Report No: CCISE190706301

ISED TEST REPORT

(EMC)

Applicant: Nebra Ltd

Address of Applicant: Unit 4 Bells Yew Green Business Court, Bells Yew Green, Kent,

TN3 9BJ, United Kindgom

Equipment Under Test (EUT)

Product Name: Media Center HAT

Model No.: v1.1

Applicable standards: ICES-003 Issue 6 Published: January 2016, Updated: April 2019

Date of sample receipt: 12 Jul., 2019

Date of Test: 12 Jul., to 05 Aug., 2019

Date of report issued: 05 Aug., 2019

Test Result: PASS*

Authorized Signature:



Bruce Zhang Laboratory Manager

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product and does not permit the use of the CCIS product certification mark. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

This report may only be reproduced and distributed in full. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards.

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^{*} In the configuration tested, the EUT complied with the standards specified above.





Version

Reviewed by:

Version No.	Date	Description
00	05 Aug., 2019	Original

Test Engineer

Date:

Test Engineer

Date: Tested by: 05 Aug., 2019

05 Aug., 2019

Telephone: +86 (0) 755 2311 8282 Fax: +86 (0) 755 2311 6366





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4 Test Summary

Test Item	Section	Result
Conducted Emission	ICES 003 Section 6.1	N/A
Radiated Emission	ICES 003 Section 6.2	Pass

Pass: The EUT complies with the essential requirements in the standard.

Report No: CCISE190706301

5 General Information

5.1 Client Information

Applicant:	Nebra Ltd
Address:	Unit 4 Bells Yew Green Business Court, Bells Yew Green, Kent, TN3 9BJ, United Kindgom
Manufacturer:	Nebra Ltd
Address:	Unit 4 Bells Yew Green Business Court, Bells Yew Green, Kent, TN3 9BJ, United Kindgom
Factory:	Sunsoar Tech Co. Ltd
Address:	9F, A block, Nanchang Huafeng The Second Industrial Zone, Hangkong Road,Xixiang Town, Bao'an District, Shenzhen City, China

5.2 General Description of E.U.T.

Product Name:	Media Center HAT
Model No.:	v1.1
Power supply:	DC 3.3V-5.0V
Test Sample Condition:	The test samples were provided in good working order with no visible defects.

5.3 Test Mode

Operating mode	Detail description
On mode	Keep the EUT in working mode

The sample was placed 0.8m above the ground plane of 3m chamber. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.

5.4 Measurement Uncertainty

Parameters	Expanded Uncertainty
Conducted Emission (9kHz ~ 30MHz)	±1.60 dB (k=2)
Radiated Emission (9kHz ~ 30MHz)	±3.12 dB (k=2)
Radiated Emission (30MHz ~ 1000MHz)	±4.32 dB (k=2)
Radiated Emission (1GHz ~ 18GHz)	±5.38 dB (k=2)



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5.5 Description of Support Units

Manufacturer	Description	Model	S/N	FCC ID/DoC
Pi supply	Raspberry Pi 3 Model B	Raspberry Pi 3 Model B	N/A	DoC
PIMORONI	Mini Black Hat Hack3r PCB	Mini Black Hat Hack3r	N/A	DoC
RS Components Ltd	Switching Adapter	DSA-13PFC-05 FCA	N/A	N/A

5.6 Related Submittal(s) / Grant (s)

This is an original grant, no related submittals and grants.

5.7 Laboratory Facility

The test facility is recognized, certified, or accredited by the following organizations:

• FCC - Registration No.: 727551

Shenzhen Zhongjian Nanfang Testing Co., Ltd. has been accredited as a testing laboratory by FCC (Federal Communications Commission). The Registration No. is 727551.

IC - Registration No.: 10106A-1

The 3m Semi-anechoic chamber of Shenzhen Zhongjian Nanfang Testing Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 10106A-1.

• CNAS - Registration No.: CNAS L6048

Shenzhen Zhongjian Nanfang Testing Co., Ltd. is accredited to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration laboratories for the competence of testing. The Registration No. is CNAS L6048.

A2LA - Registration No.: 4346.01

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 General requirements for the competence of testing and calibration laboratories. The test scope can be found as below link: https://portal.a2la.org/scopepdf/4346-01.pdf

5.8 Laboratory Location

Shenzhen Zhongjian Nanfang Testing Co., Ltd.

Address: No. B-C, 1/F., Building 2, Laodong No.2 Industrial Park, Xixiang Road,

Bao'an District, Shenzhen, Guangdong, China

Tel: +86-755-23118282, Fax: +86-755-23116366

Email: info@ccis-cb.com, Website: http://www.ccis-cb.com

Shenzhen Zhongjian Nanfang Testing Co., Ltd.
No. B-C, 1/F., Building 2, Laodong No.2 Industrial Park, Xixiang Road, Bao'an District, Shenzhen, Guangdong, China
Telephone: +86 (0) 755 2311 8282 Fax: +86 (0) 755 2311 6366



5.9 Test Instruments list

Radiated Emission:								
Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)			
3m SAC	SAEMC	9m*6m*6m	966	07-22-2017	07-21-2020			
Loop Antenna	SCHWARZBECK	FMZB1519B	00044	03-18-2019	03-17-2020			
BiConiLog Antenna	SCHWARZBECK	VULB9163	497	03-18-2019	03-17-2020			
Horn Antenna	SCHWARZBECK	BBHA9120D	916	03-18-2019	03-17-2020			
Horn Antenna	SCHWARZBECK	BBHA9120D	1805	06-22-2017	06-21-2020			
Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170582	11-21-2018	11-20-2019			
EMI Test Software	AUDIX	E3	Version: 6.110919b					
Pre-amplifier	HP	8447D	2944A09358	03-18-2019	03-17-2020			
Pre-amplifier	CD	PAP-1G18	11804	03-18-2019	03-17-2020			
Spectrum analyzer	Rohde & Schwarz	FSP30	101454	03-18-2019	03-17-2020			
Spectrum analyzer	Rohde & Schwarz	FSP40	100363	11-21-2018	11-20-2019			
EMI Test Receiver	Rohde & Schwarz	ESRP7	101070	03-18-2019	03-17-2020			
Cable	ZDECL	Z108-NJ-NJ-81	1608458	03-18-2019	03-17-2020			
Cable	MICRO-COAX	MFR64639	K10742-5	03-18-2019	03-17-2020			
Cable	SUHNER	SUCOFLEX100	58193/4PE	03-18-2019	03-17-2020			



6 Test results and Measurement Data

6.1 Radiated Emission

Test Requirement:	ICES 003 Section 6.2							
Test Method:	ANSI C63.4:2014							
Test Frequency Range:	Refer to table 3 of ICES 003							
Test site:	Measurement Distance: 3m (Semi-Anechoic Chamber)							
Receiver setup:	Frequency				VB۱	BW Remark		
· ·	30MHz-1GHz	Quasi-					Quasi-peak Value	
	Above 1GHz	Pea RM		1MHz 1MHz	1MHz 3MH		Peak Value	
Limit:	Frequenc			(dBuV/m @	3MHz		Average Value Remark	
Littit.	30MHz-88M			40.0	<i>y</i> C 111,	(Quasi-peak Value	
	88MHz-216N			43.5			Quasi-peak Value	
	216MHz-960			46.0			Quasi-peak Value	
	960MHz-1G	Hz		54.0			Quasi-peak Value	
	Above 1GI	J-7		54.0			Average Value	
	Above IGI	12		74.0			Peak Value	
Test setup:	Below 1GHz Antenna Tower Search Antenna RF Test Receiver Ground Plane Above 1GHz							
	Horn Antenna Tower Ground Reference Plane Test Receiver Amplier Controller							





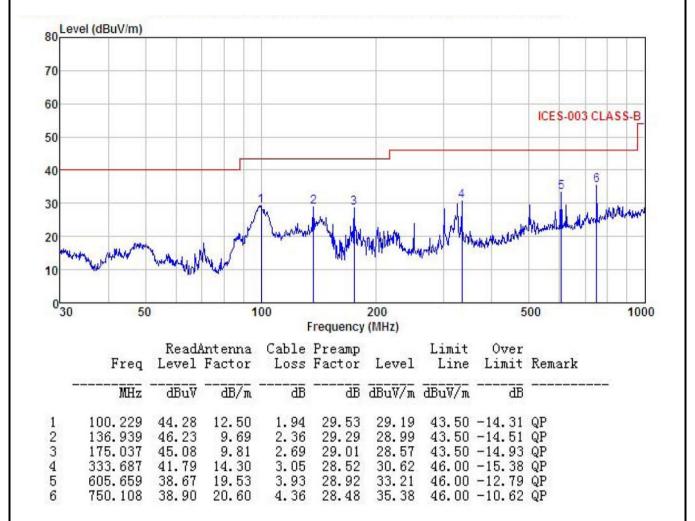
Test Procedure:	1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.
	The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
	 The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
	4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
	The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
	6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
Test Instruments:	Refer to section 5.9 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed





Measurement Data:

Product Name:	Media Center HAT	Product Model:	v1.1
Test By:	Carey	Test mode:	On Mode
Test Frequency:	30 MHz ~ 1 GHz	Polarization:	Vertical
Test Voltage:	AC 120/60Hz	Environment:	Temp: 24℃ Huni: 57%



Remark:

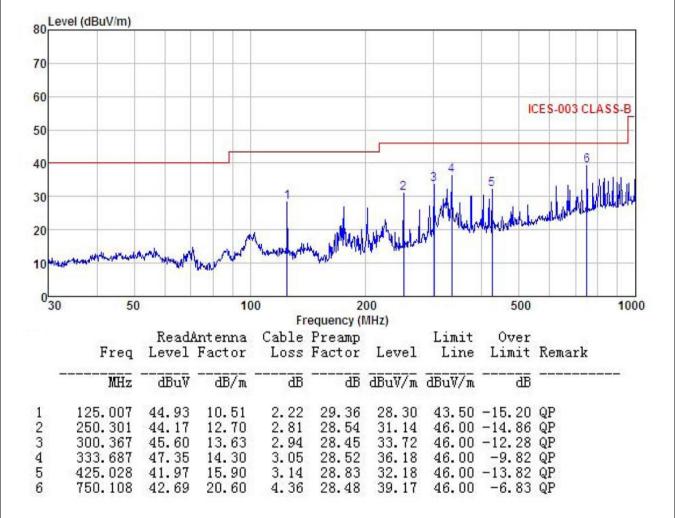
^{1.} Final Level = Receiver Read level + Antenna Factor + Cable Loss - Preamplifier Factor.

^{2.} The emission levels of other frequencies are very lower than the limit and not show in test report.





Product Name:	Media Center HAT	Product Model:	v1.1
Test By:	Carey	Test mode:	On Mode
Test Frequency:	30 MHz ~ 1 GHz	Polarization:	Horizontal
Test Voltage:	AC 120/60Hz	Environment:	Temp: 24℃ Huni: 57%



Remark

- 1. Final Level = Receiver Read level + Antenna Factor + Cable Loss Preamplifier Factor.
- 2. The emission levels of other frequencies are very lower than the limit and not show in test report.





Above 1GHz:

Product Name: Media Cen		a Center H	HAT Product M		oduct Mo	odel:		v1.1 On Mode			
est By	y:	Carey	Carey			Test mode:					
Test Frequency:		1 GH:	1 GHz ~ 6 GHz			Polarization:			Vertical		
est Vo	oltage:	AC 12	AC 120/60Hz			Environment:			Temp: 24℃ Huni: 57%		
Le	vel (dBuV/m)										
80									ICES003 CLASS B (PK)		
70											7-2-1-1
60									and the second		as beautiful as
_								ICES	003 CL	ASSE	3 (AV)
50									1	3	5
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20		1500		2000			MARKARAN			000	6000
10		1500		2000 Fr	equency (l	MHz)					
10	00 1200	1500 Read	Ant enna	2000 Fr Cable	equency (I	MHz)	Limit	Over	50	0000	
10	00 1200	1500 Read		2000 Fr Cable	equency (l	MHz)	Limit	Over	50	0000	
10	00 1200	1500 Read	Ant enna	2000 Fr Cable	equency (I Preamp Factor	MHz)	Limit Line	Over Limit	50	0000	
10 0 100	00 1200 Freq MHz 4813.252	1500 Read/Level dBuV 46.93	Antenna Factor dB/m 31.05	2000 Fr Cable Loss dB	requency (I Preamp Factor ————————————————————————————————————	MHz) Level dBuV/m 42.97	Limit Line dBuV/m 74.00	Over Limit ———————————————————————————————————	50 Remar	0000	
10 0 100 100	00 1200 Freq MHz 4813.252 4813.252	1500 Read/ Level dBuV 46.93 36.85	Antenna Factor — dB/m 31.05 31.05	2000 Fr Cable Loss dB 6.81 6.81	requency (I Preamp Factor ————————————————————————————————————	MHz) Level dBuV/m 42.97 32.89	Limit Line dBuV/m 74.00 54.00	Over Limit ———————————————————————————————————	Feak Avera	0000	
1 20 100 100	00 1200 Freq MHz 4813.252 4813.252 5217.416	1500 Read/ Level dBuV 46.93 36.85 46.93	Antenna Factor — dB/m 31.05 31.05 31.95	2000 Fr Cable Loss dB 6.81 6.81 7.09	equency (I Preamp Factor ————————————————————————————————————	MHz) Level dBuV/m 42.97 32.89 44.03	Limit Line dBuV/m 74.00 54.00 74.00	Over Limit ———————————————————————————————————	Feak Avera Peak	ooo ck	
10 0 100 100	00 1200 Freq MHz 4813.252 4813.252	1500 Read/ Level dBuV 46.93 36.85	Antenna Factor — dB/m 31.05 31.05	2000 Fr Cable Loss dB 6.81 6.81	equency (I Preamp Factor ————————————————————————————————————	MHz) Level dBuV/m 42.97 32.89 44.03 33.71	Limit Line dBuV/m 74.00 54.00 74.00 54.00	Over Limit ———————————————————————————————————	Feak Avera Peak Avera	ooo ck	

Remark:

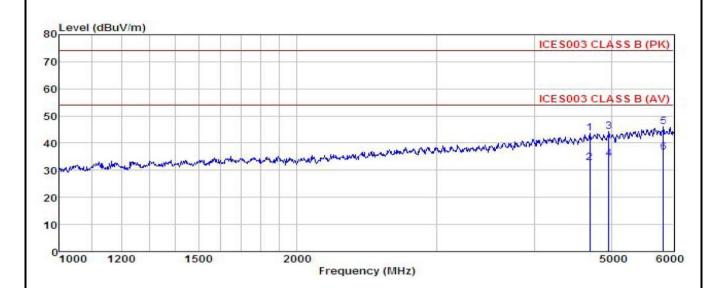
^{1.} Final Level = Receiver Read level + Antenna Factor + Cable Loss - Preamplifier Factor.

^{2.} The emission levels of other frequencies are very lower than the limit and not show in test report.





Product Name:	Media Center HAT	Product Model:	v1.1
Test By:	Carey	Test mode:	On Mode
Test Frequency:	1 GHz ~ 6 GHz	Polarization:	Horizontal
Test Voltage:	AC 120/60Hz	Environment:	Temp: 24°C Huni: 57%



	Freq		Antenna Factor				Limit Line		Remark
	MHz	dBu∀			<u>dB</u>	$\overline{dBuV/m}$	$\overline{dBuV/m}$	<u>d</u> B	
1	4694.016	47.89	30.80	6.85	41.99	43.55	74.00	-30.45	Peak
2	4694.016	37.17	30.80	6.85	41.99	32.83			Average
3	4962.120	47.86	31.33	6.91	41.87	44.23		-29.77	
4	4962.120	37.81	31.33	6.91	41.87	34.18	54.00	-19.82	Average
5	5819.996	47.57	32.66	7.89	42.02	46.10	74.00	-27.90	Peak
6	5819.996	37.98	32.66	7.89	42.02	36.51	54.00	-17.49	Average

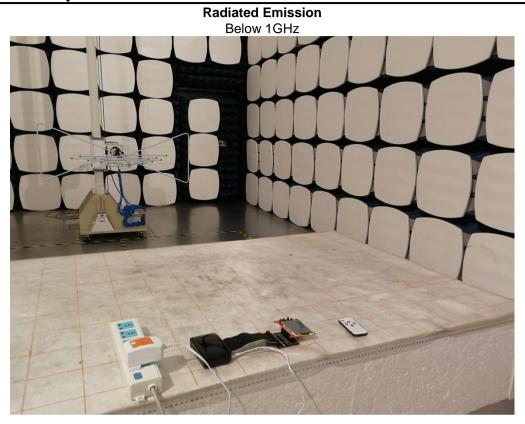
Remark:

- 1. Final Level = Receiver Read level + Antenna Factor + Cable Loss Preamplifier Factor.
- 2. The emission levels of other frequencies are very lower than the limit and not show in test report.





7 Test Setup Photo

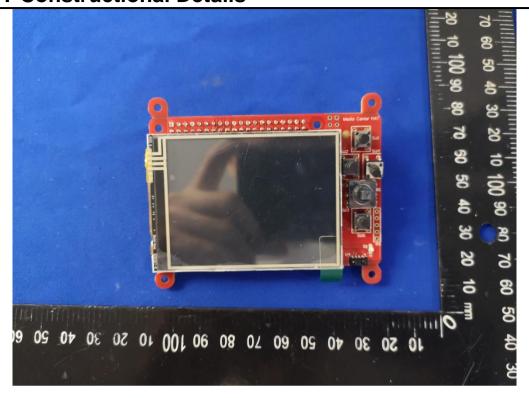


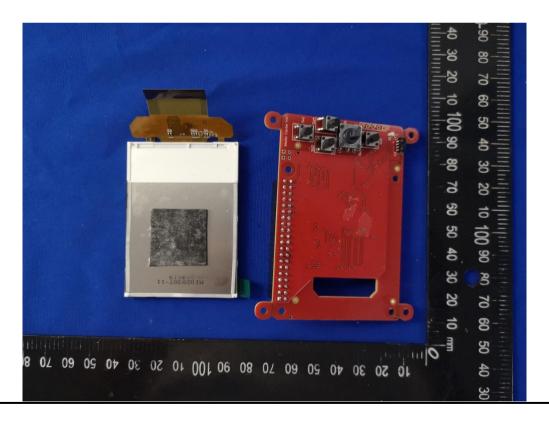




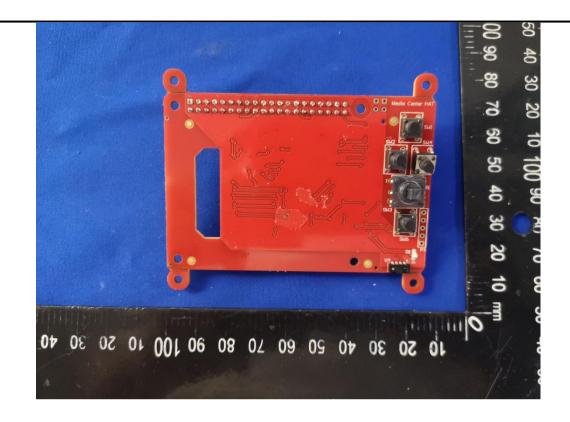


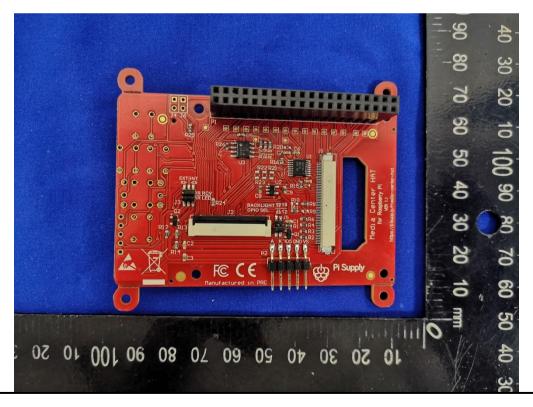
8 EUT Constructional Details





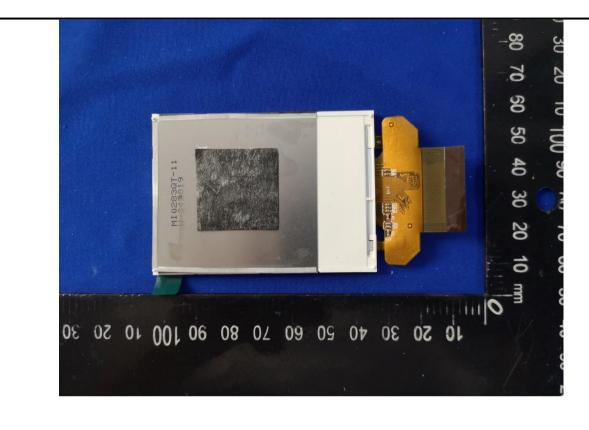


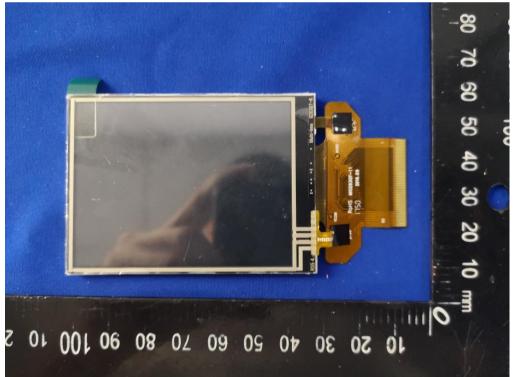










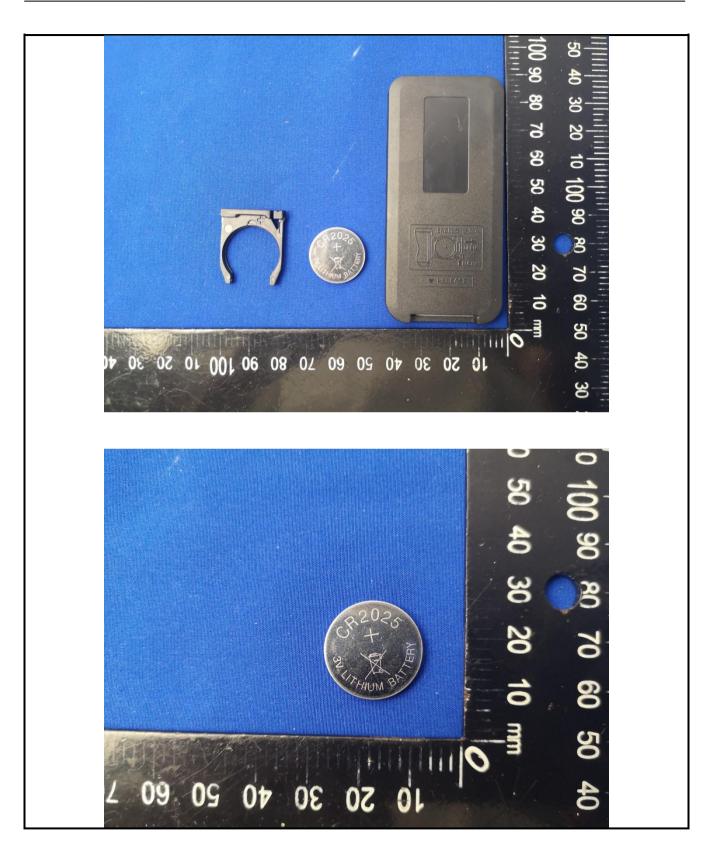








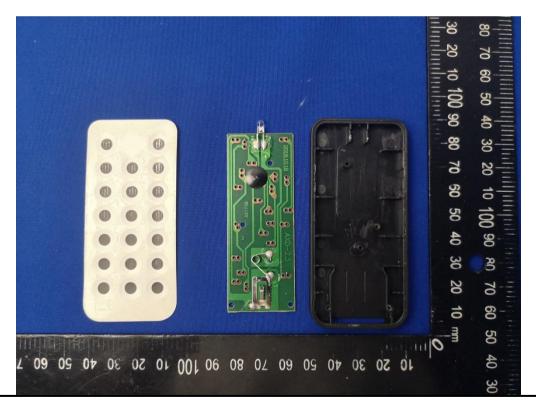






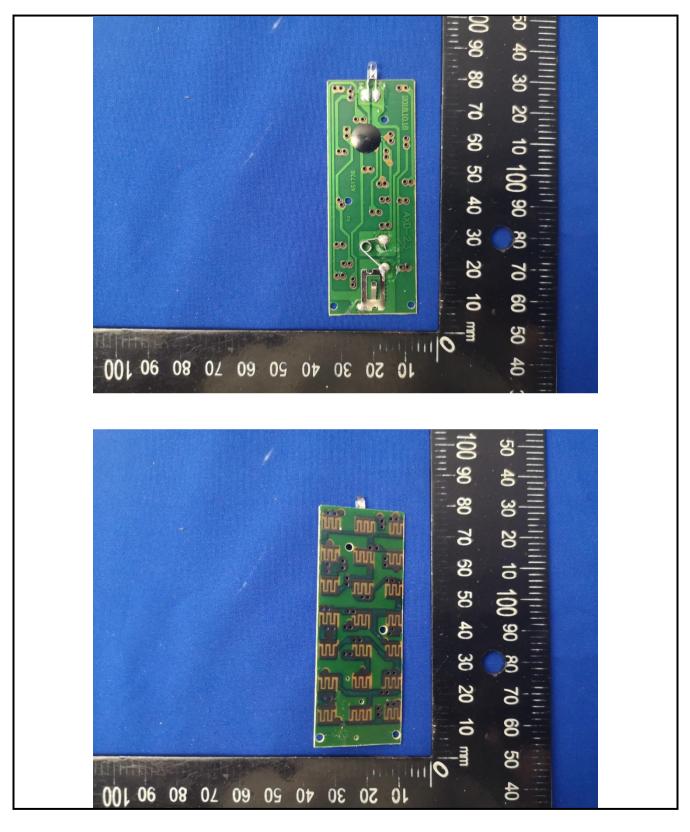












-----End of report-----