is in Transmit mode.

Limit

The spurious emissions of the transmitter shall not exceed the values in following table:

In case of equipment with antenna connectors, these limits apply to emissions at the antenna port (conducted). For emissions radiated by the cabinet or emissions radiated by integral antenna equipment (without antenna connectors),these limits are e.r.p. for emissions up to 1 GHz and e.i.r.p. for emissions above 1 GHz.

Transmitter limits for spurious emissions

Frequency range	Maximum power	Bandwidth
30 MHz to 47 MHz	-36 dBm	100 kHz
47 MHz to 74 MHz	-54 dBm	100 kHz
74 MHz to 87,5 MHz	-36 dBm	100 kHz
87,5 MHz to 118 MHz	-54 dBm	100 kHz
118 MHz to 174 MHz	-36 dBm	100 kHz
174 MHz to 230 MHz	-54 dBm	100 kHz
230 MHz to 470 MHz	-36 dBm	100 kHz
470 MHz to 694 MHz	-54 dBm	100 kHz
694 MHz to 1 GHz	-36 dBm	100 kHz
1 GHz to 12,75 GHz	-30 dBm	1 MHz

Test Procedure

The measurement procedure refer to ETSI EN 300 328 V2.2.2 (2019-07) §5.4.9.

Test Data

Test Result: *Compliant. Pre-scan all modes, worst case please refer to following tables.*

BDR_low channel **2402 MHz**

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
495.30	H	32.56	-72.91	0.00	0.35	-73.26	-54.00	19.26
589.33	V	33.67	-66.63	0.00	0.36	-66.99	-54.00	12.99
4804.00	H	52.85	-60.77	13.16	1.29	-48.90	-30.00	18.90
4804.00	V	52.25	-58.72	13.16	1.29	-46.85	-30.00	16.85
7206.00	H	53.94	-55.33	13.15	1.46	-43.64	-30.00	13.64
7206.00	V	51.65	-57.77	13.15	1.46	-46.08	-30.00	16.08

BDR_high channel **2480 MHz**

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
512.59	H	32.18	-72.85	0.00	0.35	-73.20	-54.00	19.20
533.77	V	32.59	-69.21	0.00	0.35	-69.56	-54.00	15.56
4960.00	H	56.59	-55.67	13.03	1.28	-43.92	-30.00	13.92
4960.00	V	52.89	-56.59	13.03	1.28	-44.84	-30.00	14.84
7440.00	H	63.75	-45.00	12.87	1.58	-33.71	-30.00	3.71
7440.00	V	55.83	-53.40	12.87	1.58	-42.11	-30.00	12.11

Note 1:The unit of antenna gain is dBd for frequency below 1GHz and dBi for frequency above 1GHz.
Note 2:
Absolute Level = Substituted Level - Cable loss + Antenna Gain
Margin = Limit- Absolute Level

10 – RECEIVER SPURIOUS EMISSIONS

Definition

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

Limit

The receiver spurious emissions shall not exceed the values given in the following table.

In case of equipment with antenna connectors, these limits apply to emissions at the antenna port (conducted). For emissions radiated by the cabinet or emissions radiated by integral antenna equipment (without antenna connectors), these limits are e.r.p. for emissions up to 1 GHz and e.i.r.p. for emissions above 1 GHz.

Spurious emission limits for receivers

Frequency range	Maximum power	Bandwidth
30 MHz to 1 GHz	-57 dBm	100 kHz
1 GHz to 12,75 GHz	-47 dBm	1 MHz

Test Procedure

The measurement procedure refer to ETSI EN 300 328 V2.2.2 (2019-07) §5.4.10.

Test Data

Test Result: *Compliant. Pre-scan all modes, worst case please refer to following tables.*

BDR_low channel **2402 MHz**

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
623.54	H	31.59	-70.48	0.00	0.36	-70.84	-57.00	13.84
488.60	V	32.02	-70.86	0.00	0.35	-71.21	-57.00	14.21
1143.00	H	55.14	-63.51	8.50	0.93	-55.94	-47.00	8.94
1050.00	V	54.56	-64.38	8.11	0.85	-57.12	-47.00	10.12

BDR_high channel **2480 MHz**

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
518.69	H	32.45	-72.40	0.00	0.35	-72.75	-57.00	15.75
548.67	V	32.95	-68.45	0.00	0.35	-68.80	-57.00	11.80
1463.00	H	56.63	-63.09	9.84	1.18	-54.43	-47.00	7.43
1522.00	V	55.47	-63.79	10.07	1.31	-55.03	-47.00	8.03

Note 1:The unit of antenna gain is dBd for frequency below 1GHz and dBi for frequency above 1GHz.
Note 2:
Absolute Level = Substituted Level - Cable loss + Antenna Gain
Margin = Limit- Absolute Level

11 – RECEIVER BLOCKING

Definition

Receiver blocking is a measure of the ability of the equipment to receive a wanted signal on its operating channel without exceeding a given degradation due to the presence of an unwanted input signal (blocking signal) on frequencies other than those of the operating band and spurious responses.

Limit

For equipment that supports a PER or FER test to be performed, the minimum performance criterion shall be a PER or FER less than or equal to 10 %.

For equipment that does not support a PER or a FER test to be performed, the minimum performance criterion shall be no loss of the wireless transmission function needed for the intended use of the equipment.

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 table 6, table 7 or table 8.

Table 6: Receiver Blocking parameters for Receiver Category 1 equipment

Wanted signal mean power from companion device (dBm) (see notes 1 and 4)	Blocking signal frequency (MHz)	Blocking signal power (dBm) (see note 4)	Type of blocking signal
(-133 dBm + 10 × $\log_{10}$(OCBW)) or -68 dBm whichever is less (see note 2)	2 380 2 504	-34	CW
(-139 dBm + 10 × $\log_{10}$(OCBW)) or -74 dBm whichever is less (see note 3)	2 300 2 330 2 360 2 524 2 584 2 674		
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: 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.			

Table 7: Receiver Blocking parameters receiver Category 2 equipment

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

Table 8: Receiver Blocking parameters 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 3)	Type of blocking signal
(-139 dBm + 10 × $\log_{10}$(OCBW) + 20 dB) or (-74 dBm + 20 dB) whichever is less (see note 2)	2 380 2 504 2 300 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 the 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.			

Test Setup Block Diagram

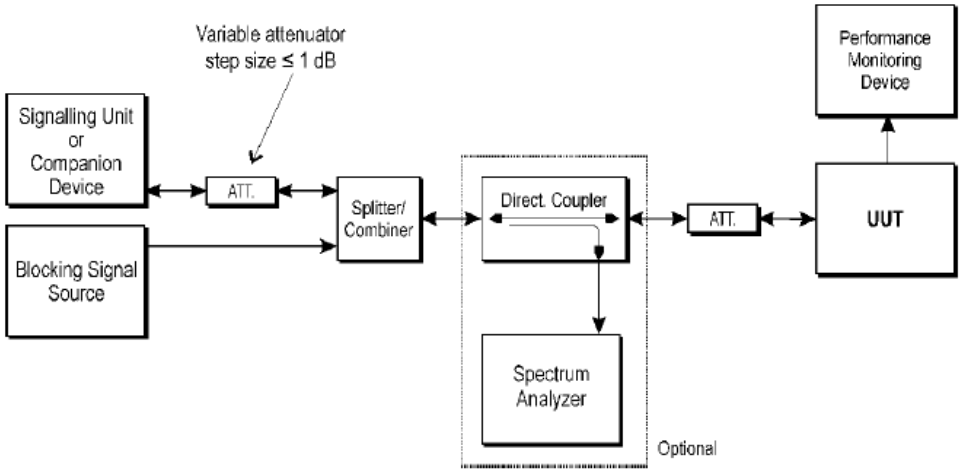


Figure 6: Test Set-up for receiver blocking

Test Procedure

The conformance tests for this requirement are defined in ETSI EN 300 328 V2.2.2 (2019-07) clause 5.4.11.

Test Data

Please refer to following table:

Mode	Receiver Category	Channel	Blocking signal frequency (MHz)	PER (%)	Limit(%)
GFSK	2	Hopping	2380	3.8	≤ 10
			2504	4.6	
			2300	3.9	
			2584	5.2	

Note: CMW500 was used to monitor the PER.

EXHIBIT A - E.2 INFORMATION AS REQUIRED BY EN 300 328 V2.2.2, CLAUSE 5.4.1

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

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: 79 ;
The minimum number of Hopping Frequencies: 79 ;

The Average Dwell Time: 3.779 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 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: µs

☐ The equipment has implemented an 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:

RF Output Power: 1.45 dBm;
Power Spectral Density N/A;
Duty cycle, Tx-Sequence, Tx-gap N/A;
Accumulated Transmit Time, Minimum Frequency Occupation & Hopping Sequence (only for FHSS equipment)
0.301s; 2; 79;
Hopping Frequency Separation (only for FHSS equipment) 1 MHz;
Medium Utilization N/A;
Adaptivity N/A;
Receiver Blocking Pass;
Nominal Occupied Channel Bandwidth 1 MHz;
Transmitter unwanted emissions in the OOB domain -54.96 dBm/MHz;
Transmitter unwanted emissions in the spurious domain -33.71 dBm;
Receiver spurious emissions -54.43 dBm;

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

☒ Operating mode 1: Single Antenna Equipment
☒ Equipment with only 1 antenna
☐ Equipment with 2 diversity antennas but only 1 antenna active at any moment in time
☐ Smart Antenna Systems with 2 or more antennas, but operating in a (legacy) mode where only 1antenna is used. (e.g. IEEE 802.11™ [i.3] legacy mode in smart antenna systems)

☐ Operating mode 2: Smart Antenna Systems - Multiple Antennas without beam forming
☐ Single spatial stream / Standard throughput / (e.g. IEEE 802.11™ [i.3] legacy mode)
☐ High Throughput (> 1 spatial stream) using Occupied Channel Bandwidth 1
☐ High Throughput (> 1 spatial stream) using Occupied Channel Bandwidth 2
Note: 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 Occupied Channel Bandwidth 1
☐ High Throughput (> 1 spatial stream) using Occupied Channel Bandwidth 2
Note: Add more lines if more channel bandwidths are supported.

h) In case of Smart Antenna Systems:

The number of Receive chains:;
The number of Transmit chains:;

☐ symmetrical power distribution
☐ asymmetrical power distribution

In case of beam forming, the maximum beam forming gain: N/A;

Note: Beam forming gain does not include the basic gain of a single antenna.

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

Operating Frequency Range 1: 2402 MHz to 2480 MHz
Operating Frequency Range 2: MHz to MHz

Note: Add more lines if more Frequency Ranges are supported.

j) Nominal Channel Bandwidth(s):

Nominal Channel Bandwidth 1:___1___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 range:__+25____° C
Other (please specify if applicable):_____

Extreme operating conditions:

Operating temperature range: Minimum:_____0_____° C Maximum ____+45____° C
Other (please specify if applicable): Minimum: _____° C Maximum _____° C

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:_____3____dBi

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

☐ Temporary RF connector provided
☐ No temporary RF connector provided

☐ Dedicated Antennas (equipment with antenna connector)
☐ Single power level with corresponding antenna(s)
☐ Multiple power settings and corresponding antenna(s)

Number of different Power Levels:;
Power Level 1:_____dBm
Power Level 2:_____dBm
Power Level 3:_____dBm

Note 1: Add more lines in case the equipment has more power levels.
Note 2: These power levels are conducted power levels (at antenna connector).

For each of the Power Levels, provide the intended antenna assemblies, their corresponding gains (G) and the resulting e.i.r.p. levels also taking into account the beamforming gain (Y) if applicable

Power Level 1:_____dBm

Number of antenna assemblies provided for this power level:

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

Note4: 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			

Note5: Add more rows in case more antenna assemblies are supported for this power level.

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

Details provided are for the: ☒stand-alone equipment
☐ combined (or host) equipment
☐ test jig

Supply Voltage ☐ AC mains State AC voltage_____V
☒ DC State DC voltage _____5/3.7_____ 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:

The measurements shall be performed during continuously transmitting .

p) The equipment type (e.g. Bluetooth®, IEEE 802.11™, IEEE 802.15.4™, 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.

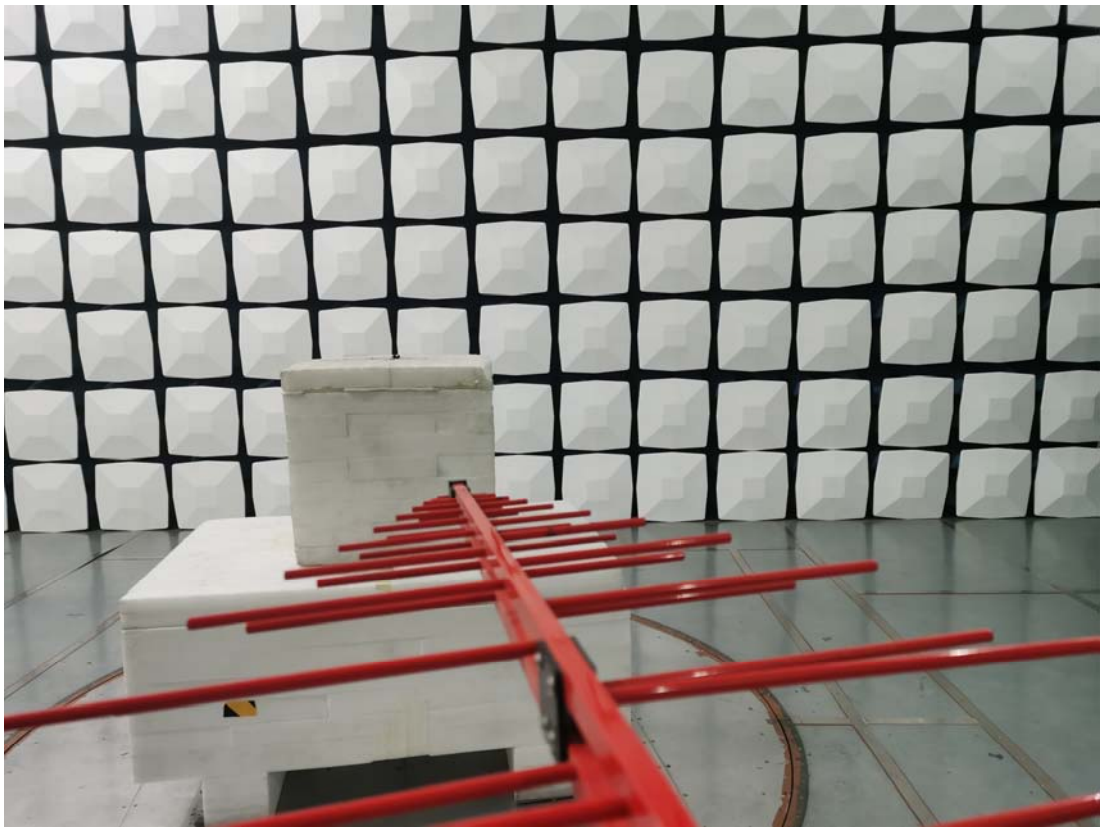
☒ No

EXHIBIT B - EUT PHOTOGRAPHS

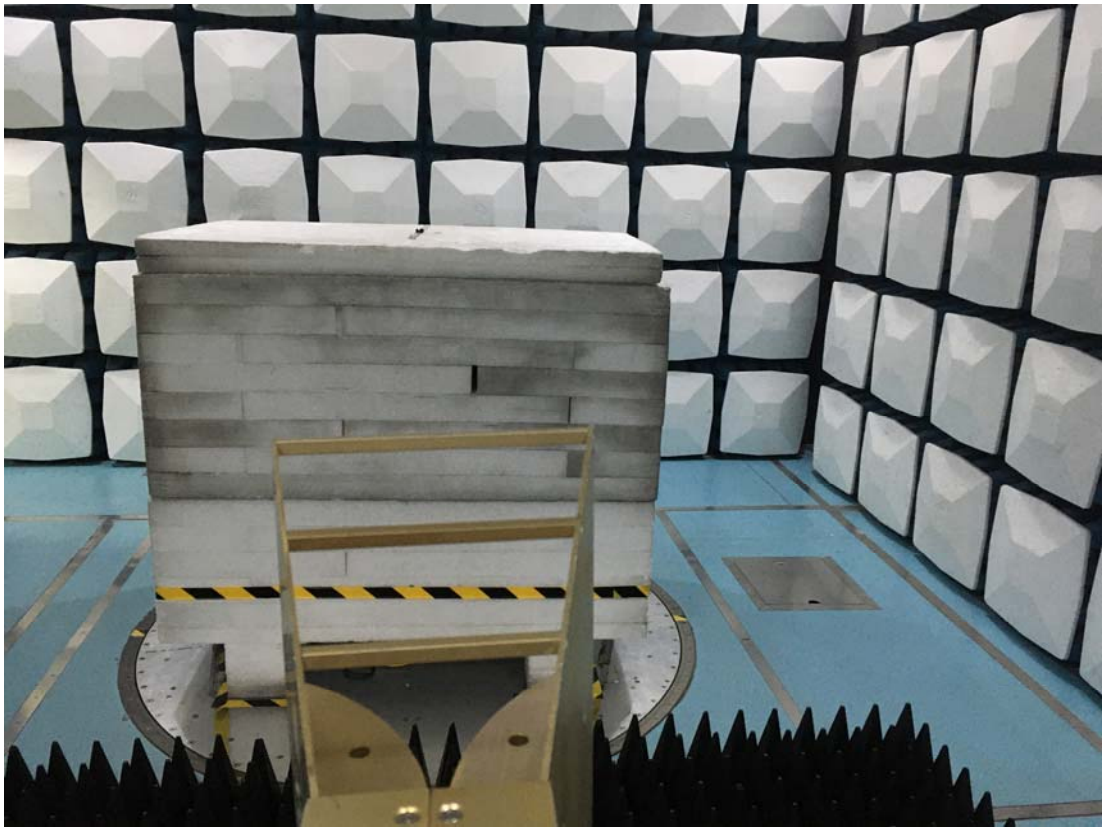
For photos in this section, please refer to report No.: SSH1230804-45338E-02 EXHIBIT A.

EXHIBIT C - TEST SETUP PHOTOGRAPHS

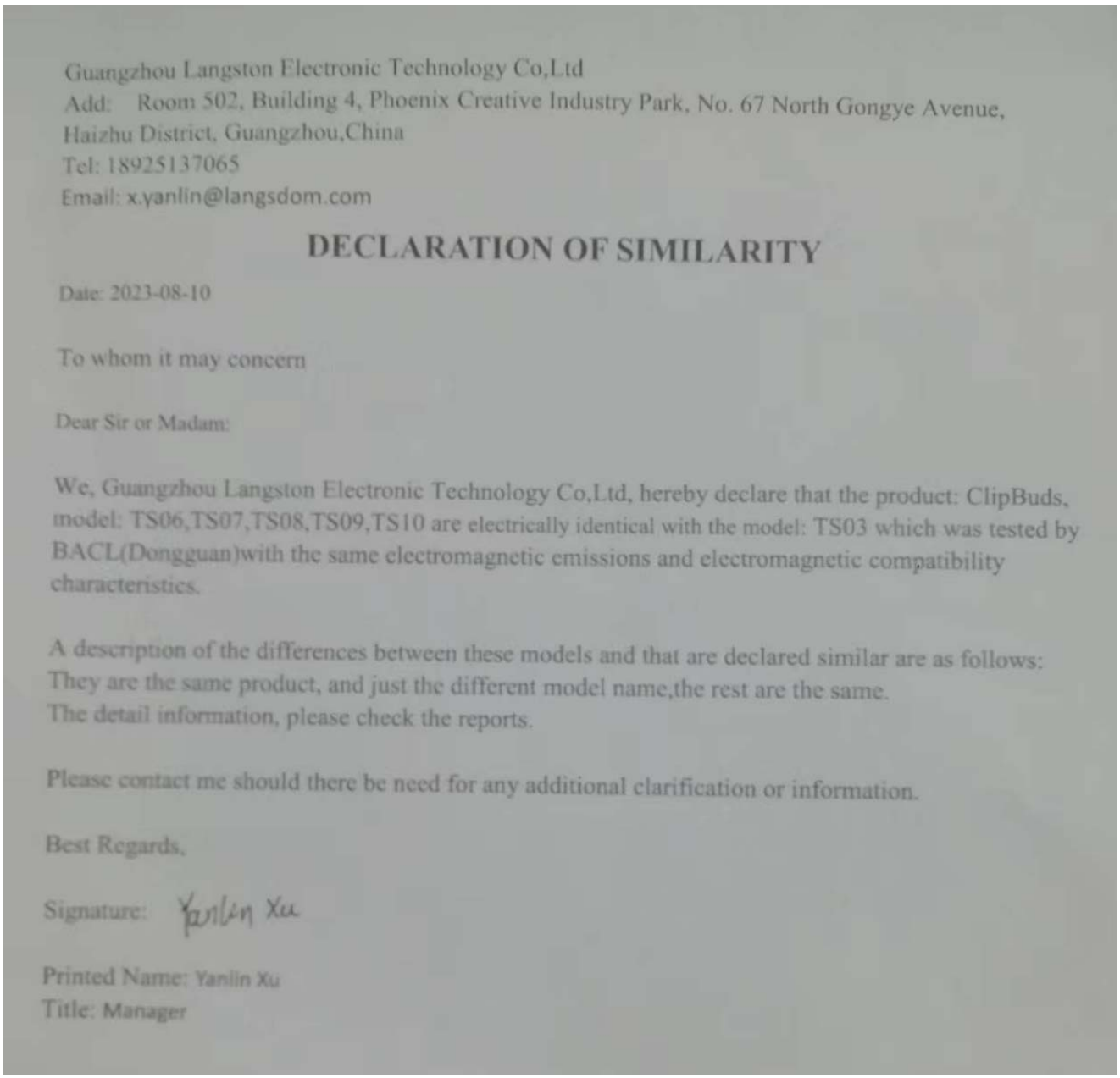
Radiated Emission Below 1GHz View



Radiated Emission Above 1GHz View



DECLARATION OF SIMILARITY LETTER



Guangzhou Langston Electronic Technology Co,Ltd
Add: Room 502, Building 4, Phoenix Creative Industry Park, No. 67 North Gongye Avenue, Haizhu District, Guangzhou,China
Tel: 18925137065
Email: x.yanlin@langsdom.com

DECLARATION OF SIMILARITY

Date: 2023-08-10

To whom it may concern

Dear Sir or Madam:

We, Guangzhou Langston Electronic Technology Co,Ltd, hereby declare that the product: ClipBuds, model: TS06,TS07,TS08,TS09,TS10 are electrically identical with the model: TS03 which was tested by BACL(Dongguan)with the same electromagnetic emissions and electromagnetic compatibility characteristics.

A description of the differences between these models and that are declared similar are as follows:
They are the same product, and just the different model name,the rest are the same.
The detail information, please check the reports.

Please contact me should there be need for any additional clarification or information.

Best Regards,

Signature: Yanlin Xu

Printed Name: Yanlin Xu
Title: Manager

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

TEST REPORT

EN IEC 62368-1

Audio/video, information and communication technology equipment – Part 1: Safety requirements

Report reference No. ..... :	SSH1230804-45338E-SF
Compiled by (+ signature) ..... :	Engineer: Endy Zhang
Approved by (+ signature) ..... :	Team Leader: Eric Ding
Date of issue ..... :	2023-08-23
Testing laboratory ..... :	Bay Area Compliance Laboratories Corp. (Dongguan)
Address ..... :	No.12, Pulong East 1st Road, Tangxia Town, Dongguan, Guangdong, China
Testing location ..... :	See above
Applicant's name ..... :	Guangzhou Langston Electronic Technology Co,Ltd
Address..... :	Room 502, Building 4, Phoenix Creative Industry Park, No. 67 North Gongye Avenue, Haizhu District, Guangzhou
Manufacturer's name..... :	Langston Group Limited
Address..... :	No.3, Tangzhou Road, Lijiafang, Shipai Town, Dongguan
Factory 's name ..... :	Langston Group Limited
Address..... :	No.3, Tangzhou Road, Lijiafang, Shipai Town, Dongguan
Standard ..... :	EN IEC 62368-1:2020+A11:2020
Test sample(s) received ..... :	2023-08-08
Test in period ..... :	2023-08-09 to 2023-08-22
Procedure deviation ..... :	N/A
Non-standard test method ..... :	N/A

Type of test object	ClipBuds
Trademark	Langsdom
Tested model	TS03, TS06, TS07, TS08, TS09, TS10
Manufacturer	Langston Group Limited
Rating	EUT input: 5V ⎓ 1.0A

Copy of marking plate:

The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.

The label for others model is identical to it except for model name.

Note:

- The CE marking and should be at least 5.0mm WEEE symbol and 7.0mm respectively in height.

- Manufacturers shall ensure that the equipment bears a type, batch or serial number or other element allowing its identification.

- Manufacturers shall indicate on the electrical equipment their name, registered trade name or registered trade mark and the postal address at which they can be contacted.

- Importers shall indicate on the electrical equipment their name, registered trade name or registered trade mark and the postal address at which they can be contacted.

Test item particulars:	
Product group	☒ end product ☐ built-in component
Classification of use by	☒ Ordinary person ☒ Children likely present ☐ Instructed person ☐ Skilled person
Supply connection	☐ AC mains ☐ DC mains ☒ 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 ☐ pluggable equipment type B - ☐ non-detachable supply cord ☐ appliance coupler ☐ permanent connection ☐ mating connector ☒ other: not directly connected to the mains
Considered current rating of protective device	☐ A; Location: ☐ building ☐ equipment ☒ N/A
Equipment mobility	☒ movable ☐ hand-held ☒ transportable ☐ direct plug-in ☐ stationary ☐ for building-in ☐ wall/ceiling-mounted ☐ SRME/rack-mounted ☐ other:
Overvoltage category (OVC)	☐ OVC I ☐ OVC II ☐ OVC III ☐ OVC IV ☒ other: not directly connected to the mains
Class of equipment	☐ Class I ☐ Class II ☒ Class III ☐ Not classified ☐
Special installation location	☒ N/A ☐ restricted access area ☐ outdoor location ☐
Pollution degree (PD)	☐ PD 1 ☒ PD 2 ☐ PD 3
Manufacturer's specified Tma.....	45°C ☐ Outdoor: minimum °C
IP protection class	☒ IPX0 ☐ IP___
Power systems	☐ TN ☐ TT ☐ IT - V L-L ☒ not AC mains
Altitude during operation (m)	☒ 2000 m or less ☐ m
Altitude of test laboratory (m)	☒ 2000 m or less ☐ m
Mass of equipment (kg)	0.045kg

Possible test case verdicts……:

- test case does not apply to the test object……..: N(N/A)
- test object does meet the requirement……..: P(ass)
- test object does not meet the requirement……..: F(ail)

General remarks:

"(see remark #)" refers to a remark appended to the report.

(see appended table)" refers to a table appended to the report.

The test results presented in this report relate only to the object tested.

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Throughout this report a ☐comma/ ☒point is used as the decimal separator.

Summary of testing:

All tests were performed at the worst case and all test results complied with the standard on the cover page.

Test Facility:

Test items: All items except clause 10.6

Test Facility: Bay Area Compliance Laboratories Corp. (Dongguan)

Test location: No.12, Pulong East 1st Road, Tangxia Town, Dongguan,Guangdong, China

Test items: Clause 10.6

Test Facility: Bay Area Compliance Lab (Shenzhen) Corp.

Test location: 6/F., West Wing, Third Phase of Wanli Industrial Building, Shihua Road, Futian Free Trade Zone, Shenzhen, Guangdong, China

General product information:

1. The EUT is a ClipBuds that supplied by 5Vdc 1A from Type-C port
2. The EUT input were considered as ES1 and PS2 circuits specified by manufacturer.
3. The product was submitted and tested for use at the manufacturer's recommended ambient temperature (T ma) of 45°C.
4. The product plays music which use the Bluetooth connect, and all test under play 1kHz sine wave signal with maximum volume.
5. Before placing the products in the different countries, the manufacturer must ensure that: Operating instructions, Ratings Labels and Warnings Labels are in an Accepted or Official Language of the country in question; The equipment complies with the National Standards and/or Electrical Codes of the country, province or city or in question.
6. The differences between the product model name of: TS03, TS06, TS07, TS08, TS09, TS10. see the Appendix B-Declaration of similarity. All tests were performed on the model of TS03. If no specified and all the test results also valid for the others model.
7. The test samples No.: 29FN-1

OVERVIEW OF ENERGY SOURCES AND SAFEGUARDS				
Clause	**Possible Hazard**			
5	Electrically-caused injury			
Class and Energy Source (e.g. ES3: Primary circuit)	Body Part (e.g. Ordinary)	Safeguards		
		B	S	R
ES1: 5Vdc input	Ordinary	--	--	--
ES1: Lithium-ion battery output for charger base	Ordinary	--	--	--
ES1: Lithium-ion battery cell output for earphone	Ordinary	--	--	--
6	Electrically-caused fire			
Class and Energy Source (e.g. PS2: 100 Watt circuit)	Material part (e.g. Printed board)	Safeguards		
		B	1st S	2nd S
PS2: 5Vdc input	Enclosure and PCB	See clause 6.3	See clause 6.4.5	--
PS2: Lithium-ion battery cell output for charger base	Enclosure and PCB	See clause 6.3	See clause 6.4.5	--
PS1: Lithium-ion battery cell output for earphone	Enclosure and PCB	--	--	--
7	Injury caused by hazardous substances			
Class and Energy Source (e.g. Ozone)	Body Part (e.g., Skilled)	Safeguards		
		B	S	R
Lithium-ion battery for charger base	Ordinary	--	--	Enclosure
Lithium-ion battery cell output for earphone	Ordinary	--	--	Enclosure
8	Mechanically-caused injury			
Class and Energy Source (e.g. MS3: Plastic fan blades)	Body Part (e.g. Ordinary)	Safeguards		
		B	S	R
MS1: Sharp edges and corners	Ordinary	--	--	--
MS1: Equipment mass < 7kg	Ordinary	--	--	--
9	Thermal burn			
Class and Energy Source (e.g. TS1: Keyboard caps)	Body Part (e.g., Ordinary)	Safeguards		
		B	S	R
TS1: Accessible parts surface	Ordinary	--	--	--
10	Radiation			
Class and Energy Source (e.g. RS1: PMP sound output)	Body Part (e.g., Ordinary)	Safeguards		
		B	S	R
RS1: Indicator light	Ordinary	--	--	--
Supplementary Information:				

“B” – Basic Safeguard; “S” – Supplementary Safeguard; “R” – Reinforced Safeguard

ENERGY SOURCE DIAGRAM
Optional. Manufacturers are to provide the energy sources diagram identify declared energy sources and identifying the demarcations are between power sources. Recommend diagram be provided included in power supply and multipart systems. Insert diagram below. Example diagram designs are; Block diagrams; image(s) with layered data; mechanical drawings
ES1, PS2, MS1, TS1 and RS1 for EUT ☒ **ES** ☒ **PS** ☒ **MS** ☒ **TS** ☒ **RS**

EN IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
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 comply with the requirements of this standard or, where specified in a requirements clause, with the safety aspects of the relevant IEC component standards. (See appended table 4.1.2)	P
4.1.3	Equipment design and construction	Parts of equipment that could cause injury shall not be accessible, and accessible parts shall not cause an injury.	P
4.1.4	Specified ambient temperature for outdoor use (°C).....	Indoor use	N/A
4.1.5	Constructions and components not specifically covered		N/A
4.1.8	Liquids and liquid filled components (LFC)	No such components	N/A
4.1.15	Markings and instructions	(See Annex F)	P
4.4.3	Safeguard robustness		P
4.4.3.1	General	See below	P
4.4.3.2	Steady force tests	(See Annex T.4)	P
4.4.3.3	Drop tests	(See Annex T.7)	P
4.4.3.4	Impact tests		N/A
4.4.3.5	Internal accessible safeguard tests	Only class 1 energy sources	N/A
4.4.3.6	Glass impact tests		N/A
4.4.3.7	Glass fixation tests		N/A
	Glass impact test (1J)		N/A
	Push/pull test (10 N)		N/A
4.4.3.8	Thermoplastic material tests	(See Annex T.8)	P
4.4.3.9	Air comprising a safeguard	Class III equipment	N/A
4.4.3.10	Accessibility, glass, safeguard effectiveness		P
4.4.4	Displacement of a safeguard by an insulating liquid		N/A
4.4.5	Safety interlocks		N/A
4.5	**Explosion**		P
4.5.1	General		P
4.5.2	No explosion during normal/abnormal operating	Tests as specified in Clause B.2,	P

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Clause	Requirement + Test	Result - Remark	Verdict
	condition	B.3 and Annex M.	
	No harm by explosion during single fault conditions	Tests as specified in Clause B.4 and Annex M.	P
4.6	**Fixing of conductors**	Class III equipment	N/A
	Fix conductors not to defeat a safeguard		N/A
	Compliance is checked by test ..... :		N/A
4.7	**Equipment for direct insertion into mains socket–outlets**		N/A
4.7.2	Mains plug part complies with relevant standard ..... :	No directly connected to the mains.	N/A
4.7.3	Torque (Nm) ..... :		N/A
4.8	**Equipment containing coin/button cell batteries**		N/A
4.8.1	General	No button cell	N/A
4.8.2	Instructional safeguard ..... :		N/A
4.8.3	Battery compartment door/cover construction		N/A
	Open torque test		N/A
4.8.4.2	Stress relief test		N/A
4.8.4.3	Battery replacement test		N/A
4.8.4.4	Drop test		N/A
4.8.4.5	Impact test		N/A
4.8.4.6	Crush test		N/A
4.8.5	Compliance		N/A
	30N force test with test probe		N/A
	20N force test with test hook		N/A
4.9	**Likelihood of fire or shock due to entry of conductive object**		N/A
4.10	**Component requirements**		N/A
4.10.1	Disconnect Device	Class III equipment	N/A
4.10.2	Switches and relays	No such components	N/A

5	**Electrically-caused injury**	P
5.2	**Classification and limits of electrical energy sources**	P

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Clause	Requirement + Test	Result - Remark	Verdict
5.2.2	ES1, ES2 and ES3 limits	ES1	P
5.2.2.2	Steady-state voltage and current limits :	(See appended table 5.2)	P
5.2.2.3	Capacitance limits :	No such electrical energy sources	N/A
5.2.2.4	Single pulse limits :	No such electrical energy sources	N/A
5.2.2.5	Limits for repetitive pulses :	No such electrical energy sources	N/A
5.2.2.6	Ringing signals	No such electrical energy sources	N/A
5.2.2.7	Audio signals	See Annex E	P
5.3	**Protection against electrical energy sources**		N/A
5.3.1	General Requirements for accessible parts to ordinary, instructed and skilled persons	Only the ES1 exist for the EUT, no need any safeguard for ES1.	N/A
5.3.1 a)	Accessible ES1/ES2 derived from ES2/ES3 circuits		N/A
5.3.1 b)	Skilled persons not unintentional contact ES3 bare conductors		N/A
5.3.2.1	Accessibility to electrical energy sources and safeguards		N/A
	Accessibility to outdoor equipment bare parts		N/A
5.3.2.2	Contact requirements		N/A
	Test with test probe from Annex V		--
5.3.2.2 a)	Air gap – electric strength test potential (V) :		N/A
5.3.2.2 b)	Air gap – distance (mm) :		N/A
5.3.2.3	Compliance		N/A
5.3.2.4	Terminals for connecting stripped wire		N/A
5.4	**Insulation materials and requirements**		P
5.4.1.2	Properties of insulating material		N/A
5.4.1.3	Material is non-hygroscopic		N/A
5.4.1.4	Maximum operating temperature for insulating materials :		P
5.4.1.5	Pollution degrees :	2	P
5.4.1.5.2	Test for pollution degree 1 environment and for an insulating compound		N/A
5.4.1.5.3	Thermal cycling test		N/A
5.4.1.6	Insulation in transformers with varying dimensions		N/A
5.4.1.7	Insulation in circuits generating starting pulses		N/A
5.4.1.8	Determination of working voltage :		N/A
5.4.1.9	Insulating surfaces		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
5.4.1.10	Thermoplastic parts on which conductive metallic parts are directly mounted		N/A
5.4.1.10.2	Vicat test :		N/A
5.4.1.10.3	Ball pressure test :		N/A
5.4.2	Clearances	Class III equipment, only ES1	N/A
5.4.2.1	General requirements		N/A
	Clearances in circuits connected to AC Mains, Alternative method		N/A
5.4.2.2	Procedure 1 for determining clearance		N/A
	Temporary overvoltage :		—
5.4.2.3	Procedure 2 for determining clearance		N/A
5.4.2.3.2.2	a.c. mains transient voltage :		—
5.4.2.3.2.3	d.c. mains transient voltage :		—
5.4.2.3.2.4	External circuit transient voltage :		—
5.4.2.3.2.5	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
5.4.2.6	Clearance measurement :		N/A
5.4.3	Creepage distances		N/A
5.4.3.1	General		N/A
5.4.3.3	Material group :		—
5.4.3.4	Creepage distances measurement :		N/A
5.4.4	Solid insulation	No solid insulation	N/A
5.4.4.1	General requirements		N/A
5.4.4.2	Minimum distance through insulation :		N/A
5.4.4.3	Insulating compound forming solid insulation		N/A
5.4.4.4	Solid insulation in semiconductor devices		N/A
5.4.4.5	Insulating compound forming 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

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Clause	Requirement + Test	Result - Remark	Verdict
	Number of layers (pcs) :		N/A
5.4.4.6.4	Standard test procedure for non-separable thin sheet material :		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, E_P, K_R, d, V_{PW} (V) :		N/A
	Alternative by electric strength test, tested voltage (V), K_R :		N/A
5.4.5	Antenna terminal insulation		N/A
5.4.5.1	General		N/A
5.4.5.2	Voltage surge test		N/A
5.4.5.3	Insulation resistance (MΩ) :		N/A
	Electric strength test :		N/A
5.4.6	Insulation of internal wire as part of supplementary safeguard		N/A
5.4.7	Tests for semiconductor components and for cemented joints		N/A
5.4.8	Humidity conditioning		N/A
	Relative humidity (%), temperature (°C), duration (h) :		—
5.4.9	Electric strength test	Class III equipment, only ES1	N/A
5.4.9.1	Test procedure for type test of solid insulation :		N/A
5.4.9.2	Test procedure for routine test		N/A
5.4.10	Safeguards against transient voltages from external circuits		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
5.4.10.3	Verification for insulation breakdown for impulse test :		N/A
5.4.11	Separation between external circuits and earth		N/A
5.4.11.1	Exceptions to separation between external circuits and earth		N/A
5.4.11.2	Requirements		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	SPDs bridge separation between external circuit and earth		N/A
	Rated operating voltage U_{op} (V) :		—
	Nominal voltage U_{peak} (V) :		—
	Max increase due to variation ΔU_{sp} :		—
	Max increase due to ageing ΔU_{sa} :		—
5.4.11.3	Test method and compliance :		N/A
5.4.12	Insulating liquid		N/A
5.4.12.1	General requirements		N/A
5.4.12.2	Electric strength of an insulating liquid :		N/A
5.4.12.3	Compatibility of an insulating liquid :		N/A
5.4.12.4	Container for insulating liquid :		N/A
5.5	**Components as safeguards**		N/A
5.5.1	General	No such components as safeguards.	N/A
5.5.2	Capacitors and RC units		N/A
5.5.2.1	General requirement		N/A
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	SPDs		N/A
5.5.8	Insulation between the mains and an external circuit consisting of a coaxial cable :		N/A
5.5.9	Safeguards for socket-outlets in outdoor equipment		N/A
	RCD rated residual operating current (mA) :		—
5.6	**Protective conductor**	Class III equipment, only ES1	N/A
5.6.2	Requirement for protective conductors		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		N/A
	Protective earthing conductor size (mm^2) :		—

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Clause	Requirement + Test	Result - Remark	Verdict
	Protective earthing conductor serving as a reinforced safeguard		N/A
	Protective earthing conductor serving as a double safeguard		N/A
5.6.4	Requirements for protective bonding conductors		N/A
5.6.4.1	Protective bonding conductors		N/A
	Protective bonding conductor size (mm^2). :		—
5.6.4.2	Protective current rating (A) :		N/A
5.6.5	Terminals for protective conductors		N/A
5.6.5.1	Terminal size for connecting protective earthing conductors (mm) :		N/A
	Terminal size for connecting protective bonding conductors (mm) :		N/A
5.6.5.2	Corrosion		N/A
5.6.6	Resistance of the protective bonding system		N/A
5.6.6.1	Requirements		N/A
5.6.6.2	Test Method :		N/A
5.6.6.3	Resistance (Ω) or voltage drop :		N/A
5.6.7	Reliable connection of a protective earthing conductor		N/A
5.6.8	Functional earthing		N/A
	Conductor size (mm^2) :		N/A
	Class II with functional earthing marking :		N/A
	Appliance inlet cl & cr (mm) :		N/A
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 voltage		N/A
5.7.3	Equipment set-up, supply connections and earth connections		N/A
5.7.4	Unearthed accessible parts :		N/A
5.7.5	Earthed accessible conductive parts :		N/A
5.7.6	Requirements when touch current exceeds ES2 limits		N/A
	Protective conductor current (mA) :		N/A
	Instructional Safeguard :		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
5.7.7	Prospective touch voltage and touch current associated with external circuits		N/A
5.7.7.1	Touch current from coaxial cables		N/A
5.7.7.2	Prospective touch voltage and touch current associated with paired conductor cables		N/A
5.7.8	Summation of touch currents from external circuits		N/A
	a) Equipment connected to earthed external circuits, current (mA) :		N/A
	b) Equipment connected to unearthed external circuits, current (mA) :		N/A
5.8	**Backfeed safeguard in battery backed up supplies**		N/A
	Mains terminal ES :		N/A
	Air gap (mm) :		N/A
6	**Electrically- caused fire**		P
6.2	**Classification of PS and PIS**		P
6.2.2	Power source circuit classifications :	PS2	P
6.2.3	Classification of potential ignition sources	See below	P
6.2.3.1	Arcing PIS :		N/A
6.2.3.2	Resistive PIS :	(See appended table 6.2.3.2)	P
6.3	**Safeguards against fire under normal operating and abnormal operating conditions**		P
6.3.1	No ignition and attainable temperature value less than 90 % defined by ISO 871 or less than 300 °C for unknown materials :	No ignition, no temperature more than 300 °C	P
	Combustible materials outside fire enclosure :	No such material	N/A
6.4	**Safeguards against fire under single fault conditions**		P
6.4.1	Safeguard method	Method by control of fire spread applied.	P
6.4.2	Reduction of the likelihood of ignition under single fault conditions in PS1 circuits		N/A
6.4.3	Reduction of the likelihood of ignition under single fault conditions in PS2 and PS3 circuits	Method by control of fire spread applied as 6.4.1	N/A
6.4.3.1	Supplementary safeguards		N/A
6.4.3.2	Single Fault Conditions :		N/A
	Special conditions for temperature limited by fuse		N/A
6.4.4	Control of fire spread in PS1 circuits		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
6.4.5	Control of fire spread in PS2 circuits	See below	P
6.4.5.2	Supplementary safeguards	V-0 plastic enclosure used and all components were mounted on Min.V-1 PCB.	P
6.4.6	Control of fire spread in PS3 circuits		N/A
6.4.7	Separation of combustible materials from a PIS		N/A
6.4.7.2	Separation by distance		N/A
6.4.7.3	Separation by a fire barrier		N/A
6.4.8	Fire enclosures and fire barriers	See below	P
6.4.8.2	Fire enclosure and fire barrier material properties	V-0 plastic enclosure used	P
6.4.8.2.1	Requirements for a fire barrier		N/A
6.4.8.2.2	Requirements for a fire enclosure	V-0 plastic enclosure used	P
6.4.8.3	Constructional requirements for a fire enclosure and a fire barrier		N/A
6.4.8.3.1	Fire enclosure and fire barrier openings		N/A
6.4.8.3.2	Fire barrier dimensions		N/A
6.4.8.3.3	Top openings and properties	No openings	N/A
	Openings dimensions (mm) :		N/A
6.4.8.3.4	Bottom openings and properties	No openings	N/A
	Openings dimensions (mm) :		N/A
	Flammability tests for the bottom of a fire enclosure		N/A
	Instructional Safeguard :		N/A
6.4.8.3.5	Side openings and properties		N/A
	Openings dimensions (mm) :		N/A
6.4.8.3.6	Integrity of a fire enclosure, condition met: a), b) or c) :		N/A
6.4.8.4	Separation of a PIS from a fire enclosure and a fire barrier distance (mm) or flammability rating :	V-0 plastic enclosure used	P
6.4.9	Flammability of insulating liquid :		N/A
6.5	**Internal and external wiring**		N/A
6.5.1	General requirements		N/A
6.5.2	Requirements for interconnection to building wiring :		N/A
6.5.3	Internal wiring size (mm^2) for socket-outlets :		N/A
6.6	**Safeguards against fire due to the connection to additional equipment**		N/A

EN IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
7	**INJURY CAUSED BY HAZARDOUS SUBSTANCES**		P
7.2	**Reduction of exposure to hazardous substances**		P
7.3	**Ozone exposure**		N/A
7.4	**Use of personal safeguards or personal protective equipment (PPE)**		N/A
	Personal safeguards and instructions :		—
7.5	**Use of instructional safeguards and instructions**		N/A
	Instructional safeguard (ISO 7010) :		—
7.6	**Batteries and their protection circuits**		P
8	**MECHANICALLY-CAUSED INJURY**		P
8.2	**Mechanical energy source classifications**		P
8.3	**Safeguards against mechanical energy sources**		N/A
8.4	**Safeguards against parts with sharp edges and corners**		P
8.4.1	Safeguards	Only MS1, no sharp edges and corners.	P
	Instructional Safeguard :		N/A
8.4.2	Sharp edges or corners		N/A
8.5	**Safeguards against moving parts**		N/A
8.5.1	Fingers, jewellery, clothing, hair, etc., contact with MS2 or MS3 parts		N/A
	MS2 or MS3 part required to be accessible for the function of the equipment		N/A
	Moving MS3 parts only accessible to skilled person		N/A
8.5.2	Instructional safeguard :		N/A
8.5.4	Special categories of equipment containing moving parts		N/A
8.5.4.1	General		N/A
8.5.4.2	Equipment containing work cells with MS3 parts		N/A
8.5.4.2.1	Protection of persons in the work cell		N/A
8.5.4.2.2	Access protection override		N/A
8.5.4.2.2.1	Override system		N/A
8.5.4.2.2.2	Visual indicator		N/A
8.5.4.2.3	Emergency stop system		N/A
	Maximum stopping distance from the point of activation (m) :		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Space between end point and nearest fixed mechanical part (mm) :		N/A
8.5.4.2.4	Endurance requirements		N/A
	Mechanical system subjected to 100 000 cycles of operation		N/A
	- Mechanical function check and visual inspection		N/A
	- Cable assembly :		N/A
8.5.4.3	Equipment having electromechanical device for destruction of media		N/A
8.5.4.3.1	Equipment safeguards		N/A
8.5.4.3.2	Instructional safeguards against moving parts :		N/A
8.5.4.3.3	Disconnection from the supply		N/A
8.5.4.3.4	Cut type and test force (N) :		N/A
8.5.4.3.5	Compliance		N/A
8.5.5	High pressure lamps	No high pressure lamps	N/A
	Explosion test :		N/A
8.5.5.3	Glass particles dimensions (mm) :		N/A
8.6	**Stability of equipment**		N/A
8.6.1	General	Equipment mass < 7kg, MS1	N/A
	Instructional safeguard :		N/A
8.6.2	Static stability		N/A
8.6.2.2	Static stability test :		N/A
8.6.2.3	Downward force test		N/A
8.6.3	Relocation stability		N/A
	Wheels diameter (mm) :		—
	Tilt test		N/A
8.6.4	Glass slide test		N/A
8.6.5	Horizontal force test :		N/A
8.7	**Equipment mounted to wall, ceiling or other structure**		N/A
8.7.1	Mount means type :		N/A
8.7.2	Test methods		N/A
	Test 1, additional downwards force (N) :		N/A
	Test 2, number of attachment points and test force (N) :		N/A
	Test 3 Nominal diameter (mm) and applied torque		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	(Nm) :		
8.8	**Handles strength**		N/A
8.8.1	General		N/A
8.8.2	Handle strength test		N/A
	Number of handles :		—
	Force applied (N) :		—
8.9	**Wheels or casters attachment requirements**		N/A
8.9.2	Pull test		N/A
8.10	**Carts, stands and similar carriers**		N/A
8.10.1	General		N/A
8.10.2	Marking and instructions :		N/A
8.10.3	Cart, stand or carrier loading test		N/A
	Loading force applied (N) :		N/A
8.10.4	Cart, stand or carrier impact test		N/A
8.10.5	Mechanical stability		N/A
	Force applied (N) :		—
8.10.6	Thermoplastic temperature stability		N/A
8.11	**Mounting means for slide-rail mounted equipment (SRME)**		N/A
8.11.1	General		N/A
8.11.2	Requirements for slide rails		N/A
	Instructional Safeguard :		N/A
8.11.3	Mechanical strength test		N/A
8.11.3.1	Downward force test, force (N) applied :		N/A
8.11.3.2	Lateral push force test		N/A
8.11.3.3	Integrity of slide rail end stops		N/A
8.11.4	Compliance		N/A
8.12	**Telescoping or rod antennas**		N/A
	Button/ball diameter (mm) :		—

9	**Thermal burn injury**		P
9.2	**Thermal energy source classifications**		P
9.3	**Touch temperature limits**		P
9.3.1	Touch temperatures of accessible parts :	(See appended table 9.3)	P
9.3.2	Test method and compliance		P

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Clause	Requirement + Test	Result - Remark	Verdict
9.4	**Safeguards against thermal energy sources**		N/A
9.5	**Requirements for safeguards**		N/A
9.5.1	Equipment safeguard		N/A
9.5.2	Instructional safeguard :		N/A
9.6	**Requirements for wireless power transmitters**		N/A
9.6.1	General		N/A
9.6.2	Specification of the foreign objects		N/A
9.6.3	Test method and compliance :		N/A
10	**RADIATION**		P
10.2	**Radiation energy source classification**		P
10.2.1	General classification	Indicator light classified as RS1.	P
	Lasers :		—
	Lamps and lamp systems :		—
	Image projectors :		—
	X-Ray :		—
	Personal music player :		—
10.3	**Safeguards against laser radiation**		N/A
	The standard(s) equipment containing laser(s) comply :		N/A
10.4	**Safeguards against optical radiation from lamps and lamp systems (including LED types)**		N/A
10.4.1	General requirements		N/A
	Instructional safeguard provided for accessible radiation level needs to exceed		N/A
	Risk group marking and location:		N/A
	Information for safe operation and installation		N/A
10.4.2	Requirements for enclosures		N/A
	UV radiation exposure :		N/A
10.4.3	Instructional safeguard :		N/A
10.5	**Safeguards against X-radiation**		N/A
10.5.1	Requirements		N/A
	Instructional safeguard for skilled persons :		—
10.5.3	Maximum radiation (pA/kg) :		—
10.6	**Safeguards against acoustic energy sources**		P

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Clause	Requirement + Test	Result - Remark	Verdict
10.6.1	General	See below	P
10.6.2	Classification		N/A
	Acoustic output $L_{Aeq,T}$, dB(A) :		N/A
	Unweighted RMS output voltage (mV) :		N/A
	Digital output signal (dBFS) :		N/A
10.6.3	Requirements for dose-based systems		N/A
10.6.3.1	General requirements		N/A
10.6.3.2	Dose-based warning and automatic decrease		N/A
10.6.3.3	Exposure-based warning and requirements		N/A
	30 s integrated exposure level (MEL30) :		N/A
	Warning for MEL ≥ 100 dB(A) :		N/A
10.6.4	Measurement methods		N/A
10.6.5	Protection of persons		N/A
	Instructional safeguards :		N/A
10.6.6	Requirements for listening devices (headphones, earphones, etc.)		P
10.6.6.1	Corded listening devices with analogue input		N/A
	Listening device input voltage (mV) :		N/A
10.6.6.2	Corded listening devices with digital input		N/A
	Max. acoustic output $L_{Aeq,T}$, dB(A) :		N/A
10.6.6.3	Cordless listening devices	See below	P
	Max. acoustic output $L_{Aeq,T}$, dB(A) :	L: 74.52dB(A) R: 72.92dB(A)	P
B	**NORMAL OPERATING CONDITION TESTS, ABNORMAL OPERATING CONDITION TESTS AND SINGLE FAULT CONDITION TESTS**		P
B.1	**General**		P
B.1.5	Temperature measurement conditions		P
B.2	**Normal operating conditions**		P
B.2.1	General requirements :	(See Test Item Particulars and appended test tables)	P
	Audio Amplifiers and equipment with audio amplifiers :	(See Test Item Particulars and appended test tables)	P
B.2.3	Supply voltage and tolerances		N/A
B.2.5	Input test :	(See appended table B.2.5)	P
B.3	**Simulated abnormal operating conditions**		P

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Clause	Requirement + Test	Result - Remark	Verdict
B.3.1	General	(See appended table B.3)	P
B.3.2	Covering of ventilation openings	No such components	N/A
	Instructional safeguard :		N/A
B.3.3	DC mains polarity test	Not connected to D.C. mains	N/A
B.3.4	Setting of voltage selector	No such components	N/A
B.3.5	Maximum load at output terminals	No such terminals	N/A
B.3.6	Reverse battery polarity	Can't be reverse as for the construction	N/A
B.3.7	Audio amplifier abnormal operating conditions	(See appended table B.3)	P
B.3.8	Safeguards functional during and after abnormal operating conditions :	(See appended table B.3)	P
B.4	**Simulated single fault conditions**		P
B.4.1	General		P
B.4.2	Temperature controlling device	No such components	N/A
B.4.3	Blocked motor test		N/A
B.4.4	Functional insulation		P
B.4.4.1	Short circuit of clearances for functional insulation	The functional insulation was short-circuited. (See appended table B.4)	P
B.4.4.2	Short circuit of creepage distances for functional insulation	The functional insulation was short-circuited. (See appended table B.4)	P
B.4.4.3	Short circuit of functional insulation on coated printed boards		N/A
B.4.5	Short-circuit and interruption of electrodes in tubes and semiconductors		N/A
B.4.6	Short circuit or disconnection of passive components	(See appended table B.4)	P
B.4.7	Continuous operation of components		N/A
B.4.8	Compliance during and after single fault conditions	(See appended table B.4)	P
B.4.9	Battery charging and discharging under single fault conditions	See Annex M	P
C	**UV RADIATION**		N/A
C.1	**Protection of materials in equipment from UV radiation**		N/A
C.1.2	Requirements	No UV radiation	N/A
C.1.3	Test method		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
C.2	**UV light conditioning test**		N/A
C.2.1	Test apparatus :		N/A
C.2.2	Mounting of test samples		N/A
C.2.3	Carbon-arc light-exposure test		N/A
C.2.4	Xenon-arc light-exposure test		N/A
D	**TEST GENERATORS**		N/A
D.1	**Impulse test generators**		N/A
D.2	**Antenna interface test generator**		N/A
D.3	**Electronic pulse generator**		N/A
E	**TEST CONDITIONS FOR EQUIPMENT CONTAINING AUDIO AMPLIFIERS**		P
E.1	**Electrical energy source classification for audio signals**		P
	Maximum non-clipped output power (W) :	Max. attainable power.	—
	Rated load impedance (Ω) :	(See appended table 4.1.2)	—
	Open-circuit output voltage (V) :		—
	Instructional safeguard :	ES1, no need Instructional safeguard.	—
E.2	**Audio amplifier normal operating conditions**		P
	Audio signal source type :		—
	Audio output power (W) :	Max. attainable power.	—
	Audio output voltage (V):		—
	Rated load impedance (Ω) :	(See appended table 4.1.2)	—
	Requirements for temperature measurement		P
E.3	Audio amplifier abnormal operating conditions	(See appended table B.3)	P
F	**EQUIPMENT MARKINGS, INSTRUCTIONS, AND INSTRUCTIONAL SAFEGUARDS**		P
F.1	**General**		P
	Language :	English version evaluated	—
F.2	**Letter symbols and graphical symbols**		P
F.2.1	Letter symbols according to IEC60027-1	Used letter symbols according to IEC 60027-1 in label and user manual	P
F.2.2	Graphic symbols according to IEC, ISO or manufacturer specific	Complied	P
F.3	**Equipment markings**		P
F.3.1	Equipment marking locations	The required marking is located on the external enclosure of the	P

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Clause	Requirement + Test	Result - Remark	Verdict
		equipment	
F.3.2	Equipment identification markings	See below	P
F.3.2.1	Manufacturer identification :	See copy of marking plate	P
F.3.2.2	Model identification :	See copy of marking plate	P
F.3.3	Equipment rating markings	See below	P
F.3.3.1	Equipment with direct connection to mains	Not directly connected to the mains	N/A
F.3.3.2	Equipment without direct connection to mains	Not directly connected to the mains	P
F.3.3.3	Nature of the supply voltage :	See the label	P
F.3.3.4	Rated voltage :	See the label	P
F.3.3.5	Rated frequency :	Not directly connected to the mains	N/A
F.3.3.6	Rated current or rated power :	See the label	P
F.3.3.7	Equipment with multiple supply connections		N/A
F.3.4	Voltage setting device	No voltage setting device	N/A
F.3.5	Terminals and operating devices		P
F.3.5.1	Mains appliance outlet and socket-outlet markings :		N/A
F.3.5.2	Switch position identification marking :		N/A
F.3.5.3	Replacement fuse identification and rating markings :		N/A
	Instructional safeguards for neutral fuse :		N/A
F.3.5.4	Replacement battery identification marking :	Comply with Annex M.	P
F.3.5.5	Neutral conductor terminal		N/A
F.3.5.6	Terminal marking location		N/A
F.3.6	Equipment markings related to equipment classification	Class III equipment	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	Protective bonding conductor terminals :		N/A
F.3.6.2	Equipment class marking :		N/A
F.3.6.3	Functional earthing terminal marking :		N/A
F.3.7	Equipment IP rating marking :	IPX0	N/A
F.3.8	External power supply output marking :		N/A
F.3.9	Durability, legibility and permanence of marking	The markings on the equipment is durable and legible, and shall be easily discernable under normal lighting conditions	P

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Clause	Requirement + Test	Result - Remark	Verdict
F.3.10	Test for permanence of markings	Rubbing the marking by hand for 15 s with piece of cloth soaked with water, And for 15 s with a piece of cloth soaked with petroleum spirit at a different place .after this test, marking is legible and cannot be easily possible to remove marking and show no curling	P
F.4	**Instructions**		P
	a) Information prior to installation and initial use		P
	b) Equipment for use in locations where children not likely to be present		N/A
	c) Instructions for installation and interconnection		P
	d) Equipment intended for use only in restricted access area		N/A
	e) Equipment intended to be fastened in place		N/A
	f) Instructions for audio equipment terminals		N/A
	g) Protective earthing used as a safeguard		N/A
	h) Protective conductor current exceeding ES2 limits		N/A
	i) Graphic symbols used on equipment		P
	j) Permanently connected equipment not provided with all-pole mains switch		N/A
	k) Replaceable components or modules providing safeguard function		N/A
	l) Equipment containing insulating liquid		N/A
	m) Installation instructions for outdoor equipment		N/A
F.5	Instructional safeguards		P
G	**COMPONENTS**		N/A
G.1	**Switches**		N/A
G.1.1	General	No such components	N/A
G.1.2	Ratings, endurance, spacing, maximum load		N/A
G.1.3	Test method and compliance		N/A
G.2	**Relays**		N/A
G.2.1	Requirements	No such components	N/A
G.2.2	Overload test		N/A
G.2.3	Relay controlling connectors supplying power to		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	other equipment		
G.2.4	Test method and compliance		N/A
G.3	**Protective devices**		N/A
G.3.1	Thermal cut-offs	No such components	N/A
	Thermal cut-outs separately approved according to IEC 60730 with conditions indicated in a) & b)		N/A
	Thermal cut-outs tested as part of the equipment as indicated in c)		N/A
G.3.1.2	Test method and compliance		N/A
G.3.2	Thermal links		N/A
G.3.2.1	a) Thermal links tested separately according to IEC 60691 with specifics		N/A
	b) Thermal links tested as part of the equipment		N/A
G.3.2.2	Test method and compliance		N/A
G.3.3	PTC thermistors		N/A
G.3.4	Overcurrent protection devices		N/A
G.3.5	Safeguards components not mentioned in G.3.1 to G.3.4		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
G.4.1	Spacings	No such components	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 such components	N/A
G.5.1.2	Protection against mechanical stress		N/A
G.5.2	Endurance test		N/A
G.5.2.1	General test requirements		N/A
G.5.2.2	Heat run test		N/A
	Test time (days per cycle) :		—
	Test temperature (°C) :		—
G.5.2.3	Wound components supplied from the mains		N/A
G.5.2.4	No insulation breakdown		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
G.5.3	Transformers	No such components	N/A
G.5.3.1	Compliance method :		N/A
	Position:		N/A
	Method of protection :		N/A
G.5.3.2	Insulation		N/A
	Protection from displacement of windings :		—
G.5.3.3	Transformer overload tests		N/A
G.5.3.3.1	Test conditions		N/A
G.5.3.3.2	Winding temperatures		N/A
G.5.3.3.3	Winding temperatures - alternative test method		N/A
G.5.3.4	Transformers using FIW		N/A
G.5.3.4.1	General		N/A
	FIW wire nominal diameter :		—
G.5.3.4.2	Transformers with basic insulation only		N/A
G.5.3.4.3	Transformers with double insulation or reinforced insulation :		N/A
G.5.3.4.4	Transformers with FIW wound on metal or ferrite core		N/A
G.5.3.4.5	Thermal cycling test and compliance		N/A
G.5.3.4.6	Partial discharge test		N/A
G.5.3.4.7	Routine test		N/A
G.5.4	Motors		N/A
G.5.4.1	General requirements	No such components	N/A
G.5.4.2	Motor overload test conditions		N/A
G.5.4.3	Running overload test		N/A
G.5.4.4.2	Locked-rotor overload test		N/A
	Test duration (days) :		—
G.5.4.5	Running overload test for DC motors		N/A
G.5.4.5.2	Tested in the unit		N/A
G.5.4.5.3	Alternative method		N/A
G.5.4.6	Locked-rotor overload test for DC motors		N/A
G.5.4.6.2	Tested in the unit		N/A
	Maximum Temperature :		N/A
G.5.4.6.3	Alternative method		N/A
G.5.4.7	Motors with capacitors		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
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 such components	N/A
G.6.2	Enamelled winding wire insulation		N/A
G.7	**Mains supply cords**		N/A
G.7.1	General requirements	No such components	N/A
	Type :		—
G.7.2	Cross sectional area (mm^2 or AWG) :		N/A
G.7.3	Cord anchorages and strain relief for non-detachable power supply cords		N/A
G.7.3.2	Cord strain relief		N/A
G.7.3.2.1	Requirements		N/A
	Strain relief test force (N) :		N/A
G.7.3.2.2	Strain relief mechanism failure		N/A
G.7.3.2.3	Cord sheath or jacket position, distance (mm) :		N/A
G.7.3.2.4	Strain relief and cord anchorage 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	Test method and compliance		N/A
	Overall diameter or minor overall dimension, *D* (mm) :		—
	Radius of curvature after test (mm) :		—
G.7.6	Supply wiring space		N/A
G.7.6.1	General requirements		N/A
G.7.6.2	Stranded wire		N/A
G.7.6.2.1	Requirements		N/A
G.7.6.2.2	Test with 8 mm strand		N/A
G.8	**Varistors**		N/A
G.8.1	General requirements	No such components	N/A
G.8.2	Safeguards against fire		N/A
G.8.2.1	General		N/A
G.8.2.2	Varistor overload test		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
G.8.2.3	Temporary overvoltage test		N/A
G.9	**Integrated circuit (IC) current limiters**		N/A
G.9.1	Requirements	No such components	N/A
	IC limiter output current (max. 5A) :		—
	Manufacturers' defined drift :		—
G.9.2	Test Program		N/A
G.9.3	Compliance		N/A
G.10	**Resistors**		N/A
G.10.1	General	No such components	N/A
G.10.2	Conditioning		N/A
G.10.3	Resistor test		N/A
G.10.4	Voltage surge test		N/A
G.10.5	Impulse test		N/A
G.10.6	Overload test		N/A
G.11	**Capacitors and RC units**		N/A
G.11.1	General requirements	No such components	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 with specifics	No such components	N/A
	Type test voltage $V_{ini,a}$:		—
	Routine test voltage, $V_{ini,b}$:		—
G.13	**Printed boards**		N/A
G.13.1	General requirements		N/A
G.13.2	Uncoated printed boards		N/A
G.13.3	Coated printed boards		N/A
G.13.4	Insulation between conductors on the same inner surface		N/A
G.13.5	Insulation between conductors on different surfaces		N/A
	Distance through insulation :		N/A
	Number of insulation layers (pcs) :		—
G.13.6	Tests on coated printed boards		N/A
G.13.6.1	Sample preparation and preliminary inspection		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
G.13.6.2	Test method and compliance		N/A
G.14	**Coating on components terminals**		N/A
G.14.1	Requirements :	No such components	N/A
G.15	**Pressurized liquid filled components**		N/A
G.15.1	Requirements	No such components	N/A
G.15.2	Test methods and compliance		N/A
G.15.2.1	Hydrostatic pressure test		N/A
G.15.2.2	Creep resistance test		N/A
G.15.2.3	Tubing and fittings compatibility test		N/A
G.15.2.4	Vibration test		N/A
G.15.2.5	Thermal cycling test		N/A
G.15.2.6	Force test		N/A
G.15.3	Compliance		N/A
G.16	**IC including capacitor discharge function (ICX)**		N/A
G.16.1	Condition for fault tested is not required	No such components	N/A
	ICX with associated circuitry tested in equipment		N/A
	ICX tested separately		N/A
G.16.2	Tests		N/A
	Smallest capacitance and smallest resistance specified by ICX manufacturer for impulse test :		—
	Mains voltage that impulses to be superimposed on :		—
	Largest capacitance and smallest resistance for ICX tested by itself for 10000 cycles test :		—
G.16.3	Capacitor discharge test:		N/A
H	**CRITERIA FOR TELEPHONE RINGING SIGNALS**		N/A
H.1	**General**		N/A
H.2	**Method A**		N/A
H.3	**Method B**		N/A
H.3.1	Ringing signal	No ringing signals	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

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Clause	Requirement + Test	Result - Remark	Verdict
H.3.2.1	Conditions for use of a tripping device or a monitoring voltage		N/A
H.3.2.2	Tripping device		N/A
H.3.2.3	Monitoring voltage (V) :		N/A
J	**INSULATED WINDING WIRES FOR USE WITHOUT INTERLEAVED INSULATION**		N/A
J.1	**General**		N/A
	Winding wire insulation :	No such components	—
	Solid round winding wire, diameter (mm):		N/A
	Solid square and rectangular (flatwise bending) winding wire, cross-sectional area (mm^2):		N/A
J.2/J.3	Tests and Manufacturing		—
K	**SAFETY INTERLOCKS**		N/A
K.1	**General requirements**		N/A
	Instructional safeguard :	No such components	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
K.5.1	Under single fault condition		N/A
K.6	**Mechanically operated safety interlocks**		N/A
K.6.1	Endurance requirement		N/A
K.6.2	Test method and compliance :		N/A
K.7	**Interlock circuit isolation**		N/A
K.7.1	Separation distance for contact gaps & interlock circuit elements		N/A
	In circuit connected to mains, separation distance for contact gaps (mm) :		N/A
	In circuit isolated from mains, separation distance for contact gaps (mm) :		N/A
	Electric strength test before and after the test of K.7.2 :		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	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
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
	Instructional safeguard :		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	Batteries and their cells comply with relevant IEC standards :	(See table 4.1.2)	P
M.3	**Protection circuits for batteries provided within the equipment**		P
M.3.1	Requirements	See below	P
M.3.2	Test method		P
	Overcharging of a rechargeable battery	(See appended table Annex M.3)	P
	Excessive discharging	(See appended table Annex M.3)	P
	Unintentional charging of a non-rechargeable battery		N/A
	Reverse charging of a rechargeable battery	The construction of battery can't be reverse charged	N/A
M.3.3	Compliance	After test, no hazards.	P
M.4	**Additional safeguards for equipment containing a portable secondary lithium battery**		P
M.4.1	General	See appended table Annex M.4	P
M.4.2	Charging safeguards	See below	P
M.4.2.1	Requirements	Not exceed the limits	P
M.4.2.2	Compliance :	See appended table Annex M.4.	P
M.4.3	Fire enclosure :	All batteries are comply with PS1, so does not apply.	N/A
M.4.4	Drop test of equipment containing a secondary lithium battery	See below	P
M.4.4.2	Preparation and procedure for the drop test	1000mm height applied. Following order from Step 1 to Step 3	P

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Clause	Requirement + Test	Result - Remark	Verdict
M.4.4.3	Drop, Voltage on reference and dropped batteries (V); voltage difference during 24 h period (%): :	After testing, the change of the open circuit voltage of the dropped battery is not more than 5% of the voltage of the undropped battery	P
M.4.4.4	Check of the charge/discharge function	Three complete discharge and charge cycles under normal operating conditions	P
M.4.4.5	Charge / discharge cycle test	After test, no fire and no explosion.	P
M.4.4.6	Compliance	After test, no hazards.	P
M.5	**Risk of burn due to short-circuit during carrying**		P
M.5.1	Requirement		P
M.5.2	Test method and compliance	No hazards.	P
M.6	**Safeguards against short-circuits**		P
M.6.1	External and internal faults		P
M.6.2	Compliance	No hazards.	P
M.7	**Risk of explosion from lead acid and NiCd batteries**		N/A
M.7.1	Ventilation preventing explosive gas concentration		N/A
	Calculated hydrogen generation rate :		N/A
M.7.2	Test method and compliance		N/A
	Minimum air flow rate, Q (m^3/h) :		N/A
M.7.3	Ventilation tests		N/A
M.7.3.1	General		N/A
M.7.3.2	Ventilation test – alternative 1		N/A
	Hydrogen gas concentration (%):		N/A
M.7.3.3	Ventilation test – alternative 2		N/A
	Obtained hydrogen generation rate :		N/A
M.7.3.4	Ventilation test – alternative 3		N/A
	Hydrogen gas concentration (%):		N/A
M.7.4	Marking:		N/A
M.8	**Protection against internal ignition from external spark sources of batteries with aqueous electrolyte**		N/A
M.8.1	General		N/A
M.8.2	Test method		N/A
M.8.2.1	General		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
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**		P
M.9.1	Protection from electrolyte spillage		P
M.9.2	Tray for preventing electrolyte spillage		N/A
M.10	Instructions to prevent reasonably foreseeable misuse		P
	Instructional safeguard :		P
N	**ELECTROCHEMICAL POTENTIALS**		N/A
	Material(s) used:		—
O	**MEASUREMENT OF CREEPAGE DISTANCES AND CLEARANCES**		N/A
	Value of *X* (mm) :		—
P	**SAFEGUARDS AGAINST CONDUCTIVE OBJECTS**		N/A
P.1	**General**		N/A
P.2	**Safeguards against entry or consequences of entry of a foreign object**		N/A
P.2.1	General		N/A
P.2.2	Safeguards against entry of a foreign object		N/A
	Location and Dimensions (mm) :		—
P.2.3	Safeguards against the consequences of entry of a foreign object		N/A
P.2.3.1	Safeguard requirements		N/A
	The ES3 and PS3 keep-out volume in Figure P.3 not applicable to transportable equipment		N/A
	Transportable equipment with metalized plastic parts :		N/A
P.2.3.2	Consequence of entry test :		N/A
P.3	**Safeguards against spillage of internal liquids**		N/A
P.3.1	General		N/A
P.3.2	Determination of spillage consequences		N/A
P.3.3	Spillage safeguards		N/A
P.3.4	Compliance		N/A
P.4	**Metallized coatings and adhesives securing parts**		N/A
P.4.1	General		N/A
P.4.2	Tests		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Conditioning, T_C (°C) :		—
	Duration (weeks) :		—
Q	**CIRCUITS INTENDED FOR INTERCONNECTION WITH BUILDING WIRING**		N/A
Q.1	**Limited power sources**		N/A
Q.1.1	Requirements		N/A
	a) Inherently limited output		N/A
	b) Impedance limited output		N/A
	c) Regulating network limited output		N/A
	d) Overcurrent protective device limited output		N/A
	e) IC current limiter complying with G.9		N/A
Q.1.2	Test method and compliance :		N/A
	Current rating of overcurrent protective device (A) :		N/A
Q.2	**Test for external circuits – paired conductor cable**		N/A
	Maximum output current (A) :		N/A
	Current limiting method :		—
R	**LIMITED SHORT CIRCUIT TEST**		N/A
R.1	**General**		N/A
R.2	**Test setup**		N/A
	Overcurrent protective device for test :		—
R.3	**Test method**		N/A
	Cord/cable used for test :		—
R.4	**Compliance**		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**		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

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Clause	Requirement + Test	Result - Remark	Verdict
S.2	**Flammability test for fire enclosure and fire barrier integrity**		N/A
	Samples, material :		—
	Wall thickness (mm) :		—
	Conditioning (°C) :		—
S.3	**Flammability test for the bottom of a fire enclosure**		N/A
S.3.1	Mounting of samples		N/A
S.3.2	Test method and compliance		N/A
	Mounting of samples :		—
	Wall thickness (mm) :		—
S.4	**Flammability classification of materials**		N/A
S.5	**Flammability test for fire enclosures and fire barrier materials of equipment where the steady state power exceeding 4 000 W**		N/A
	Samples, material :		—
	Wall thickness (mm) :		—
	Conditioning (°C) :		—
T	**MECHANICAL STRENGTH TESTS**		P
T.1	**General**		P
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 :**	(See appended table Annex T.4)	P
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 Annex T.7)	P
T.8	**Stress relief test :**	(See appended table Annex T.8)	P
T.9	**Glass Impact Test :**		N/A
T.10	**Glass fragmentation test**		N/A
	Number of particles counted :		N/A
T.11	**Test for telescoping or rod antennas**		N/A
	Torque value (Nm) :		N/A
U	**MECHANICAL STRENGTH OF CATHODE RAY TUBES (CRT) AND PROTECTION AGAINST THE EFFECTS OF IMPLOSION**		N/A
U.1	**General**		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Instructional safeguard :		N/A
U.2	**Test method and compliance for non-intrinsically protected CRTs**		N/A
U.3	**Protective screen**		N/A
V	**DETERMINATION OF ACCESSIBLE PARTS**		P
V.1	**Accessible parts of equipment**		P
V.1.1	General	Only plastic enclosure can be touched by test probes of Figure V.2. No hazards.	P
V.1.2	Surfaces and openings tested with jointed test probes		N/A
V.1.3	Openings tested with straight unjointed test probes		N/A
V.1.4	Plugs, jacks, connectors tested with blunt probe		N/A
V.1.5	Slot openings tested with wedge probe		N/A
V.1.6	Terminals tested with rigid test wire		N/A
V.2	**Accessible part criterion**		P
X	**ALTERNATIVE METHOD FOR DETERMINING CLEARANCES FOR INSULATION IN CIRCUITS CONNECTED TO AN AC MAINS NOT EXCEEDING 420 V PEAK (300 V RMS)**		N/A
	Clearance :		N/A
Y	**CONSTRUCTION REQUIREMENTS FOR OUTDOOR ENCLOSURES**		N/A
Y.1	**General**		N/A
Y.2	**Resistance to UV radiation**		N/A
Y.3	**Resistance to corrosion**		N/A
Y.3.1	Metallic parts of outdoor enclosures are resistant to effects of water-borne contaminants by :		N/A
Y.3.2	Test apparatus		N/A
Y.3.3	Water – saturated sulphur dioxide atmosphere		N/A
Y.3.4	Test procedure :		N/A
Y.3.5	Compliance		N/A
Y.4	**Gaskets**		N/A
Y.4.1	General		N/A
Y.4.2	Gasket tests		N/A
Y.4.3	Tensile strength and elongation tests		N/A
	Alternative test methods:		N/A
Y.4.4	Compression test		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
Y.4.5	Oil resistance		N/A
Y.4.6	Securing means		N/A
Y.5	**Protection of equipment within an outdoor enclosure**		N/A
Y.5.1	General		N/A
Y.5.2	Protection from moisture		N/A
	Relevant tests of IEC 60529 or Y.5.3 :		N/A
Y.5.3	Water spray test		N/A
Y.5.4	Protection from plants and vermin		N/A
Y.5.5	Protection from excessive dust		N/A
Y.5.5.1	General		N/A
Y.5.5.2	IP5X equipment		N/A
Y.5.5.3	IP6X equipment		N/A
Y.6	**Mechanical strength of enclosures**		N/A
Y.6.1	General		N/A
Y.6.2	Impact test :		N/A

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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 IEC 62368-1:2020+A11:2020

Attachment Form No.....: EU_GD_IEC62368_1E

Attachment Originator .....: UL(Demko)

Master Attachment.....: 2021-02-04

	CENELEC COMMON MODIFICATIONS (EN)	P
	Clause numbers in the cells that are shaded light grey are clause references in EN IEC 62368-1:2020+A11:2020. All other clause numbers in that column, except for those in the paragraph below, refers to IEC 62368-1:2018. Clauses, subclauses, notes, tables, figures and annexes which are additional to those in IEC 62368-1:2018 are prefixed “Z”.	P
	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
1	**Modification to Clause 3 .**	N/A
3.3.19	**Sound exposure** *Replace 3.3.19 of IEC 62368-1 with the following definitions:*	N/A

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

3.3.19.1	**momentary exposure level, MEL** metric for estimating 1 s sound exposure level from the HD 483-1 S2 test signal applied to both channels, based on EN 50332-1:2013, 4.2. Note 1 to entry: MEL is measured as A-weighted levels in dB. Note 2 to entry: See B.3 of EN 50332-3:2017 for additional information.		N/A
3.3.19.3	**sound exposure, *E*** A-weighted sound pressure (p) squared and integrated over a stated period of time, T Note 1 to entry: The SI unit is Pa^2 s. $E = \int_0^T p(t)^2 \, dt$		N/A
3.3.19.4	**sound exposure level, *SEL*** logarithmic measure of sound exposure relative to a reference value, E_0, typically the 1 kHz threshold of hearing in humans. Note 1 to entry: *SEL* is measured as A-weighted levels in dB. $SEL = 10 \lg \left(\frac{E}{E_0}\right)$ dB Note 2 to entry: See B.4 of EN 50332-3:2017 for additional information.		N/A
3.3.19.5	**digital signal level relative to full scale, dBFS** levels reported in dBFS are always r.m.s. Full scale level, 0 dBFS, is the level of a dc-free 997-Hz sine wave whose undithered positive peak value is positive digital full scale, leaving the code corresponding to negative digital full scale unused Note 1 to entry: It is invalid to use dBFS for non-r.m.s. levels. Because the definition of full scale is based on a sine wave, the level of signals with a crest factor lower than that of a sine wave may exceed 0 dBFS. In particular, square wave signals may reach +3,01 dBFS.		N/A
2	**Modification to Clause 10**		P
10.6	**Safeguards against acoustic energy sources** Replace 10.6 of IEC 62368-1 with the following:		P
10.6.1.1	**Introduction** **Safeguard** requirements for protection against		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	long-term exposure to excessive sound pressure levels from personal music players closely coupled to the ear are specified below. Requirements for earphones and headphones intended for use with personal music players are also covered. A personal music player is a portable equipment intended for use by an **ordinary person**, that: – is designed to allow the user to listen to audio or audiovisual content / material; and – uses a listening device, such as headphones or earphones that can be worn in or on or around the ears; and – has a player that can be body worn (of a size suitable to be carried in a clothing pocket) and is intended for the user to walk around with while in continuous use (for example, on a street, in a subway, at an airport, etc.). EXAMPLES Portable CD players, MP3 audio players, mobile phones with MP3 type features, PDAs or similar equipment. Personal music players shall comply with the requirements of either 10.6.2 or 10.6.3. NOTE 1 Protection against acoustic energy sources from telecom applications is referenced to ITU-T P.360. NOTE 2 It is the intention of the Committee to allow the alternative methods for now, but to only use the dose measurement method as given in 10.6.5 in future. Therefore, manufacturers are encouraged to implement 10.6.5 as soon as possible. Listening devices sold separately shall comply with the requirements of 10.6.6. These requirements are valid for music or video mode only. The requirements do not apply to: – professional equipment; NOTE 3 Professional equipment is equipment sold through special sales channels. All products sold through normal electronics stores are considered not to be professional equipment. – hearing aid equipment and other devices for assistive listening; – the following type of analogue personal music players: • long distance radio receiver (for example, a multiband radio receiver or world band radio receiver, an AM radio receiver), and • cassette player/recorder; NOTE 4 This exemption has been allowed because this technology is falling out of use and it is expected that within a few years it will no longer exist. This exemption will not		

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Clause	Requirement + Test	Result - Remark	Verdict

	be extended to other technologies. – a player while connected to an external amplifier that does not allow the user to walk around while in use. For equipment that is clearly designed or intended primarily for use by children, the limits of the relevant toy standards may apply. The relevant requirements are given in EN 71-1:2011, 4.20 and the related tests methods and measurement distances apply.		
10.6.1.2	**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.		N/A
10.6.2	**Classification of devices without the capacity to estimate sound dose**		N/A
10.6.2.1	**General** This standard is transitioning from short-term based (30 s) requirements to long-term based (40 hour) requirements. These clauses remain in effect only for devices that do not comply with sound dose estimation as stipulated in EN 50332-3. For classifying the acoustic output $L_{Aeq,T}$, measurements are based on the A-weighted equivalent sound pressure level over a 30 s period. For music where the average sound pressure (long term $L_{Aeq,T}$) measured over the duration of the song is lower than the average produced by the programme simulation noise, measurements may be done over the duration of the complete song. In this case, T becomes the duration of the song. NOTE Classical music, acoustic music and broadcast typically has an average sound pressure (long term $L_{Aeq,T}$) which is much lower than the average programme simulation noise. Therefore, if the player is capable to analyse the content and compare it with the programme simulation noise, the warning does not need to be given as long as the average sound pressure of the song does not exceed the required limit.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	For example, if the player is set with the programme simulation noise to 85 dB, but the average music level of the song is only 65 dB, there is no need to give a warning or ask an acknowledgement as long as the average sound level of the song is not above the basic limit of 85 dB.		
10.6.2.2	**RS1 limits (to be superseded, see 10.6.3.2)** RS1 is a class 1 acoustic energy source that does not exceed the following: – for equipment provided as a package (player with its listening device), and with a proprietary connector between the player and its listening device, or where the combination of player and listening device is known by other means such as setting or automatic detection, the $L_{Aeq,T}$ acoustic output shall be ≤ 85 dB when playing the fixed "programme simulation noise" described in EN 50332-1. – for equipment provided with a standardized connector (for example, a 3,5 phone jack) that allows connection to a listening device for general use, the unweighted r.m.s. output voltage shall be ≤ 27 mV (analogue interface) or -25 dBFS (digital interface) when playing the fixed "programme simulation noise" described in EN 50332-1. – The RS1 limits will be updated for all devices as per 10.6.3.2.		N/A
10.6.2.3	**RS2 limits (to be superseded, see 10.6.3.3)** RS2 is a class 2 acoustic energy source that does not exceed the following: – for equipment provided as a package (player with its listening device), and with a proprietary connector between the player and its listening device, or when the combination of player and listening device is known by other means such as setting or automatic 130 detection, the $L_{Aeq,T}$ acoustic output shall be ≤ 100 dB(A) when playing the fixed "programme simulation noise" as described in EN 50332-1. – for equipment provided with a standardized connector (for example, a 3,5 phone jack) that allows connection to a listening device for general use, the unweighted r.m.s. output voltage shall be ≤ 150 mV (analogue interface) or -10 dBFS (digital interface) when playing the fixed "programme simulation noise" as described in EN 50332-1.		N/A
10.6.2.4	**RS3 limits** RS3 is a class 3 acoustic energy source that exceeds RS2 limits.		N/A
10.6.3	**Classification of devices (new)**		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
10.6.3.1	**General** Previous limits (10.6.2) created abundant false negative and false positive PMP sound level warnings. New limits, compliant with The Commission Decision of 23 June 2009, are given below.		N/A
10.6.3.2	**RS1 limits (new)** RS1 is a class 1 acoustic energy source that does not exceed the following: – for equipment provided as a package (player with its listening device), and with a proprietary connector between the player and its listening device, or where the combination of player and listening device is known by other means such as setting or automatic detection, the $L_{Aeq,T}$ acoustic output shall be ≤ 80 dB when playing the fixed "programme simulation noise" described in EN 50332-1. – for equipment provided with a standardized connector (for example, a 3,5 phone jack) that allows connection to a listening device for general use, the unweighted r.m.s. output voltage shall be ≤ 15 mV (analogue interface) or -30 dBFS (digital interface) when playing the fixed "programme simulation noise" described in EN 50332-1.		N/A
10.6.3.3	**RS2 limits (new)** RS2 is a class 2 acoustic energy source that does not exceed the following: – for equipment provided as a package (player with its listening device), and with a proprietary connector between the player and its listening device, or where the combination of player and listening device is known by other means such as setting or automatic detection, the weekly sound exposure level, as described in EN 50332-3, shall be ≤ 80 dB when playing the fixed "programme simulation noise" described in EN 50332-1. – for equipment provided with a standardized connector (for example, a 3,5 phone jack) that allows connection to a listening device for general use, the unweighted r.m.s. output level, integrated over one week, as described in EN50332-3, shall be ≤ 15 mV (analogue interface) or -30 dBFS (digital interface) when playing the fixed "programme simulation noise" described in EN 50332-1.		N/A
10.6.4	**Requirements for maximum sound exposure**		N/A
10.6.4.1	**Measurement methods** All volume controls shall be turned to maximum		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	during tests. Measurements shall be made in accordance with EN 50332-1 or EN 50332-2 as applicable.		
10.6.4.2	**Protection of persons** Except as given below, protection requirements for parts **accessible** to **ordinary persons**, **instructed persons** and **skilled persons** are given in 4.3. NOTE 1 Volume control is not considered a **safeguard.** Between RS2 and an **ordinary person**, the **basic safeguard** may be replaced by an **instructional safeguard** in accordance with Clause F.5, except that the **instructional safeguard** shall be placed on the equipment, or on the packaging, or in the instruction manual. Alternatively, the **instructional safeguard** may be given through the equipment display during use. The elements of the **instructional safeguard** shall be as follows: – element 1a: the symbol  , IEC 60417-6044 (2011-01) – element 2: “High sound pressure” or equivalent wording – element 3: “Hearing damage risk” or equivalent wording – element 4: “Do not listen at high volume levels for long periods.” or equivalent wording An **equipment safeguard** shall prevent exposure of an **ordinary person** to an RS2 source without intentional physical action from the **ordinary person** and shall automatically return to an output level not exceeding what is specified for an RS1 source when the power is switched off. The equipment shall provide a means to actively inform the user of the increased sound level when the equipment is operated with an output exceeding RS1. Any means used shall be acknowledged by the user before activating a mode of operation which allows for an output exceeding RS1. The acknowledgement does not need to be repeated more than once every 20 h of cumulative listening time. NOTE 2 Examples of means include visual or audible signals. Action from the user is always needed. NOTE 3 The 20 h listening time is the accumulative listening		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

	time, independent of how often and how long the personal music player has been switched off. A **skilled person** shall not be unintentionally exposed to RS3.		
10.6.5	**Requirements for dose-based systems**		N/A
10.6.5.1	**General requirements** Personal music players shall give the warnings as provided below when tested according to EN 50332-3, using the limits from this clause. The manufacturer may offer optional settings to allow the users to modify when and how they wish to receive the notifications and warnings to promote a better user experience without defeating the safeguards. This allows the users to be informed in a method that best meets their physical capabilities and device usage needs. If such optional settings are offered, an administrator (for example, parental restrictions, business/educational administrators, etc.) shall be able to lock any optional settings into a specific configuration. The personal music player shall be supplied with easy to understand explanation to the user of the dose management system, the risks involved, and how to use the system safely. The user shall be made aware that other sources may significantly contribute to their sound exposure, for example work, transportation, concerts, clubs, cinema, car races, etc.		N/A
10.6.5.2	**Dose-based warning and requirements** When a dose of 100 % *CSD* is reached, and at least at every 100 % further increase of *CSD*, the device shall warn the user and require an acknowledgement. In case the user does not acknowledge, the output level shall automatically decrease to compliance with class RS1. The warning shall at least clearly indicate that listening above 100 % *CSD* leads to the risk of hearing damage or loss.		N/A
10.6.5.3	**Exposure-based requirements** With only dose-based requirements, cause and effect could be far separated in time, defying the purpose of educating users about safe listening practice. In addition to dose-based requirements, a PMP shall therefore also put a limit to the short-term sound level a user can listen at.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	The exposure-based limiter (EL) shall automatically reduce the sound level not to exceed 100 dB(A) or 150 mV integrated over the past 180 s, based on methodology defined in EN 50332-3. The EL settling time (time from starting level reduction to reaching target output) shall be 10 s or faster. Test of EL functionality is conducted according to EN 50332-3, using the limits from this clause. For equipment provided as a package (player with its listening device), the level integrated over 180 s shall be 100 dB or lower. For equipment provided with a standardized connector, the unweighted level integrated over 180 s shall be no more than 150 mV for an analogue interface and no more than -10 dBFS for a digital interface. NOTE In case the source is known not to be music (or test signal), the EL may be disabled.		

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Clause	Requirement + Test	Result - Remark	Verdict

10.6.6	**Requirements for listening devices (headphones, earphones, etc.)**		P
10.6.6.1	**Corded listening devices with analogue input** With 94 dB L_{Aeq} acoustic pressure output of the listening device, and with the volume and sound settings in the listening device (for example, built-in volume level control, additional sound features like equalization, etc.) set to the combination of positions that maximize the measured acoustic output, the input voltage of the listening device when playing the fixed "programme simulation noise" as described in EN 50332-1 shall be ≥ 75 mV. NOTE The values of 94 dB and 75 mV correspond with 85 dB and 27 mV or 100 dB and 150 mV.		N/A
10.6.6.2	**Corded listening devices with digital input** With any playing device playing the fixed "programme simulation noise" described in EN 50332-1, and with the volume and sound settings in the listening device (for example, built-in volume level control, additional sound features like equalization, etc.) set to the combination of positions that maximize the measured acoustic output, the $L_{Aeq,T}$ acoustic output of the listening device shall be ≤ 100 dB with an input signal of -10 dBFS.		N/A
10.6.6.3	**Cordless listening devices** In cordless mode, – with any playing and transmitting device playing the fixed programme simulation noise described in EN 50332-1; and – respecting the cordless transmission standards, where an air interface standard exists that specifies the equivalent acoustic level; and – with volume and sound settings in the receiving device (for example, built-in volume level control, additional sound features like equalization, etc.) set to the combination of positions that maximize the measured acoustic output for the above mentioned programme simulation noise, the $L_{Aeq,T}$ acoustic output of the listening device shall be ≤ 100 dB with an input signal of -10 dBFS.	L: 74.52dB(A) R: 72.92dB(A)	P
10.6.6.4	**Measurement method** *Measurements shall be made in accordance with EN 50332-2 as applicable.*		P
3	**Modification to the whole document**		

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Clause	Requirement + Test	Result - Remark	Verdict

	Delete all the "country" notes in the reference document according to the following list: 0.2.1 Note 1 and 2 | 1 Note 4 and 5 | 3.3.8.1 Note 2 3.3.8.3 Note 1 | 4.1.15 Note | 4.7.3 Note 1 and 2 5.2.2.2 Note | 5.4.2.3.2.2 Table 12 Note c | 5.4.2.3.2.4 Note 1 and 3 5.4.2.3.2.4 Table 13 Note 2 | 5.4.2.5 Note 2 | 5.4.5.1 Note 5.4.10.2.1 Note | 5.4.10.2.2 Note | 5.4.10.2.3 Note 5.5.2.1 Note | 5.5.6 Note | 5.6.4.2.1 Note 2 and 3 and 4 5.6.8 Note 2 | 5.7.6 Note | 5.7.7.1 Note 1 and Note 2 8.5.4.2.3 Note | 10.2.1 Table 39 Note 3 and 4 and 5 | 10.5.3 Note 2 ~~10.6.1~~ Note 3 | F.3.3.6 Note 3 | Y.4.1 Note Y.4.5 Note	P
4	**Modification to Clause 1**	P
1	***Add** the following note:* *NOTE Z1 The use of certain substances in electrical and electronic equipment is restricted within the EU: see Directive 2011/65/EU.*	P

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Clause	Requirement + Test	Result - Remark	Verdict

5	**Modification to 4.Z1**		N/A
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.		N/A
6	**Modification to 5.4.2.3.2.4**		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.		N/A
7	**Modification to 10.2.1**		N/A
10.2.1	Add the following to [c] and [d] in table 39: For additional requirements, see 10.5.1.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

8	**Modification to 10.5.1**		N/A
10.5.1	***Add** the following after the first paragraph:* For RS 1 compliance is checked by measurement under the following conditions: In addition to the normal operating conditions, all controls adjustable from the outside by hand, by any object such as a tool or a coin, and those internal adjustments or pre-sets 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. NOTE Z1 Soldered joints and paint lockings are examples of adequate locking. 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. 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. For RS1, the dose-rate shall not exceed 1 µSv/h taking account of the background level. NOTE Z2 These values appear in Directive 96/29/Euratom of 13 May 1996.		N/A
9	**Modification to G.7.1**		N/A
G.7.1	***Add** the following note:* NOTE Z1 The harmonized code designations corresponding to the IEC cord types are given in Annex ZD.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

10	**Modification to Bibliography**		N/A
	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.		N/A
11	**ADDITION OF ANNEXES**		N/A
ZB	**ANNEX ZB, SPECIAL NATIONAL CONDITIONS (EN)**		N/A
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" In **Norway**: “Apparatet må tilkoples jordet stikkontakt” In **Sweden**: “Apparaten skall anslutas till jordat uttag”		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
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		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.		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 • is subject to routine testing for electric strength during manufacturing, using a test voltage of 1,5 kV. It is permitted to bridge this insulation with a capacitor complying with EN 60384-14:2005,		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	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.		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. *Justification:* 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** 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.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

5.6.4.2.1	**France** After the indent for **pluggable equipment type A**, the following is added: – in certain cases, the **protective current rating** of the circuit supplied from the mains is taken as 20 A instead of 16 A.		N/A
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.		N/A
5.6.8	**Norway** To the end of the subclause the following is added: Equipment connected with an earthed mains plug is classified as **class I equipment**. See the Norway marking requirement in 4.1.15. The symbol IEC 60417-6092, as specified in F.3.6.2, is accepted.		N/A
5.7.6	**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.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

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 .		N/A
5.7.7.1	**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 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		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

	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.".		
8.5.4.2.3	**United Kingdom** Add the following after the 2nd dash bullet in 3rd paragraph: An emergency stop system complying with the requirements of IEC 60204-1 and ISO 13850 is required where there is a risk of personal injury.		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**, until the requirements of Annexes B.3.1 and B.4 are met		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
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 polyphase 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 *Justification:* 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.		N/A

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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.		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		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.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

ZC	**ANNEX ZC, NATIONAL DEVIATIONS (EN)**		N/A
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. *Justification*: German ministerial decree against ionizing radiation (Röntgenverordnung), in force since 2002-07-01, implementing the European Directive 96/29/EURATOM. **NOTE** Contact address: Physikalisch-Technische Bundesanstalt, Bundesallee 100, D-38116 Braunschweig, Tel.: Int+49-531-592-6320, Internet: http://www.ptb.de		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

ZD	**IEC and CENELEC CODE DESIGNATIONS FOR FLEXIBLE CORDS (EN)**	N/A
		N/A

Type of flexible cord	Code designations	
	IEC	CENELEC
PVC insulated cords		
Flat twin tinsel cord	60227 IEC 41	H03VH-Y
Light polyvinyl chloride sheathed flexible cord	60227 IEC 52	H03VV-F H03VVH2-F
Ordinary polyvinyl chloride sheathed flexible cord	60227 IEC 53	H05VV-F H05VVH2-F
Rubber insulated cords		
Braided cord	60245 IEC 51	H03RT-F
Ordinary tough rubber sheathed flexible cord	60245 IEC 53	H05RR-F
Ordinary polychloroprene sheathed flexible cord	60245 IEC 57	H05RN-F
Heavy polychloroprene sheathed flexible cord	60245 IEC 66	H07RN-F
Cords having high flexibility		
Rubber insulated and sheathed cord	60245 IEC 86	H03RR-H
Rubber insulated, crosslinked PVC sheathed cord	60245 IEC 87	H03RV4-H
Crosslinked PVC insulated and sheathed cord	60245 IEC 88	H03V4V4-H
Cords insulated and sheathed with halogen-free thermoplastic compounds		
Light halogen-free thermoplastic insulated and sheathed flexible cords		H03Z1Z1-F H03Z1Z1H2-F
Ordinary halogen-free thermoplastic insulated and sheathed flexible cords		H05Z1Z1-F H05Z1Z1H2-F

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Clause	Requirement + Test	Result - Remark	Verdict

5.2	TABLE: Classification of electrical energy sources						P
Supply Voltage	Location (e.g. circuit designation)	Test conditions	Parameters				ES Class
			U (V)	I (mA)	Type[1)]	Additional Info [2)]	
5.0Vdc	DC input	Normal	5.0Vdc	--	SS	--	ES1
		Abnormal	--	--	--	--	
		Single fault	--	--	--	--	
3.7Vdc	Battery output of charger base	Normal	4.15Vdc	--	SS	--	ES1
		Abnormal	4.15Vdc	--	SS	--	
		Single fault P- to B- of battery PCB Short circuit	4.15Vdc	--	SS	--	
3.7Vdc	Battery cell output of earphone	Normal	4.15Vdc	--	SS	--	ES1
		Abnormal	4.15Vdc	--	SS	--	
		Single fault	4.15Vdc	--	SS	--	
Supplementary information: 1) Type: Steady state (SS), Capacitance (CP), Single pulse (SP), Repetitive pulses (RP), etc. 2) Additional Info: Frequency, Pulse duration, Pulse off time, Capacitance value, etc.							

5.4.1.8	TABLE: Working voltage measurement				N/A
Location	RMS voltage (V)	Peak voltage (V)	Frequency (Hz)	Comments	
--	--	--	--	--	
Supplementary information:					

5.4.1.10.2	TABLE: Vicat softening temperature of thermoplastics			N/A
Method :		ISO 306 / B50		—
Object/ Part No./Material	Manufacturer/trademark	Thickness (mm)	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	Thickness (mm)	Test temperature (°C)	Impression diameter (mm)	

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Clause	Requirement + Test	Result - Remark	Verdict

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Supplementary information:				

5.4.2, 5.4.3	TABLE: Minimum Clearances/Creepage distance							N/A
Clearance (cl) and creepage distance (cr) at/of/between:	U_p (V)	U_{rms} (V)	Freq [1] (Hz)	Required cl (mm)	cl (mm)	E.S. [2] (V)	Required cr (mm)	cr (mm)
--	--	--	--	--	--	--	--	--
Supplementary information: 1) Only for frequency above 30 kHz 2) Complete Electric Strength voltage (E.S. (V) when 5.4.2.4 applied)								

5.4.4.2	TABLE: Minimum distance through insulation			N/A
Distance through insulation (DTI) at/of	Peak voltage (V)	Insulation	Required DTI (mm)	Measured DTI (mm)
--	--	--	--	--
Supplementary information:				

5.4.4.9	TABLE: Solid insulation at frequencies >30 kHz						N/A
Insulation material	E_P	Frequency (kHz)	K_R	Thickness d (mm)	Insulation	V_{PW} (Vpk)	
--	--	--	--	--	--	--	
Supplementary information:							

5.4.9	TABLE: Electric strength tests			N/A
Test voltage applied between:	Voltage shape (Surge, Impulse, AC, DC, etc.)	Test voltage (V)	Breakdown Yes / No	
--	--	--	--	
Supplementary information:				

5.5.2.2	TABLE: Stored discharge on capacitors				N/A
Location	Supply voltage (V)	Operating and fault condition [1]	Switch position	Measured voltage (Vpk)	ES Class
--	--	--	--	--	--
Supplementary information: X-capacitors installed for testing: ☐ bleeding resistor rating: ☐ ICX:					

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Clause	Requirement + Test	Result - Remark	Verdict

1) Normal operating condition (e.g., normal operation, or open fuse), SC= short circuit, OC= open circuit

5.6.6	TABLE: Resistance of protective conductors and terminations				N/A
Location		Test current (A)	Duration (min)	Voltage drop (V)	Resistance (Ω)
--		--	--	--	--
Supplementary information:					

5.7.4	TABLE: Unearthed accessible parts					N/A
Location	Operating and fault conditions	Supply Voltage (V)	Parameters			ES class
			Voltage (V_{rms} or V_{pk})	Current (A_{rms} or A_{pk})	Freq. (Hz)	
--	--	--	--	--	--	--
Supplementary information: Abbreviation: SC= short circuit; OC= open circuit						

5.7.5	TABLE: Earthed accessible conductive part			N/A
Supply voltage (V) :				—
Phase(s) :	[] Single Phase; [ ] Three Phase: [ ] Delta [ ] Wye			
Power Distribution System :	☐ TN ☐ TT ☐ IT			
Location		Fault Condition No in IEC 60990 clause 6.2.2	Touch current (mA)	Comment
--		--	--	--
Supplementary Information:				

5.8	TABLE: Backfeed safeguard in battery backed up supplies					N/A
Location	Supply voltage (V)	Operating and fault condition	Time (s)	Open-circuit voltage (V)	Touch current (A)	ES Class
--	--	--	--	--	--	--
Supplementary information: Abbreviation: SC= short circuit, OC= open circuit						

6.2.2	TABLE: Power source circuit classifications					P
Location	Operating and fault condition	Voltage (V)	Current (A)	Max. Power[1)] (W)	Time (S)	PS class
EUT input	--	--	--	--	--	PS2 (Declared)
Battery for charger base	Normal condition	3.41	2.45	8.36	3	PS1

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Clause	Requirement + Test	Result - Remark	Verdict

	Single fault - (B- to P- of battery PCB Short circuit)	2.80	7.55	20.94	5	PS2
Battery cell for earphone	--	3.12	0.53	1.63	3	PS1
Supplementary information: 5Vdc input declared as PS2 1) Measured after 3 s for PS1 and measured after 5s for PS2 and PS3.						

6.2.3.1	TABLE: Determination of Arcing PIS			N/A
Location	Open circuit voltage after 3 s (Vpk)	Measured r.m.s current (A)	Calculated value	Arcing PIS? Yes / No
--	--	--	--	--
Supplementary information:				

6.2.3.2	TABLE: Determination of resistive PIS		P
Location	Operating and fault condition	Dissipate power (W)	Resistive PIS? Yes / No
--	--	--	--
Supplementary information: The EUT input is PS2 circuits, exist resistive PIS. Abbreviation: SC= short circuit; OC= open circuit			

8.5.5	TABLE: High pressure lamp			N/A
Lamp manufacturer	Lamp type	Explosion method	Longest axis of glass particle (mm)	Particle found beyond 1 m Yes / No
--	--	--	--	--
Supplementary information:				

9.6	TABLE: Temperature measurements for wireless power transmitters								N/A
Supply voltage (V) :									—
Max. transmit power of transmitter (W) :									—
	w/o receiver and direct contact		with receiver and direct contact		with receiver and at distance of 2 mm		with receiver and at distance of 5 mm		
Foreign objects	Object (°C)	Ambient (°C)	Object (°C)	Ambient (°C)	Object (°C)	Ambient (°C)	Object (°C)	Ambient (°C)	
--	--	--	--	--	--	--	--	--	
Supplementary information:									

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

5.4.1.4, 9.3, B.1.5, B.2.6	**TABLE: Temperature measurements**	P

Supply voltage (V) :	5.0Vdc charge by power supply		Earphone battery 3.7Vdc discharge mode		—
Ambient temperature during test T_{amb} (°C):	26.9		26.1		—
Maximum measured temperature *T* of part/at:	*T* (°C)				Allowed T_{max} (°C)
Ambient	26.9	45.0	26.1	45.0	--
PCB near U1 of charging base	36.1	54.2	--	--	105
Battery body of charging base	32.2	50.3	--	--	Ref.
Enclosure inside of charging base	31.5	49.6	--	--	60
Battery body of earphone	30.9	49.0	28.7	47.6	Ref.
Enclosure inside of earphone	30.4	48.5	28.3	47.2	60
Accessible parts (shift to 25°C)					
Ambient	26.9	--	26.1	--	--
Enclosure outside of charging base	31.4	--	--	--	48#
Enclosure outside of earphone	30.8	--	28.4	--	48#

Temperature T of winding:	t_1 (°C)	R_1 (Ω)	t_2 (°C)	R_2 (Ω)	T (°C)	Allowed T_{max} (°C)	Insulation class
--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--

Supplementary information:
Working condition:
1. Earphone play 1kHz sine wave signal with maximum volume.
The external plastic surfaces touched time for >1 min during normal use.

5.4.1.4, 9.3, B.1.5, B.2.6	**TABLE: Temperature measurements**	P

Supply voltage (V) :	Earphone battery 3.7Vdc charge mode (from charger base)		--		—
Ambient temperature during test T_{amb} (°C):	26.6		--		—
Maximum measured temperature *T* of part/at:	*T* (°C)				Allowed T_{max} (°C)
Ambient	26.6	45.0	--	--	--

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Clause	Requirement + Test	Result - Remark	Verdict

PCB near U1 of charging base	34.5	52.9	--	--	105
Battery body of charging base	31.3	49.7	--	--	Ref.
Enclosure inside of charging base	30.5	48.9	--	--	60
Battery body of earphone	29.3	47.7	--	--	Ref.
Enclosure inside of earphone	29.2	47.6	--	--	60
Accessible parts (shift to 25°C)					
Ambient	26.6	--	--	--	--
Enclosure outside of charging base	30.3	--	--	--	48#
Enclosure outside of earphone	29.1	--	--	--	48#

Temperature T of winding:	t_1 (°C)	R_1 (Ω)	t_2 (°C)	R_2 (Ω)	T (°C)	Allowed T_{max} (°C)	Insulation class
--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--

Supplementary information:
Working condition:
1. Earphone play 1kHz sine wave signal with maximum volume.
The external plastic surfaces touched time for >1 min during normal use.

B.2.5	**TABLE: Input test**						P
U (V)	I (A)	I rated (A)	P (W)	P rated (W)	Fuse No	I fuse (A)	Condition/status
5Vdc	0.291	1.0	--	--	--	--	EUT load with charge mode with earphone. Charger base battery charge current: 0.211A. Earphone battery charge current: 0.032A.
5Vdc	0.222	1.0	--	--	--	--	EUT load with charge mode without earphone. Charger base battery charge current: 0.211A.
3.7Vdc	0.110	--	--	--	--	--	Charger base load with discharge mode. Earphone battery charge current: 0.030A.
3.7Vdc	0.008	--	--	--	--	--	Earphone load with discharge mode.
Supplementary information:							

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

B.3	**TABLE: Abnormal operating tests**						P
Ambient temperature T_{amb} (°C) :			25.0°C				—
Power source for EUT: Manufacturer, model/type, output rating :			See the label				—
Component No.	Condition	Supply voltage (V)	Test time	Fuse no.	Fuse current (A)	Observation	
Speaker for earphone	SC	3.7Vdc	30mins	--	--	EUT normal work, no sound, no molten metal dropped, no fire occurred, no hazard.	
Supplementary information:							

B.4	**TABLE: Fault condition tests**						P
Ambient temperature T_{amb} (°C) :				25.0°C			—
Power source for EUT: Manufacturer, model/type, output rating :				See the label			—
Component No.	Condition	Supply voltage (V)	Test time	Fuse no.	Fuse current (A)	Observation	
For Charging base							
Battery	Overcharge (Normal)	5Vdc	7hrs	--	--	Over-charging with empty battery, the overcharging current: 0.211A, continued for 7hrs, No hazard.	
Battery	Overcharge (P- to B of battery SC)	5Vdc	7hrs	--	--	Over-charging with empty battery, the overcharging current: 0.212A, continued for 7hrs, No hazard.	
Battery	Overcharge (U2 pin 2-3 SC)	5Vdc	7hrs	--	--	Over-charging with empty battery, the overcharging current: 0.214A, continued for 7hrs, No hazard.	
Battery	Over discharge (Normal)	3.7Vdc	7hrs	--	--	Over-discharging with fully charged battery, the discharging current: 0.110A, continued for 7hrs, No hazard.	
Battery	Over discharge (P- to B- SC of battery SC)	3.7Vdc	7hrs	--	--	Over-discharging with fully charged battery, the discharging current: 0.111A, continued for 7hrs, No hazard.	

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Clause	Requirement + Test	Result - Remark	Verdict

C3	SC	3.7Vdc	30mins	--	--	Unit shutdown immediately, recoverable when fault condition removed, no hazard.
For earphone						
Battery	Overcharge (Normal)	3.7Vdc	7hrs	--	--	Over-charging with empty battery, the overcharging current: 0.032A, continued for 7hrs, No hazard.
Battery	Overcharge (C1 SC)	3.7Vdc	7hrs	--	--	Over-charging with empty battery, the overcharging current: 0A, continued for 7hrs, No hazard.
Battery	Over discharge (Normal)	3.7Vdc	7hrs	--	--	Over-discharging with fully charged battery, the discharging current: 0.008A, continued for 7hrs, No hazard.
Battery	Over discharge (C4 SC)	3.7Vdc	7hrs	--	--	Over-discharging with fully charged battery, the discharging current: 0A, continued for 7hrs, No hazard.
Supplementary information:						

M.3	**TABLE: Protection circuits for batteries provided within the equipment**	P
Is it possible to install the battery in a reverse polarity position? :	Construction made it can't be reverse	—

Equipment Specification	Charging	
	Voltage (V)	Current (A)
	5.0V	1.0
Manufacturer/type	Battery specification see appended table 4.1.2	

	Non-rechargeable batteries		Rechargeable batteries			
	Discharging current (A)	Unintentional charging current (A)	Charging		Discharging current (A)	Reverse charging current (A)
			Voltage (V)	Current (A)		
Charger base battery (See appended table 4.1.2)	--	--	4.20V	0.4A	0.4A	--
Earphone speaker	--	--	4.20V	0.040A	0.040A	--

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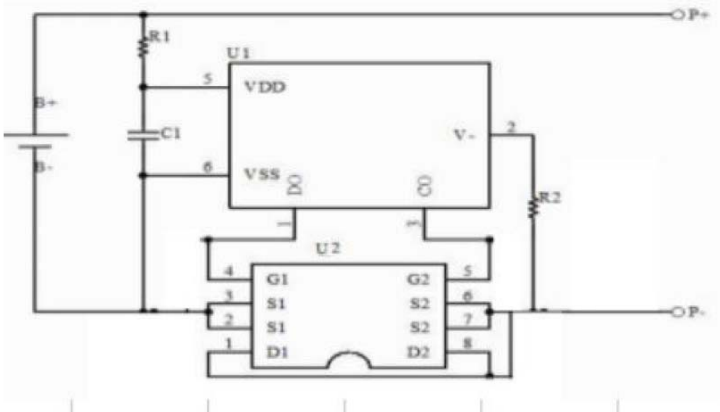
Clause	Requirement + Test	Result - Remark	Verdict

battery (See appended table 4.1.2)							
Note: The tests of M.3.2 are applicable only when above appropriate data is not available.							
Specified battery temperature (°C) :				0-45			
Component No.	Fault condition	Charge/ discharge mode	Test time	Temp. (°C)	Current (A)	Voltage (V)	Observation
Charger base battery							
Battery	Normal	Charge mode	7hrs	32.2	0.211	4.15	Charge at ambient 26.9°C NL,NS,NE,NF
Battery	P- to B of battery SC	Charge mode	7hrs	32.3	0.212	4.15	Charge at ambient 26.9°C NL,NS,NE,NF
Battery	U2 pin 2-3 SC	Charge mode	7hrs	32.5	0.214	4.15	Charge at ambient 26.9°C NL,NS,NE,NF
Battery	Normal	Discharge mode	7hrs	31.3	0.110	4.15	Charge at ambient 26.1°C NL,NS,NE,NF
Battery	P- to B of battery SC	Discharge mode	7hrs	31.4	0.111	4.15	Charge at ambient 26.1°C NL,NS,NE,NF
Earphone battery							
Battery	Normal	Charge mode	7hrs	30.9	0.032	4.20	Charge at ambient 26.9°C NL,NS,NE,NF
Battery	C31 SC	Charge mode	7hrs	26.9	0	4.20	Charge at ambient 26.9°C NL,NS,NE,NF
Battery	Normal	Discharge mode	7hrs	28.7	0.008	4.20	Charge at ambient 26.1°C NL,NS,NE,NF
Battery	C23 SC	Discharge mode	7hrs	26.1	0	4.20	Charge at ambient 26.1°C NL,NS,NE,NF
Supplementary information: Abbreviation: SC= short circuit; OC= open circuit NL= no chemical leakage; NS= no spillage of liquid; NE= no explosion; NF= no emission of flame or expulsion of molten metal.							
602035 Circuit diagram:							

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



M.4.2	TABLE: Charging safeguards for equipment containing a secondary lithium battery	P
Maximum specified charging voltage (V) :	Model:602035 4.2V Model: 501012: 4.20V	—
Maximum specified charging current (A) :	Model: 602035: 0.4A Model: 501012: 0.040A	—
Highest specified charging temperature (°C) :	45	
Lowest specified charging temperature (°C) :	0	

Battery manufacturer/type	Operating and fault condition	Measurement			Observation
		Charging voltage (V)	Charging current (A)	Temp. (°C)	
Charger base battery	Normal condition	4.15V	0.211	Cell: 0	Charging at ambient -1°C, battery charge current not more than the value specified by the battery manufacturer, no hazards.
	Single fault condition – (P- to B of battery SC)	4.15V	0.212	Cell: 0	Charging at ambient -1°C, battery charge current not more than the value specified by the battery manufacturer, no hazards.
	Single fault condition – (U2 pin 2-3 SC)	4.15V	0.214	Cell: 0	Charging at ambient -1°C, battery charge current not more than the value specified by the battery manufacturer, no hazards.

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Clause	Requirement + Test	Result - Remark	Verdict

	Normal condition	4.15V	0	Cell: 45.0	Charge at ambient 45°C, charge circuit stop charge, no hazards.
	Single fault condition – (P- to B of battery SC)	4.15V	0	Cell:45.0	Charge at ambient 45°C, charge circuit stop charge, no hazards.
	Single fault condition – (U2 pin 2-3 SC)	4.15V	0	Cell:45.0	Charge at ambient 45°C, charge circuit stop charge, no hazards.
Earphone battery	Normal condition	4.15V	0.032	Cell:0	Charging at ambient -1°C, battery charge current not more than the value specified by the battery manufacturer, no hazards.
	Overcharge (C31 SC)	4.15V	0	Cell: 0	Charging at ambient -1°C, battery charge current not more than the value specified by the battery manufacturer, no hazards.
	Normal condition	4.15V	0	Cell: 45.0	Charge at ambient 45°C, charge circuit stop charge, no hazards.
	Single fault condition – (C31SC)	4.15V	0	Cell:45.0	Charge at ambient 45°C, charge circuit stop charge, no hazards.
Supplementary information: The highest specified charging temperature declared by manufacturer is 45°C. Abbreviation: SC= short circuit; OC= open circuit; MSCV= maximum specified charging voltage; MSCC= maximum specified charging current; HSCT= highest specified charging temperature; LSCT= lowest specified charging temperature					

Q.1	**TABLE: Circuits intended for interconnection with building wiring (LPS)**						N/A
Output Circuit	Condition	U_{oc} (V)	Time (s)	I_{sc} (A)		S (VA)	
				Meas.	Limit	Meas.	Limit
--	--	--	--	--	--	--	--
Supplementary Information:							

T.2, T.3, T.4, T.5	**TABLE: Steady force test**					P
Part/Location	Material	Thickness (mm)	Probe	Force (N)	Test Duration (s)	Observation

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Clause	Requirement + Test	Result - Remark	Verdict

Plastic enclosure (Top)	Plastic	Min.0.9	--	100	5	Safeguards remained effective, no hazards
Plastic enclosure (Side)	Plastic	Min.0.9	--	100	5	Safeguards remained effective, no hazards
Plastic enclosure (Bottom)	Plastic	Min.0.9	--	100	5	Safeguards remained effective, no hazards
Supplementary information:						

T.6, T.9	**TABLE: Impact test**			N/A
Location/part	Material	Thickness (mm)	Height (mm)	Observation
--	--	--	--	--
Supplementary information:				

T.7	**TABLE: Drop test**			P
Location/part	Material	Thickness (mm)	Height (mm)	Observation
Bottom enclosure	Plastic	Min.0.9	1000	After test, no hazards
Side enclosure	Plastic	Min.0.9	1000	After test, no hazards
Supplementary information:				

T.8	**TABLE: Stress relief test**					P
Location/Part	Material	Thickness (mm)	Oven Temperature (°C)	Duration (h)	Observation	
Plastic enclosure	Plastic	Min.0.9	70.0	7hrs	After test, no hazards	
Supplementary information:						

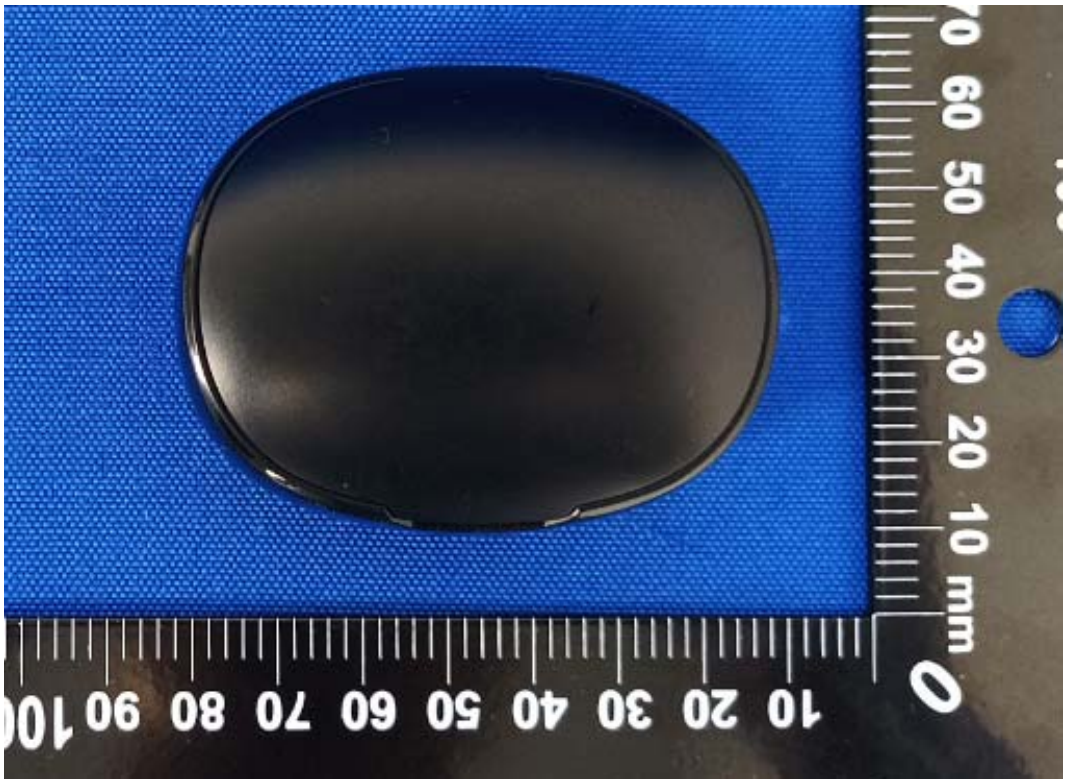
X	**TABLE: Alternative method for determining minimum clearances distances**			N/A
Clearance distanced between:	Peak of working voltage (V)	Required cl (mm)	Measured cl (mm)	
--	--	--	--	
Supplementary information:				

EN 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	Mark(s) of conformity[1]
Plastic enclosure	Covestro Deutschland AG [PC Resins]	FR3002 +	V-0 Min.0.9mm, 60℃	UL 746 UL 94	UL E41613
PCB	Interchangeable	Interchangeable	Min.V-1 ,105°C	UL 796 UL 94	UL
Speaker for earphone	Dongguan City Langston electronics Co., LTD	P13M2232	32Ω±15% Rated Power: 5mW	EN IEC 62368-1: 2020+A11:2020	Test with appliance
Alt.	Interchangeable	Interchangeable	32Ω±15% Rated Power: 5mW	EN IEC 62368-1: 2020+A11:2020	Test with appliance
Lithium-ion battery for earphone	Shenzhen Jin yu zhou Energy Co., Ltd.	501012	3.7V, 40mAh,0.148Wh Max. charge current: 40mA Max. discharge current: 40mA	IEC 62133-2:2017 EN 62133-2:2017	Report No.: LCS201228166AS
Lithium-ion battery for Charger base	Guangdong Manyi Energy Co., Ltd.	602035	3.7V, 400mAh, 1.48Wh Max. charge current: 400mA Max. discharge current: 400mA	IEC 62133-2:2017, IEC 62133-2: 2017/AMD1:2021 EN62133-2: 2017, EN 62133-2 :2017/A1:2021	Report No.: S03A23070765L00201
Supplementary information: (#): The information marked # is provided by the applicant, the laboratory is not responsible for its authenticity and this information can affect the validity of the result in the test report.					

Appendix A - EUT PHOTOS

EUT- Top view



EUT- Side view

EUT- Side view

EUT- Side view

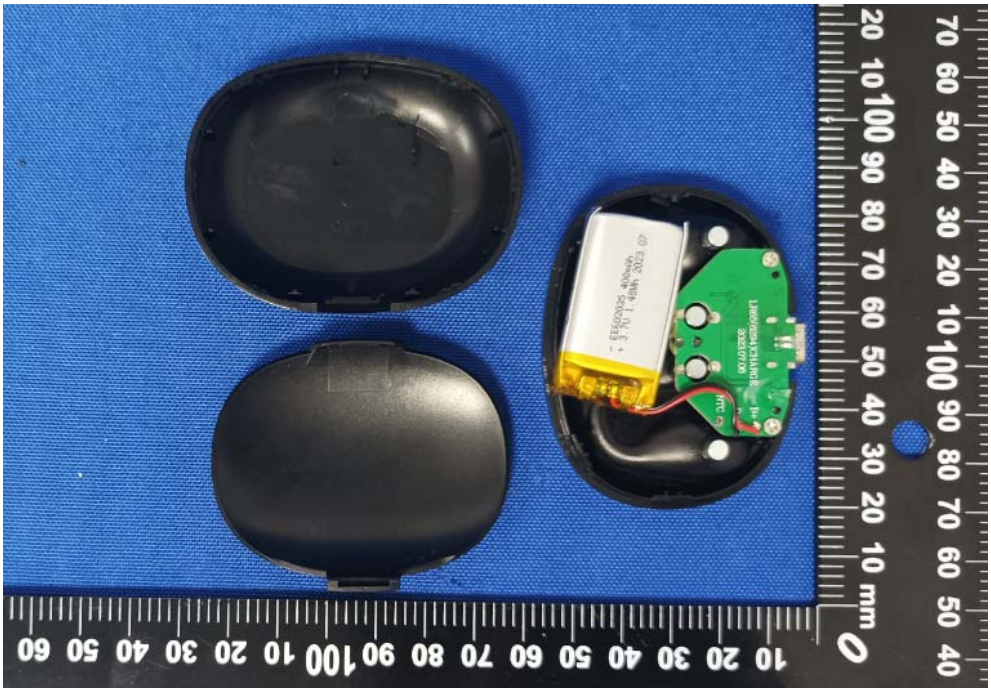
EUT- Side view

EUT- Bottom view

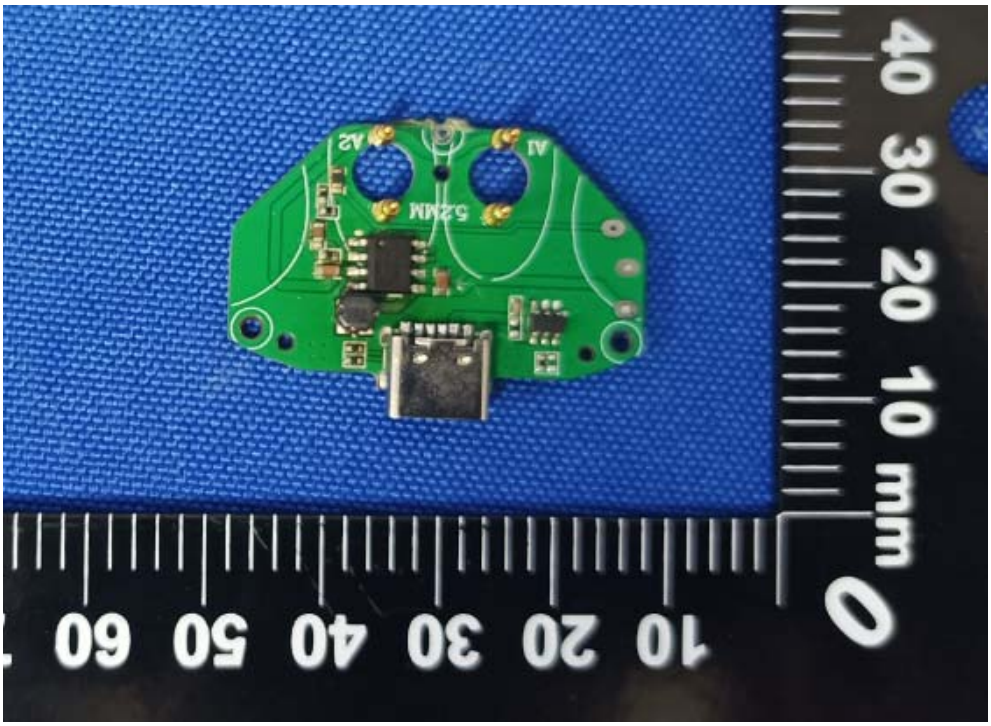
EUT- Uncover view

EUT- Uncover view

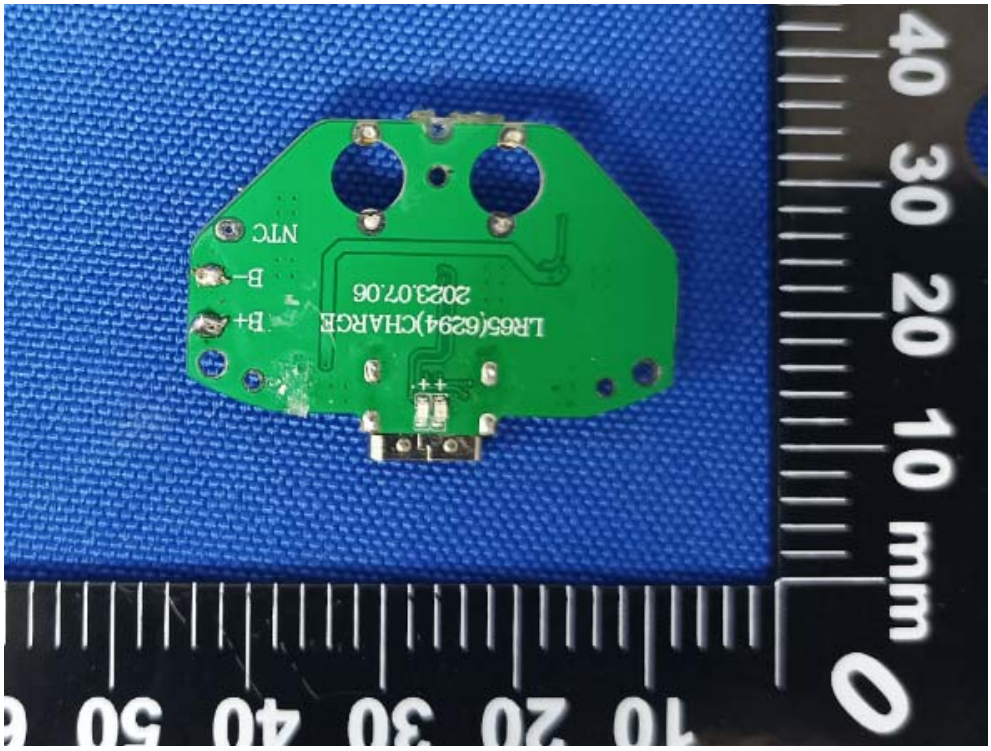
EUT- Uncover view of charger base



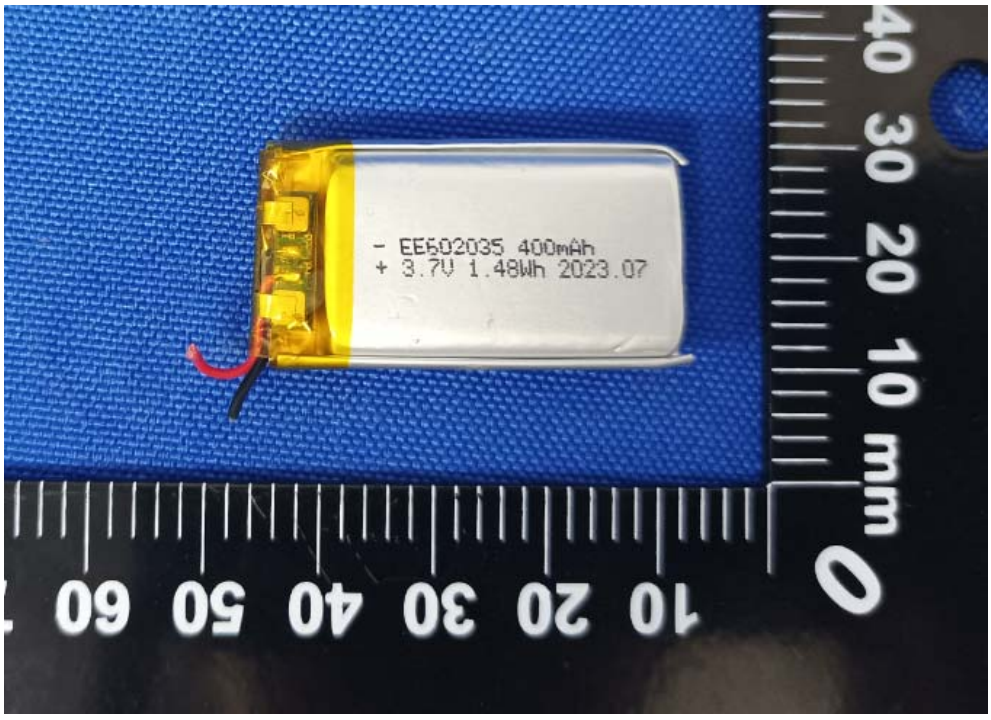
EUT- PCB top view of charger base



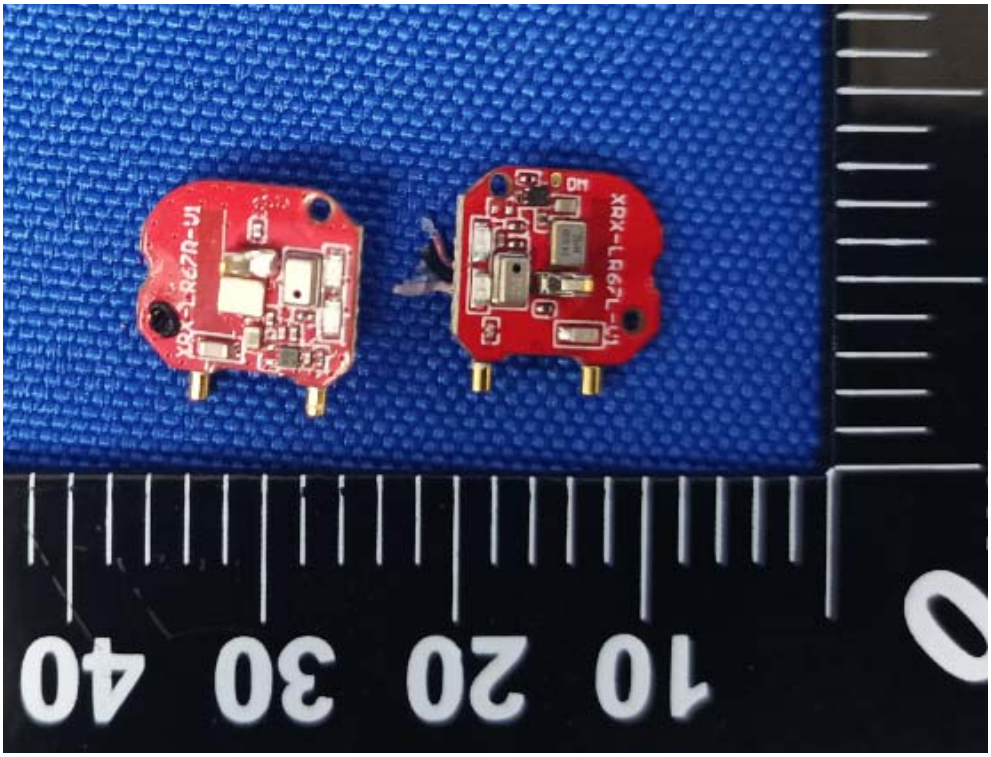
EUT- PCB Bottom view of charger base



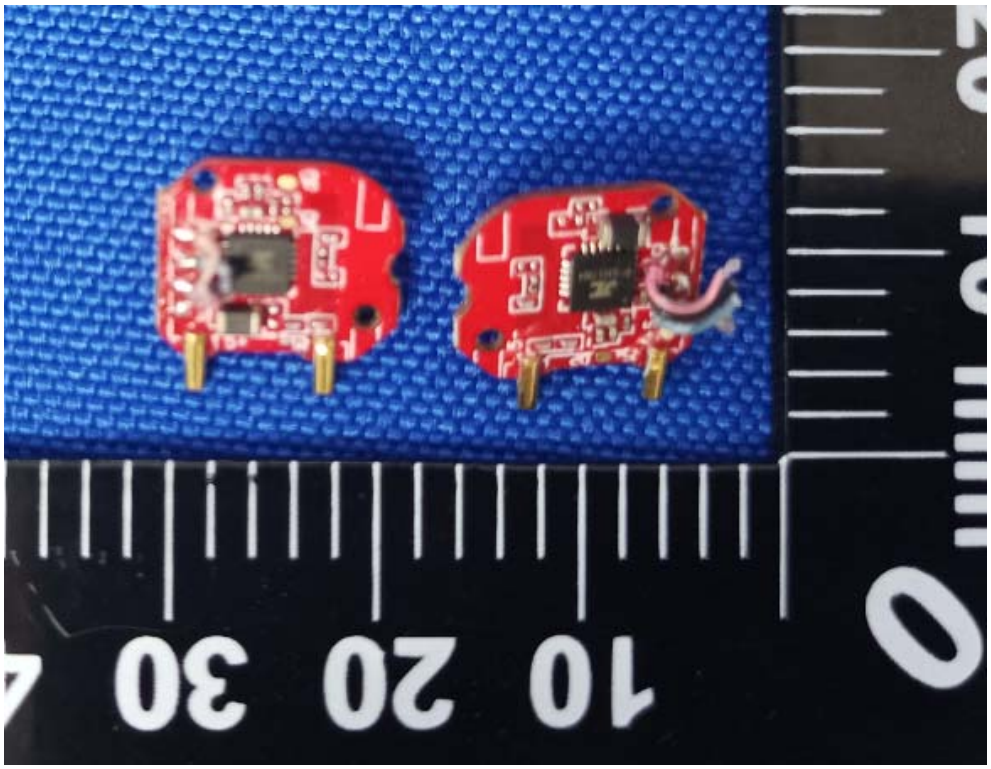
EUT- Battery view of charger base



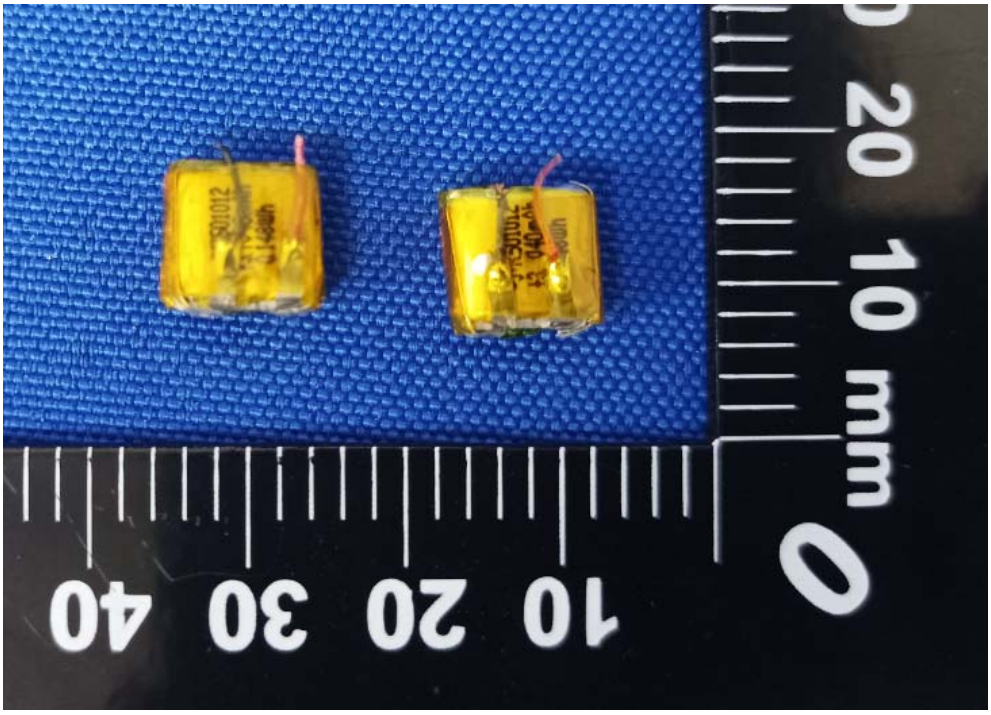
EUT- PCB top view of earphone



EUT- PCB bottom view of earphone

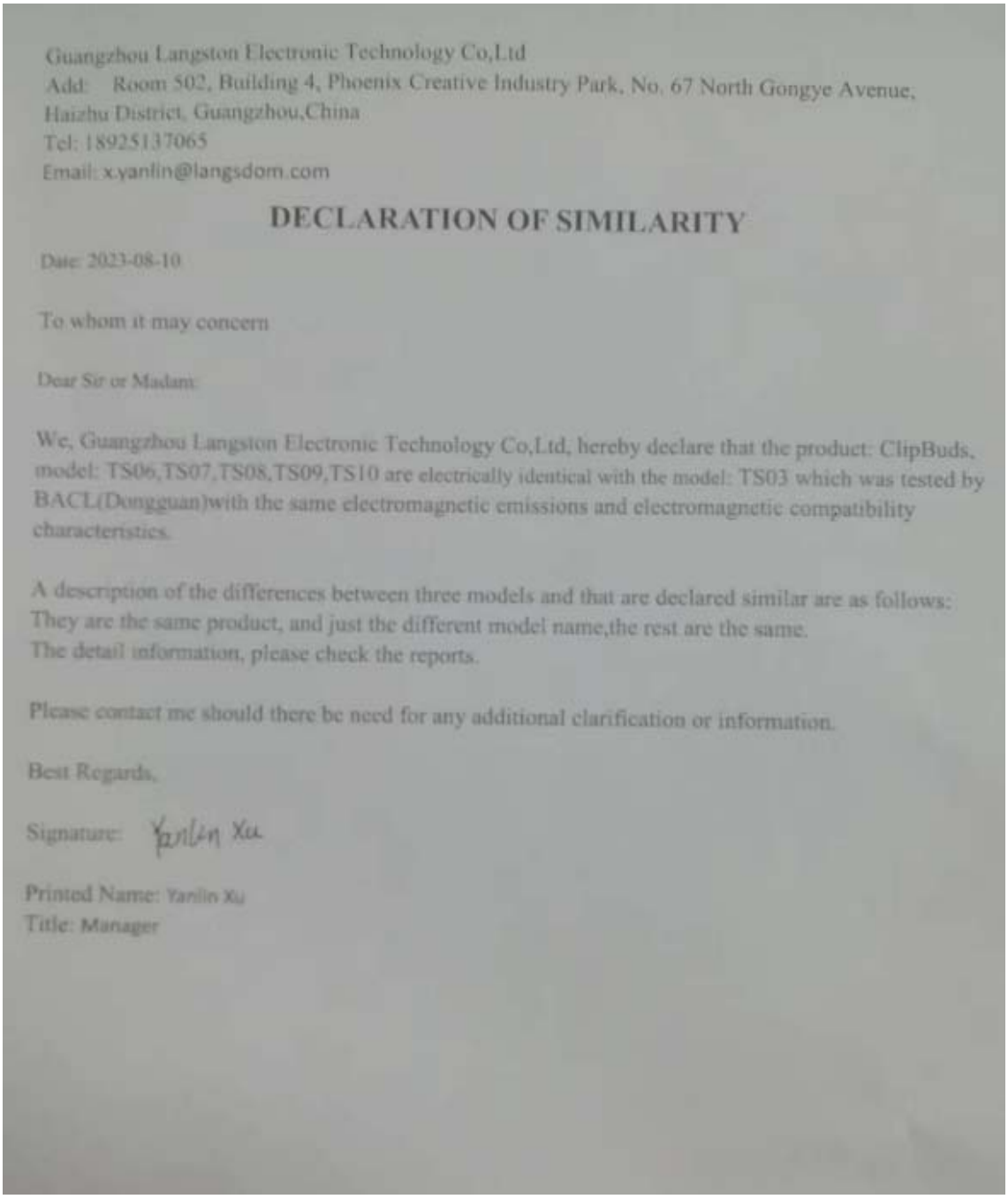


EUT- Battery view of earphone



EUT- Speaker view of earphone

Appendix B- Declaration of similarity



Guangzhou Langston Electronic Technology Co,Ltd
Add: Room 502, Building 4, Phoenix Creative Industry Park, No. 67 North Gongye Avenue, Haizhu District, Guangzhou,China
Tel: 18925137065
Email: x.yanlin@langsdom.com

DECLARATION OF SIMILARITY

Date: 2023-08-10

To whom it may concern

Dear Sir or Madam:

We, Guangzhou Langston Electronic Technology Co,Ltd, hereby declare that the product: ClipBuds, model: TS06,TS07,TS08,TS09,TS10 are electrically identical with the model: TS03 which was tested by BACL(Dongguan)with the same electromagnetic emissions and electromagnetic compatibility characteristics.

A description of the differences between three models and that are declared similar are as follows:
They are the same product, and just the different model name,the rest are the same.
The detail information, please check the reports.

Please contact me should there be need for any additional clarification or information.

Best Regards,

Signature: Yanlin Xu

Printed Name: Yanlin Xu
Title: Manager

Appendix C- Directions

1. The information marked # is provided by the applicant, the laboratory is not responsible for its authenticity and this information can affect the validity of the result in the test report.
2. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.
3. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.
4. The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.
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*****END OF REPORT*****