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## TEST REPORT IEC 60998-2-2

## Connecting devices for low voltage circuits for household and similar purposes

# Part 2-2: Particular requirements for connecting devices as separate entities with screwless-type clamping units

Report Reference No...... LCS200305038AS

Date of issue...... March 19, 2020

Total number of page...... 18 pages

Applicant's name...... Shenzhen Onlumi Technology Limited

Heping Road, Qinghua Community, Longhua District, Shenzhen,

G.D., China

Test specification:

**Test Report Form No......** IEC60998\_2\_2B

Test Report Form(s) Originator...... DEKRA certification B.V.

Master TRF...... Dated 2013-02

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Test item description...... Beetle Clip LED Strip Connector

Trade Mark...... QIJIE

Manufacturer...... Shenzhen QIJIE Electronic Co., Ltd.

5F, 21th, Chuangye Road, Shilong Community, Shiyan, Baoan,

Shenzhen, Guangdong, China

Model/Type reference...... BCN8XB-2, BCN8BB-2, BCN10XB-2, BCN10BB-2, WBCN8XB-2,

WBCN8BB-2, WBCN10XB-2, WBCN10BB-2

Ratings..... 24V----, 5A



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$\boxtimes$	Testing Laboratory:	Shenz	hen LCS Complia	ance Testing Laboratory Ltd.
Testing location/ address:		101, 201 Building A and 301 Building C, Juji Industrial Park, Yabianxueziwei, Shajing Street, Baoan District, Shenzhen, Guangdong, China		
Test	ed by:		en / Test eer	HL Chen
Rev	iewed by:	Albert	t Lai / Project or	A tope westing on
Арр	roved by:	Hart C	iu / Technical ger	ST S
	chment No.1: Photo documentation (3 p mary of testing:	ages)		
Test	s performed (name of test and test cla	ause):	Testing location	n:
The submitted samples were found to comply the requirements of:  > Electrical safety IEC 60998-2-2:2002 (see also IEC 60998-		y with	Shenzhen LCS Compliance Testing Laboratory Ltd.  101, 201 Building A and 301 Building C, Juji Industrial Park, Yabianxueziwei, Shajing Street,	
> E	EC 60998-2-2:2002 (see also IEC 60998-		Decem District C	Shenzhen, Guangdong, China

☑ The product have evaluated the requirements of EN 60998-1:2004, EN 60998-2-2:2004.



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## Copy of marking plate:

The artwork below may be only a draft.

QIJIE

BCN10XB-2 24V===, 5A Importer: XXXX Address: XXXX

f Shenzhen QIJIE Electronic Co., Ltd.

henzhen QIJIE Electronic Co., Ltd.

Made in China

#### Remark:

- 1) Representative markings of model: BCN10XB-2, markings of all models are identical except for model names.
- 2) The height dimension of CE mark should not less than 5mm.



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Test item particulars:			
Number of terminals:	□single ⊠multiway		
Protection against electric shock:	□with ⊠without		
Means of fixing:	⊠with □without		
Rated temperature:	⊠without T marking ⊡with T marking (°C)		
IP number:	IPX0		
Type of terminals, screwless-type:	⊠universal		
Conductor type:	□rigid ⊠flexible		
Rated connecting capacity:	<ul> <li>☑ 0.34mm² ☑ 0.5mm² ☐ 0.75mm² ☐ 1mm²</li> <li>☐ 1.5mm²</li> </ul>		
Conductor insulation:	☐ 2.0mm² ☐ 2.5mm² ☐ 4mm² ☐ 6mm² ☐ 10mm² ☐ 16mm² ☐ 25mm² ☐ 35 mm²		
Rated voltage (V ac / V dc):			
Classification of installation and use:	Multiway terminal devices		
Supply Connection:	Screwless-type terminal		
Possible test case verdicts:			
- test case does not apply to the test object:	N/A		
- test object does meet the requirement:	P (Pass)		
- test object does not meet the requirement:	F (Fail)		
Testing:			
Date of receipt of test item:	2020-03-05		
Date (s) of performance of tests:	From 2020-03-05 to 2020-03-19		
General remarks:			
The test results presented in this report relate only This report shall not be reproduced, except in full, laboratory.  "(see Enclosure #)" refers to additional information	without the written approval of the Issuing testing in appended to the report.		
"(see appended table)" refers to a table appended t	to the report.		
Throughout this report a $\square$ comma / $\boxtimes$ point is used as the decimal separator.			



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Manufacturer's Declaration per sub-clause 4.2.5 of IECEE 02:
The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided:
When differences exist; they shall be identified in the General product information section.
Name and address of factory (ies): Same as manufacturer
General product information:
<ol> <li>All models are similar except for the model name, colour and width, all tests were conducted on model BCN10XB-2.</li> <li>The text of the International Standard IEC 60998-2-2:2002 was approved as European Standard EN 60998-2-2:2004 without any modification.</li> </ol>



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	IEC 60998-2-2		
Clause	Requirement + Test	Result - Remark	Verdic
8	MARKING		Р
8.1	On main part:		Р
	a) rated connecting capacity (mm²):	0.34-0.5	Р
	b) rated insulation voltage (V):	24	Р
	c) T marking (°C) (if > 40 °C or < -5 °C):		N/A
	d) type reference:	See copy of marking plate	Р
	e) manufacturer's or responsible vendor's name, trademark or identification mark:	See copy of marking plate	Р
	f) IP if > IP20:		N/A
	Small devices: only d) and e) indicated on device		Р
	All marks visible on smallest package unit		Р
8.101	Type of acceptable conductor "s" "r" or "f"		Р
8.102	Marking indicating the length of insulation to be removed before insertion of the conductor		Р
8.2	Multiway terminal devices: at least two adjacent		Р
8.3	When symbols are used they shall be as follow:  V for volts  mm² or □ for square millimetres  T for T-rating	See copy of marking plate	Р
8.4	Marking: durable and easily legible; 15 s water; 15 s hexane		Р
9	PROTECTION AGAINST ELECTRIC SHOCK		N/A
	Live parts not accessible		N/A
10	CONNECTION OF CONDUCTORS		Р
10.1	Connecting devices allow correct connection of conductors		Р
10.101	Connection or disconnection: use a general tool or simple insertion		Р
	Disconnection operation other than a pull		Р
10.102	Terminals accept two or more conductors of same or sectional areas; see table 101 (as specified by manuf		Р
	+		

conductors

Universal terminals shall accept rigid(solid or stranded) and flexible unprepared



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	IEC 60998-2-2		
Clause	Requirement + Test	Result - Remark	Verdict

	Non-universal terminals shall accept the types of condumanufacturer	uctors declared by the	N/A
	Rated connecting capacity (mm²):	0.34-0.5	Р
	Suitable for connecting cross-sectional areas (mm²)	0.34-0.5	Р
10.103	Terminals accept rigid and flexible conductors (table 101), unless otherwise specified (see 8.1)		Р
	Smallest diameter (mm); largest diameter (mm):	1.1	Р
	During the test: terminals show no damage		Р
10.104	Terminals clamp the conductor without undue damage	:	Р
10.104.1	Connection/disconnection 5 times: smallest diameter (mm):	0.9	Р
	Connection/disconnection 5 times: largest diameter (mm):	1.1	Р
	After the test, terminal not damaged		Р
10.104.2	Rated cross-sectional area (mm²):	0.34-0.5	Р
	Туре:	Flexible	Р
	After the test, no wire of conductor escaped outside the terminal		Р
10.105	Secureness test:		Р
	during the test: the conductor does not slip out, no break near clamping unit and no damage	See appended table 10.105	Р
10.106	Pull test:		Р
	- during the test the conductor does not come out	See appended table 10.106	Р

11	CONSTRUCTION	Р
11.101	Contact pressure not transmitted via insulating material, unless there is sufficient resiliency	Р
11.102	Insertion and disconnection, in accordance with manufacturer's instructions	Р
	Openings clearly distinguishable	Р
11.103	Terminals so constructed that:	Р
	- each conductor is clamped individually	Р
	- conductors can be connected or disconnected at same time or separately	Р
	Possible to clamp maximum number of conductors	Р



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	IEC 60998-2-2		
Clause	Requirement + Test	Result - Remark	Verdict
11.104	Inadequate insertion of conductor avoided		Р
11.2	Clamping units clamp conductors reliably and between metal surfaces		Р
11.3	Connecting devices: insulation of conductors not in contact with live parts of different polarity		Р
11.4	Insulating lining: adequate mechanical strength and secured in a reliable manner		Р
11.5	Current-carrying parts: adequate mechanical strength, electrical conductivity and resistance to corrosion; type of metal		Р
	Current-carrying parts not made with electroplated coating if subjected to mechanical wear		Р
11.6	Terminals: possible to connect number of conductors manufacturer:	as specified by the	Р
	- number of conductors:		Р
	- rigid, cross-sectional area (mm²):		N/A
	- flexible, cross-sectional area (mm²):	0.34-0.5	Р
11.7	Fixing means of bases do not serve any other purpose		Р
	I		
12	RESISTANCE TO AGEING, TO HUMIDITY CONDIT SOLID OBJECTS AND TO HARMFUL INGRESS O		Р
12.1	Connecting devices resistant to ageing; after the test (168 h): no cracks visible, not sticky or greasy, no damage; test temperature (°C):	⊠70 °C	Р
12.2	After humidity test (91-95%): no damage; test duration (168 h for connecting devices > IPx2, 48 h for all other)	☐168 h ⊠ 48 h	Р
12.3	IP test (IEC 60529)	IP	N/A
	After the test, electric strength test as 13.4, and by inspection	IP	N/A
	no appreciable entry of water		N/A
13	INSULATION RESISTANCE AND ELECTRIC STRE	NGTH	N/A
13.1	Insulated connecting devices provided with adequate insulation resistance and electric strength		N/A



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	IEC 60998-2-2		
Clause	Requirement + Test	Result - Remark	Verdict
13.2	Insulation between the connected conductors and the external surface is adequate for all the combinations of conductors		N/A
13.3	Insulation resistance measured 1 min after application of 500 V d.c.	See appended table 13.3	N/A
13.4	Electric strength test	See appended table 13.4	N/A
14	MECHANICAL CERENCELI		Р
14.101	the test conductor, properly inserted into a clamping shall be allowed to be bent (deflected) in all 12 direct the adjacent directions by 30° ± 5°		P
	Deflection test (principle of test apparatus shown in	figure 103a):	Р
	- requirement: ≤ 2,5 mV	See appended table 14.101	Р
	max measured voltage drop (mV)		Р
14.2	Tumbling barrel (for < 50 g): 50 falls; after the test no damage		Р
14.3	Impact test (for > 50 g): 10 blows:		N/A
	- height of fall: 7,5 cm		N/A
	- height of fall: 10 cm		N/A
	- height of fall: 20 cm		N/A
	- height of fall: 25 cm		N/A
	After the test, no damage and live parts shall not become accessible		N/A
15	TEMPERATURE RISE		P
	requirement: ≤ 45K	0	Р
1= 101	max measured temperature rise (K)	See appended table 15	Р
15.101	192 temperature cycles test, each cycle with a duration of 1 h, with the test current as defined in Table 2 of Part I		Р
	Cabinet temperature (°C):	☐ 40 ☐ T-marking:°C	Р
	Maximum voltage drop did not exceed 22,5 mV or 1,5 times 24th cycle value	See appended table 15.101	Р
16	DECICTANCE TO LIEAT		Р
16 1	RESISTANCE TO HEAT		
16.1	Connecting devices are sufficiently resistant to heat		P
16.2	Heating cabinet test	See appended table 16.2	Р



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IEC 60998-2-2			
Clause	Requirement + Test	Result - Remark	Verdict
			I

	After the test: no changes impairing further use and markings still legible		Р
16.3	Ball-pressure test (IEC 60695-10-2) for parts necessary to retain current-carrying parts and parts of the earthing circuit in position	See appended table 16.3A	N/A
	Impression diameter not exceed 2 mm		N/A
	Ball-pressure test (IEC 60695-10-2) for parts not necessary to retain current-carrying parts and parts of the earthing circuit in position	See appended table 16.3B	Р
	Impression diameter not exceed 2 mm		Р
17	CLEARANCES AND CREEPAGE DISTANCES		N/A
	Creepage distances, clearances and distances through sealing compound	See appended table 17	N/A

18	RESISTANCE OF INSULATING MATERIAL TO ABNORMAL HEAT AND FIRE		Р
	Glow-wire test (clauses 4 to 10 of IEC 60695-2-10)	See appended table 18	Р
	No visible flames and no sustained glowing or flame and glowing extinguished within 30 s		Р
	No ignition of the tissue paper or scorching of the board		Р

19	RESISTANCE OF INSULATING MATERIAL TO TRACKING		
	Tracking test (IEC 60112): PTI 175 V, 50 drops, solution A	See appended table 19	N/A



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	IEC 60998-2-2		
Clause	Requirement + Test	Result - Remark	Verdict

10.105	TA	TABLE: Clamping securement and damage to the conductor test						Р	
	Mc	del/type refere	nce	:	BCN10X	B-2		Р	
No of sam	o of sample Conductor cross-sectional area (mm²) Conductor type Mass for conductor (kg) Height H (mm)		Diameter of bushing hole (mm)						
1		0.5	Flexible		0.3	260	6.5	Р	
2		0.5	Flexible	0.3		260	6.5	Р	
3		0.5	Flexible		0.3	260	6.5	Р	

## Supplementary information:

10.106	TABLE: Pull-out test					Р
	Model/type reference:			BCN10XB-2		Р
No of samp	ole	Conductor cross- sectional area (mm²)	Condu	uctor type	Pull force (N)	
1		0.5	Flexible		20	Р
2		0.5	Flexible		20	Р
3		0.5	Flexible		20	Р

## **Supplementary information:**

13.3	TABLE: Insulation resistance			N/A
	Model/type reference:	BCN10XB-2		
	Smallest cross-sectional area (mm²) :	0.34		
	Largest cross-sectional area (mm²) :	0.5		
Test voltage applied between		Measured (MΩ)	Required	(MΩ)
All clamping units together and the body				
Each clamping unit and all others together				
Supplementary information:				

13.4	TABLE: Electric strength test		N/A
	Model/type reference	BCN10XB-2	N/A
	Rated insulation voltage (V)	24V <del></del>	N/A



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		IEC 60998-2-2		
Clause	Requirement + Test		Result - Remark	Verdict

Test voltage applied between	Test voltage (V)	Flashover / breakdown (Yes/No)
All clamping units together and the body		
Each clamping unit and all others together		
Supplementary information:		

14.101	TABLE: Mechanical strength				Р
	0,1 times the test current (A)	0.5	0.5		
	smallest cross-sectional area (mm²) 10.103:	0.34			
- I	force (N) (table 104):	0.09			
	Distance (mm) (table 104)	100			
- I	-screwless terminal number	1	2	3	
	- voltage drop measured (mV) (1st deflection):	0.9	0.8	1.1	
	- voltage drop measured (mV) (2 <sup>nd</sup> deflection):	0.8	0.9	1.0	
	- voltage drop measured (mV) (3 <sup>rd</sup> deflection):	1.1	1.0	0.8	
	- voltage drop measured (mV) (4 <sup>th</sup> deflection):	0.9	0.9	0.8	
	- voltage drop measured (mV) (5 <sup>th</sup> deflection):	1.0	1.1	0.8	
	- voltage drop measured (mV) (6th deflection):	1.1	1.0	1.1	
	- voltage drop measured (mV) (7 <sup>th</sup> deflection):	1.1	0.9	1.1	
	- voltage drop measured (mV) (8 <sup>th</sup> deflection):	0.8	1.1	0.8	
	- voltage drop measured (mV) (9th deflection):	1.1	1.1	1.0	
	- voltage drop measured (mV) (10th deflection):	0.8	1.1	0.8	
	- voltage drop measured (mV) (11th deflection):	1.0	1.1	1.1	
	- voltage drop measured (mV) (12th deflection):	1.1	0.9	1.1	
	- requirement: ≤ 2,5 mV				
	0,1 times the test current (A)	0.5			
	Largest cross-sectional area (mm²) 10.103:	0.5			
	force (N) (table 104):	0.09			
	Distance (mm) (table 104)	100			
	- screwless terminal number:	1	2	3	
	- voltage drop measured (mV) (1st deflection):	0.8	0.9	0.9	
	- voltage drop measured (mV) (2 <sup>nd</sup> deflection):	0.9	0.9	0.8	
	- voltage drop measured (mV) (3 <sup>rd</sup> deflection):	0.6	0.8	0.7	



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		IEC 609	98-2-2				
Clause	Requirement + Test			Result - R	Remark		Verdict
	- voltage drop measured (mV)	(4th deflection	on):	0.8	0.9	0.6	
	- voltage drop measured (mV)	(5 <sup>th</sup> deflection	on):	0.7	0.7	0.9	
	- voltage drop measured (mV)	(6th deflection	on):	0.8	0.7	0.8	
	- voltage drop measured (mV)	(7 <sup>th</sup> deflection	on):	0.9	0.7	0.8	
	- voltage drop measured (mV) (8 <sup>th</sup> deflection):			0.8	0.6	0.7	
	- voltage drop measured (mV) (9 <sup>th</sup> deflection):			0.9	0.8	0.7	
	- voltage drop measured (mV) (10 <sup>th</sup> deflection):			0.9	0.6	0.9	
	- voltage drop measured (mV)	(11th deflect	ion):	0.9	0.6	0.8	
	- voltage drop measured (mV)	(12 <sup>th</sup> deflect	ion):	0.9	0.6	0.8	
	- requirement: ≤ 2,5 mV						
							Т_
15	TABLE: Temperature rise			T			Р
	Model/type reference			BCN10XB-2			Р
	Terminal:			single Multiway			
	T marking (°C)		:	☐Yes (°C):			
	Largest cross-sectional area (	mm²)	:	0.5 Flexible 0.34-0.5			
	Conductors		:				
	Rated connecting capacity (m	m²)	:				
	Test current (A)		:	5			
TI	hermocouple Locations		tempera neasured, (°C)				e limit,
On condu	uctor in the terminal		15.4		45		
Plastic m	aterial		8.9			45	
Supplem	nentary information:						
15.101	TABLE: Temperature-cycling	g test					Р
	Model/type reference		:	BCN10XE	3-2		Р
	Smallest cross -sectional are	ea (mm²)	:	0.34			Р
	Test current (Table 2) (A)		:	5			Р
		asured vol	tage drop	(mV)			

Flexible conductors

Measured voltage drop of:

(after 24 cycles)

Sample 1

5.2

Sample 2

5.5

Sample 3

4.5

Ρ



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Clause         Requirement + Test         Result - Remark         Verdict           Flexible conductors (1,5 times 24 <sup>th</sup> cycle value)         6.5         6.7         7.9         P           Flexible conductors (after 192 cycles)         8.4         8.2         9.1         P           Largest cross-sectional area (mm²)         :         0.5         P           Test current (Table 2) (A)         :         6         P           Measured voltage drop of:         Sample 1         Sample 2         Sample 3
Flexible conductors (after 192 cycles) 8.4 8.2 9.1 P  Largest cross-sectional area (mm²): 0.5 P  Test current (Table 2) (A): 6 P  Measured voltage drop of:
Flexible conductors (after 192 cycles) 8.4 8.2 9.1 P  Largest cross-sectional area (mm²): 0.5 P  Test current (Table 2) (A): 6 P  Measured voltage drop of:
Largest cross-sectional area (mm²): 0.5  Test current (Table 2) (A): 6  Measured voltage drop of:  Measured voltage drop (mV)
Test current (Table 2) (A)
Measured voltage drop of:  Measured voltage drop (mV)
Measured voltage drop of:
Sample 1 Sample 2 Sample 3
Flexible conductors (after 24 cycles) 5.4 5.1 P
Flexible conductors (1,5 times 24 <sup>th</sup> cycle value) 6.9 7.1 7.0 P
Flexible conductors (after 192 cycles) 7.8 8.4 9.2 P
Supplementary information:
16.2 TABLE: Heating cabinet test
Test temperature (°C)         :         ≥         85°C         □T + 45         P
Model/type reference Sample 1 Sample 2 Sample 3
BCN10XB-2 Pass Pass Pass
Supplementary information:
16.3A TABLE: Ball pressure test of insulating materials N/A
Test temperature (°C): 125 T + 45 = N/A
Part under test Material designation / manufacturer Impression diameter (mm)
Current carrying parts /
Supplementary information:
16.3B TABLE: Ball pressure test of insulating materials
Test temperature (°C):
Part under test
Plastic material / 0.9 P
Supplementary information:
17 TABLE: Clearances and creepage distances N/A
Rated insulation voltage (V) 24V 24V N/A



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	IEC 60998-2-2		
Clause	Requirement + Test	Result - Remark	Verdict

Clearance cl, creepage distance cr and distance through sealing compound tsc at/of:	Required cl, cr, tsc (mm)	Measured cl (mm)	Measured cr (mm)	Measured tsc (mm)
Between clamping units				
Contacts-Plastic material				
Supplementary information:				

18	TABLE: Glow-wire test			Р	
Part	under test	Material designation / manufacturer	Test temperature (°C)	Time of extinguish of flames and glowing, if any	
Plastic material		/	650	No flame	
Supplementary information:					

19	TABLE: Tracking			N/A	
Part under test		Material designation / manufacturer	Test voltage (V)	Remarks	
Current carrying parts		/			
Supplementary information:					

APPENDED TABLE					
Critical components					
Object / part no.	Manufacturer / trademark	Type / model	Technical data	Standard	Mark(s) of Conformity
Plastic material	WEIYUAN PLATICS CO.LTD	PP	PP	IEC/EN 60998-2-2, IEC/EN 60998-1	Test with appliance



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#### Attachment No.1

#### Photo Documentation

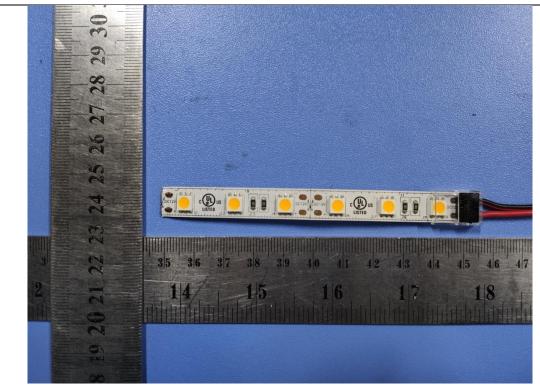
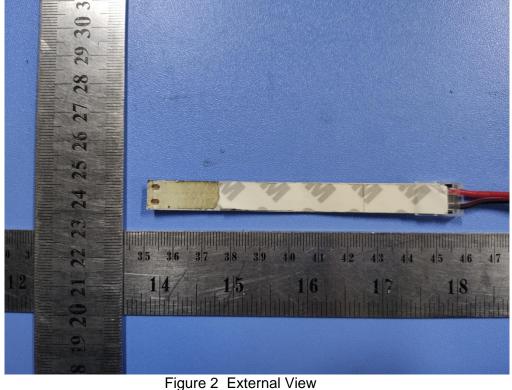


Figure 1 External View





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#### **Attachment No.1**

### **Photo Documentation**

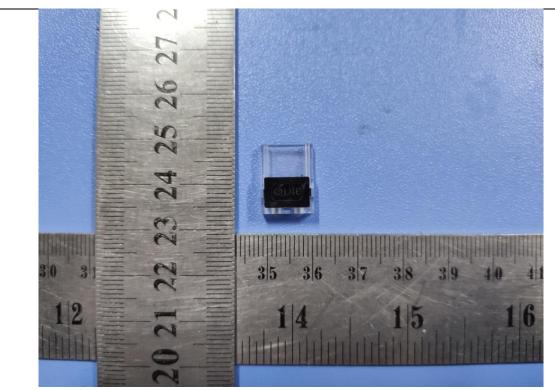


Figure 3 External View

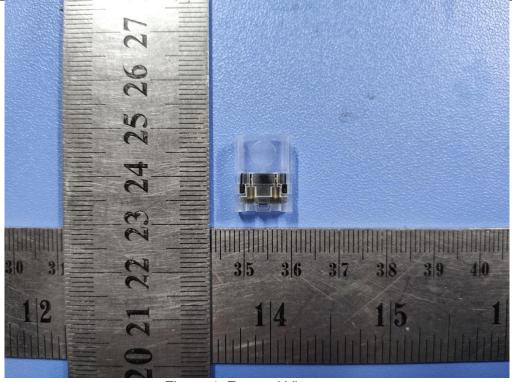


Figure 4 External View



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#### **Attachment No.1**

#### Photo Documentation

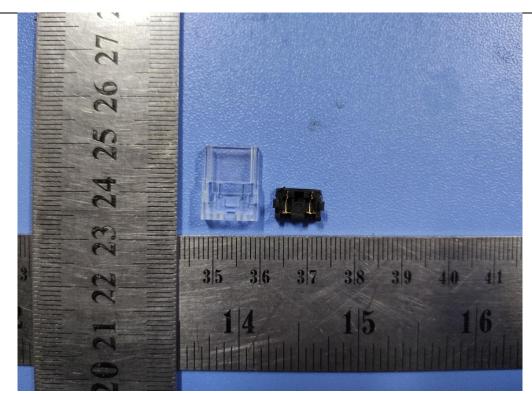


Figure 5 Internal View

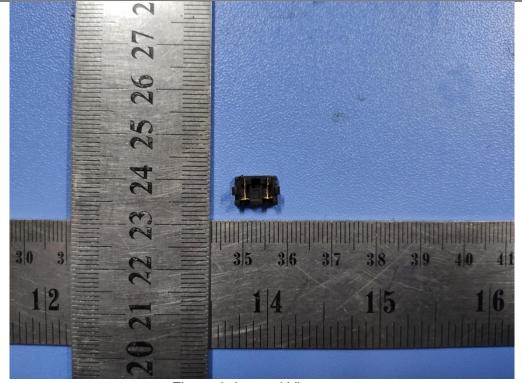


Figure 6 Internal View

--- END OF TEST REPORT ---