

Test Report

Report No. : TCT221125C034

Date : Nov. 28, 2022

Page No.: 1 of 16

Applicant: ShenZhen Doctors of Intelligence & Technology Co., Ltd
Address: 903, 904, Block A, Building 8, International Innovation Valley,
Xilidashi Second Road, Nanshan District, Shenzhen

The following sample was submitted and identified by/on behalf of the client as:

Sample Name: ESP-F WiFi Module /ESP-F1 WiFi Module/ESPC2-12 WiFi Module
Model No.: ESP-F
Client Reference ESP-F1, ESPC2-12
Information:
Sample Received Date: 2022.11.25
Testing Period: 2022.11.25—2022.11.28
Test Requested: As specified by client, Split the sample and determine the Pb, Cd, Hg, Cr(VI), PBBs ,PBDEs, DBP, BBP, DEHP and DIBP content of the parts.

Test Method:

1. Sample Screening testing with reference to IEC 62321-3-1:2013
2. Chemical Test Method
 - a. Determination of Lead ,Cadmium by ICP-OES with reference to IEC 62321-5:2013
 - b. Determination of Mercury by ICP-OES with reference to IEC 62321-4:2013+AMD1:2017
 - c. Determination of Hexavalent Chromium by Colorimetric method using UV-Vis reference to IEC 62321-7-1:2015, IEC 62321-7-2:2017
 - d. Determination of PBBs and PBDEs by GC-MS with reference to IEC 62321-6:2015
 - e. Determination of DBP, BBP, DEHP and DIBP by GC-MS with reference to IEC 62321-8:2017

Test Result(s): Please refer to the following page(s).

Conclusion: Base upon the performed tests by submitted sample, the test results comply with the limits as set by Directive (EU) 2015/863 - Amendment of EU RoHS Directive 2011/65/EU Annex II.

Checked by

Justin

Approved by

Ryan Zhang
Technical Manager



Test Report

Report No. : TCT221125C034

Date : Nov. 28, 2022

Page No.: 2 of 16

Test Result(s)

Part No.	Part Description	Restricted Substances	Result of EDXRF (1)	Result of Chemical Testing (2) (mg/kg)	Conclusion on RoHS
1	Silvery color metal	Pb Cd Hg Cr(VI) PBBs PBDEs DBP BBP DEHP DIBP	BL BL BL BL --- --- --- --- --- ---	--- --- --- --- --- --- --- --- --- ---	Comply Comply Comply Comply NA NA NA NA NA NA
2	Black resistor	Pb Cd Hg Cr(VI) PBBs PBDEs DBP BBP DEHP DIBP	BL BL BL BL BL BL --- --- --- ---	--- --- --- --- --- --- N.D. N.D. N.D. N.D.	Comply Comply Comply Comply Comply Comply Comply Comply Comply Comply
3	Silvery color crystal oscillator	Pb Cd Hg Cr(VI) PBBs PBDEs DBP BBP DEHP DIBP	BL BL BL BL BL BL --- --- --- ---	--- --- --- --- --- --- N.D. N.D. N.D. N.D.	Comply Comply Comply Comply Comply Comply Comply Comply Comply Comply

Test Report

Report No. : TCT221125C034

Date : Nov. 28, 2022

Page No.: 3 of 16

Part No.	Part Description	Restricted Substances	Result of EDXRF (1)	Result of Chemical Testing (2) (mg/kg)	Conclusion on RoHS
4	Brown capacitor	Pb	BL	---	Comply
		Cd	BL	---	Comply
		Hg	BL	---	Comply
		Cr(VI)	BL	---	Comply
		PBBs	BL	---	Comply
		PBDEs	BL	---	Comply
		DBP	---	N.D.	Comply
		BBP	---	N.D.	Comply
		DEHP	---	N.D.	Comply
		DIBP	---	N.D.	Comply
5	Black electronic component	Pb	BL	---	Comply
		Cd	BL	---	Comply
		Hg	BL	---	Comply
		Cr(VI)	BL	---	Comply
		PBBs	BL	---	Comply
		PBDEs	BL	---	Comply
		DBP	---	N.D.	Comply
		BBP	---	N.D.	Comply
		DEHP	---	N.D.	Comply
		DIBP	---	N.D.	Comply
6	Brown capacitor	Pb	BL	---	Comply
		Cd	BL	---	Comply
		Hg	BL	---	Comply
		Cr(VI)	BL	---	Comply
		PBBs	BL	---	Comply
		PBDEs	BL	---	Comply
		DBP	---	N.D.	Comply
		BBP	---	N.D.	Comply
		DEHP	---	N.D.	Comply
		DIBP	---	N.D.	Comply

Test Report

Report No. : TCT221125C034

Date : Nov. 28, 2022

Page No.: 4 of 16

Part No.	Part Description	Restricted Substances	Result of EDXRF (1)	Result of Chemical Testing (2) (mg/kg)	Conclusion on RoHS
7	Black IC	Pb	BL	---	Comply
		Cd	BL	---	Comply
		Hg	BL	---	Comply
		Cr(VI)	BL	---	Comply
		PBBs	BL	---	Comply
		PBDEs	BL	---	Comply
		DBP	---	N.D.	Comply
		BBP	---	N.D.	Comply
		DEHP	---	N.D.	Comply
		DIBP	---	N.D.	Comply
8	Solder	Pb	BL	---	Comply
		Cd	BL	---	Comply
		Hg	BL	---	Comply
		Cr(VI)	BL	---	Comply
		PBBs	---	---	NA
		PBDEs	---	---	NA
		DBP	---	---	NA
		BBP	---	---	NA
		DEHP	---	---	NA
		DIBP	---	---	NA
9	Black PCB	Pb	BL	---	Comply
		Cd	BL	---	Comply
		Hg	BL	---	Comply
		Cr(VI)	BL	---	Comply
		PBBs	IN	N.D.	Comply
		PBDEs	IN	N.D.	Comply
		DBP	---	N.D.	Comply
		BBP	---	N.D.	Comply
		DEHP	---	N.D.	Comply
		DIBP	---	N.D.	Comply

Test Report

Report No. : TCT221125C034

Date : Nov. 28, 2022

Page No.: 5 of 16

Part No.	Part Description	Restricted Substances	Result of EDXRF (1)	Result of Chemical Testing (2) (mg/kg)	Conclusion on RoHS
10	Silvery color metal	Pb	BL	---	Comply
		Cd	BL	---	Comply
		Hg	BL	---	Comply
		Cr(VI)	BL	---	Comply
		PBBs	---	---	NA
		PBDEs	---	---	NA
		DBP	---	---	NA
		BBP	---	---	NA
		DEHP	---	---	NA
		DIBP	---	---	NA
11	Brown capacitor	Pb	BL	---	Comply
		Cd	BL	---	Comply
		Hg	BL	---	Comply
		Cr(VI)	BL	---	Comply
		PBBs	BL	---	Comply
		PBDEs	BL	---	Comply
		DBP	---	N.D.	Comply
		BBP	---	N.D.	Comply
		DEHP	---	N.D.	Comply
		DIBP	---	N.D.	Comply
12	Silvery color crystal oscillator	Pb	BL	---	Comply
		Cd	BL	---	Comply
		Hg	BL	---	Comply
		Cr(VI)	BL	---	Comply
		PBBs	BL	---	Comply
		PBDEs	BL	---	Comply
		DBP	---	N.D.	Comply
		BBP	---	N.D.	Comply
		DEHP	---	N.D.	Comply
		DIBP	---	N.D.	Comply

Test Report

Report No. : TCT221125C034

Date : Nov. 28, 2022

Page No.: 6 of 16

Part No.	Part Description	Restricted Substances	Result of EDXRF (1)	Result of Chemical Testing (2) (mg/kg)	Conclusion on RoHS
13	Black IC	Pb	BL	---	Comply
		Cd	BL	---	Comply
		Hg	BL	---	Comply
		Cr(VI)	BL	---	Comply
		PBBs	IN	N.D.	Comply
		PBDEs	IN	N.D.	Comply
		DBP	---	N.D.	Comply
		BBP	---	N.D.	Comply
		DEHP	---	N.D.	Comply
		DIBP	---	N.D.	Comply
14	Black IC	Pb	BL	---	Comply
		Cd	BL	---	Comply
		Hg	BL	---	Comply
		Cr(VI)	BL	---	Comply
		PBBs	BL	---	Comply
		PBDEs	BL	---	Comply
		DBP	---	N.D.	Comply
		BBP	---	N.D.	Comply
		DEHP	---	N.D.	Comply
		DIBP	---	N.D.	Comply
15	Solder	Pb	BL	---	Comply
		Cd	BL	---	Comply
		Hg	BL	---	Comply
		Cr(VI)	BL	---	Comply
		PBBs	---	---	NA
		PBDEs	---	---	NA
		DBP	---	---	NA
		BBP	---	---	NA
		DEHP	---	---	NA
		DIBP	---	---	NA

Test Report

Report No. : TCT221125C034

Date : Nov. 28, 2022

Page No.: 7 of 16

Part No.	Part Description	Restricted Substances	Result of EDXRF (1)	Result of Chemical Testing (2) (mg/kg)	Conclusion on RoHS
16	Black PCB	Pb	BL	---	Comply
		Cd	BL	---	Comply
		Hg	BL	---	Comply
		Cr(VI)	BL	---	Comply
		PBBs	IN	N.D.	Comply
		PBDEs	IN	N.D.	Comply
		DBP	---	N.D.	Comply
		BBP	---	N.D.	Comply
		DEHP	---	N.D.	Comply
		DIBP	---	N.D.	Comply
17	Silvery color metal	Pb	BL	---	Comply
		Cd	BL	---	Comply
		Hg	BL	---	Comply
		Cr(VI)	BL	---	Comply
		PBBs	---	---	NA
		PBDEs	---	---	NA
		DBP	---	---	NA
		BBP	---	---	NA
		DEHP	---	---	NA
		DIBP	---	---	NA
18	Brown capacitor	Pb	BL	---	Comply
		Cd	BL	---	Comply
		Hg	BL	---	Comply
		Cr(VI)	BL	---	Comply
		PBBs	BL	---	Comply
		PBDEs	BL	---	Comply
		DBP	---	N.D.	Comply
		BBP	---	N.D.	Comply
		DEHP	---	N.D.	Comply
		DIBP	---	N.D.	Comply

Test Report

Report No. : TCT221125C034

Date : Nov. 28, 2022

Page No.: 8 of 16

Part No.	Part Description	Restricted Substances	Result of EDXRF (1)	Result of Chemical Testing (2) (mg/kg)	Conclusion on RoHS
19	Silvery color crystal oscillator	Pb	BL	---	Comply
		Cd	BL	---	Comply
		Hg	BL	---	Comply
		Cr(VI)	BL	---	Comply
		PBBs	IN	N.D.	Comply
		PBDEs	IN	N.D.	Comply
		DBP	---	N.D.	Comply
		BBP	---	N.D.	Comply
		DEHP	---	N.D.	Comply
		DIBP	---	N.D.	Comply
20	White LED	Pb	BL	---	Comply
		Cd	BL	---	Comply
		Hg	BL	---	Comply
		Cr(VI)	BL	---	Comply
		PBBs	BL	---	Comply
		PBDEs	BL	---	Comply
		DBP	---	N.D.	Comply
		BBP	---	N.D.	Comply
		DEHP	---	N.D.	Comply
		DIBP	---	N.D.	Comply
21	Black IC	Pb	BL	---	Comply
		Cd	BL	---	Comply
		Hg	BL	---	Comply
		Cr(VI)	BL	---	Comply
		PBBs	BL	---	Comply
		PBDEs	BL	---	Comply
		DBP	---	N.D.	Comply
		BBP	---	N.D.	Comply
		DEHP	---	N.D.	Comply
		DIBP	---	N.D.	Comply

Test Report

Report No. : TCT221125C034

Date : Nov. 28, 2022

Page No.: 9 of 16

Part No.	Part Description	Restricted Substances	Result of EDXRF (1)	Result of Chemical Testing (2) (mg/kg)	Conclusion on RoHS
22	Black IC	Pb	BL	---	Comply
		Cd	BL	---	Comply
		Hg	BL	---	Comply
		Cr(VI)	BL	---	Comply
		PBBs	BL	---	Comply
		PBDEs	BL	---	Comply
		DBP	---	N.D.	Comply
		BBP	---	N.D.	Comply
		DEHP	---	N.D.	Comply
		DIBP	---	N.D.	Comply
23	Black resistor	Pb	BL	---	Comply
		Cd	BL	---	Comply
		Hg	BL	---	Comply
		Cr(VI)	BL	---	Comply
		PBBs	BL	---	Comply
		PBDEs	BL	---	Comply
		DBP	---	N.D.	Comply
		BBP	---	N.D.	Comply
		DEHP	---	N.D.	Comply
		DIBP	---	N.D.	Comply
24	Solder	Pb	BL	---	Comply
		Cd	BL	---	Comply
		Hg	BL	---	Comply
		Cr(VI)	BL	---	Comply
		PBBs	---	---	NA
		PBDEs	---	---	NA
		DBP	---	---	NA
		BBP	---	---	NA
		DEHP	---	---	NA
		DIBP	---	---	NA

Test Report

Report No. : TCT221125C034

Date : Nov. 28, 2022

Page No.: 10 of 16

Part No.	Part Description	Restricted Substances	Result of EDXRF (1)	Result of Chemical Testing (2) (mg/kg)	Conclusion on RoHS
25	Black PCB	Pb	BL	---	Comply
		Cd	BL	---	Comply
		Hg	BL	---	Comply
		Cr(VI)	BL	---	Comply
		PBBs	IN	N.D.	Comply
		PBDEs	IN	N.D.	Comply
		DBP	---	N.D.	Comply
		BBP	---	N.D.	Comply
		DEHP	---	N.D.	Comply
		DIBP	---	N.D.	Comply

Test Report

Report No. : TCT221125C034

Date : Nov. 28, 2022

Page No.: 11 of 16

Remark:

- (1) (a) It is the result on total Br while test item on restricted substances is PBBs/PBDEs. It is the result on total Cr while test item on restricted substances is Cr(VI).
(b) Results are obtained by EDXRF for primary screening, and further chemical testing by ICP-OES (for Cd, Pb, Hg), UV-Vis (for Cr(VI)) and GC/MS (for PBBs, PBDEs) is recommended to be performed, if the concentration exceeds the below warning value according to IEC62321-3-1:2013 (unit: mg/kg)

Element	Polymer	Metal	Composite Materials
Cd	$BL \leq (70-3\sigma) < X < (130+3\sigma) \leq OL$	$BL \leq (70-3\sigma) < X < (130+3\sigma) \leq OL$	$LOD < X < (150+3\sigma) \leq OL$
Pb	$BL \leq (700-3\sigma) < X < (1300+3\sigma) \leq OL$	$BL \leq (700-3\sigma) < X < (1300+3\sigma) \leq OL$	$BL \leq (500-3\sigma) < X < (1500+3\sigma) \leq OL$
Hg	$BL \leq (700-3\sigma) < X < (1300+3\sigma) \leq OL$	$BL \leq (700-3\sigma) < X < (1300+3\sigma) \leq OL$	$BL \leq (500-3\sigma) < X < (1500+3\sigma) \leq OL$
Br	$BL \leq (300-3\sigma) < X$	NA	$BL \leq (250-3\sigma) < X$
Cr	$BL \leq (700-3\sigma) < X$	$BL \leq (700-3\sigma) < X$	$BL \leq (500-3\sigma) < X$

(c) BL = Below Limit, OL = Over Limit, IN = Inconclusive, LOD = Limit of Detection,
--- = Not Regulated, NA = Not Applicable.

(d) The XRF screening test for RoHS elements – The reading may be different to the actual content in the sample be of non-uniformity composition.

- (2) (a) 1mg/kg = 1ppm = 0.0001%, N.D.= Not Detected (<MDL), --- = Not Conducted.

(b) Unit and Method Detection Limit (MDL) in chemical test

Test Items	Pb	Cd	Hg	Cr(VI)	PBBs	PBDEs	DBP	BBP	DEHP	DIBP
MDL(mg/kg)	10	10	10	*	100	100	100	100	100	100
Limit(mg/kg)	1000	100	1000	1000	1000	1000	1000	1000	1000	1000

*MDL of Cr(VI) for polymer, composite sample is 10 mg/kg,

MDL of Cr(VI) for metal sample is 0.10 $\mu\text{g}/\text{cm}^2$,

The limit is quoted from the Directive (EU) 2015/863 - Amendment of EU RoHS Directive 2011/65/EU Annex II.

(c) According to IEC 62321-7-1:15, For metal samples,

- When the Cr (VI) concentration is $> 0.13 \mu\text{g}/\text{cm}^2$, the sample is positive for Cr(VI) and considered to contain Cr(VI).
- When the Cr (VI) concentration is N.D.($< 0.10 \mu\text{g}/\text{cm}^2$), the sample is negative for Cr(VI) and considered a non-Cr(VI) based coating.
- When the Cr (VI) concentration is $\geq 0.10 \mu\text{g}/\text{cm}^2$ and $\leq 0.13 \mu\text{g}/\text{cm}^2$, the result is considered to be inconclusive - Unavoidable coating variations may influence the determination.

Because the storage condition and production date of the sample are not known, the test results of

Test Report

Report No. : TCT221125C034

Date : Nov. 28, 2022

Page No.: 12 of 16

the sample of hexavalent chromium can only represent the state of hexavalent chromium in the samples tested.



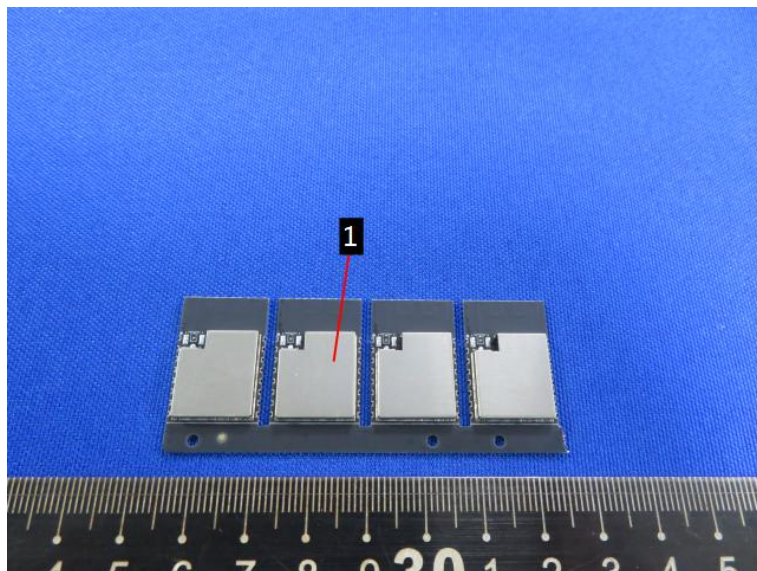
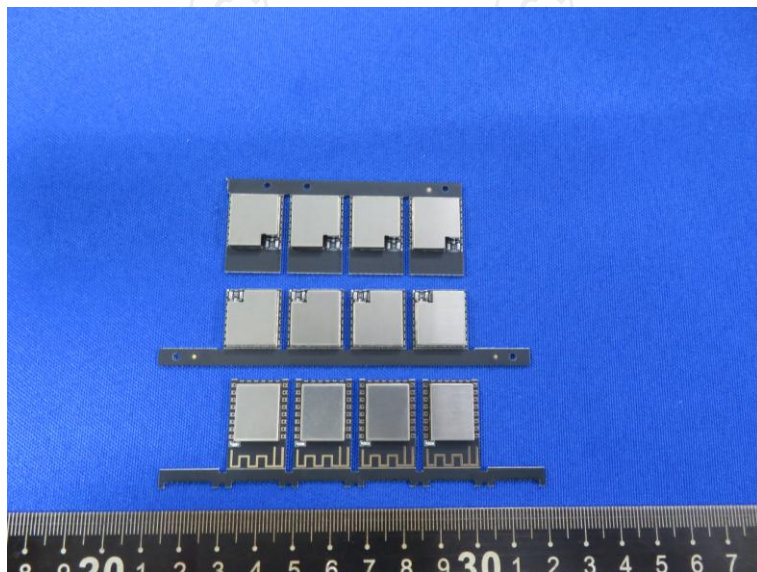
Test Report

Report No. : TCT221125C034

Date : Nov. 28, 2022

Page No.: 13 of 16

Photo(s) of the sample(s)

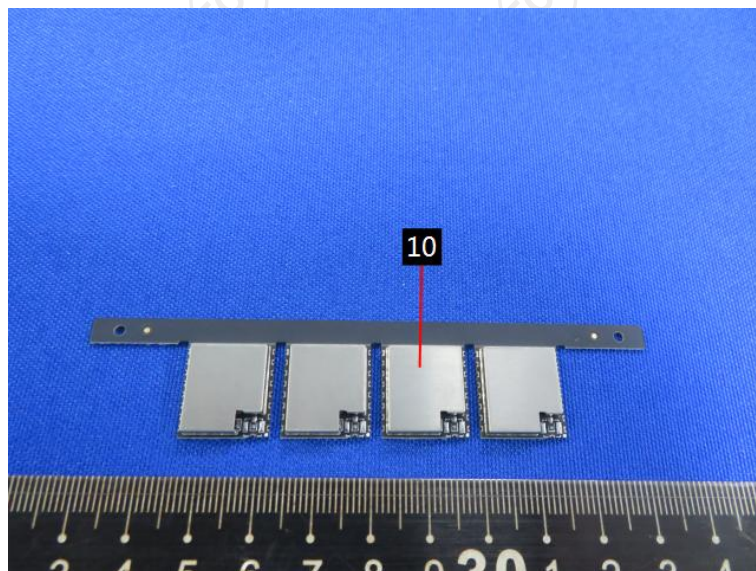
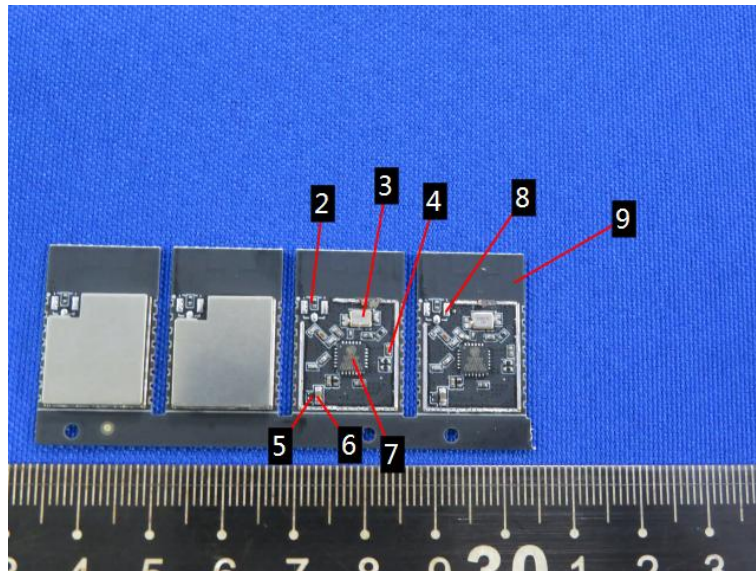


Test Report

Report No. : TCT221125C034

Date : Nov. 28, 2022

Page No.: 14 of 16

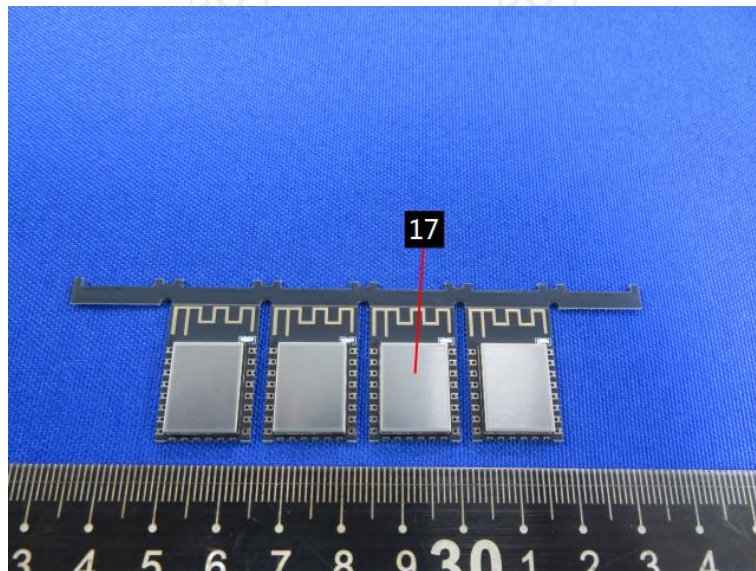
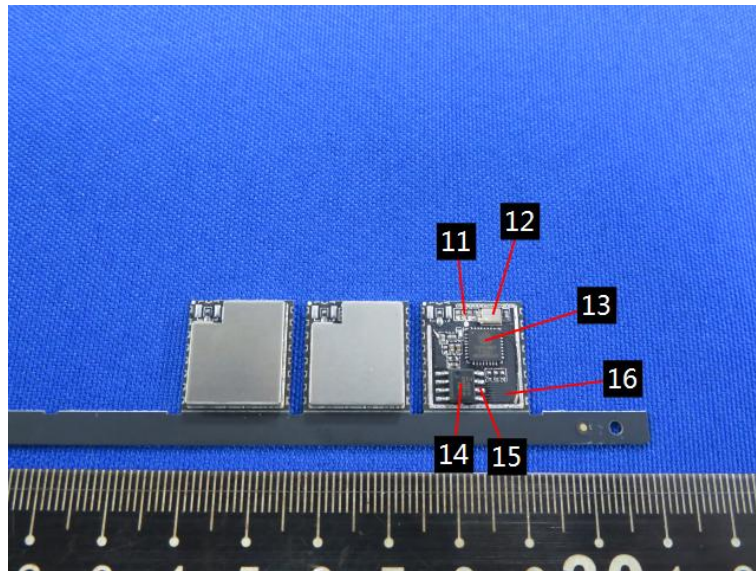


Test Report

Report No. : TCT221125C034

Date : Nov. 28, 2022

Page No.: 15 of 16

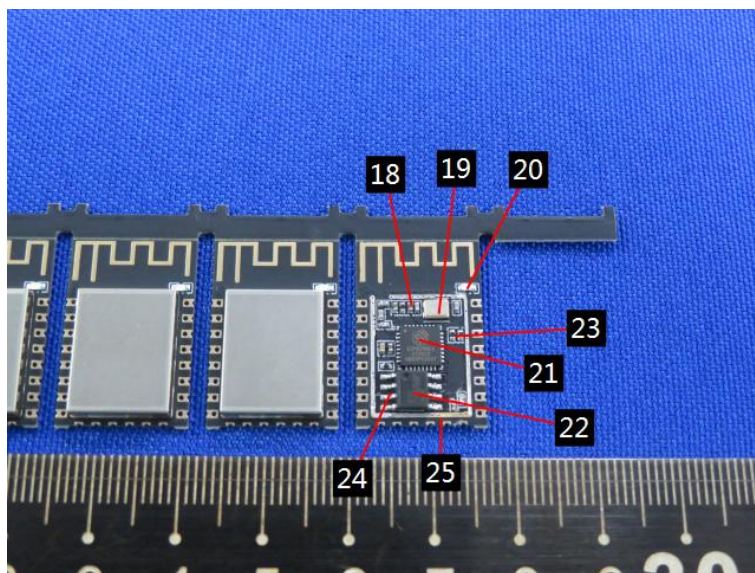


Test Report

Report No. : TCT221125C034

Date : Nov. 28, 2022

Page No.: 16 of 16



*** End of Report ***

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