



FCC Part 15, Subpart B Test Report

For

Applicant Name: TCL Communication Ltd.
Address: 5/F, Building 22E, 22 Science Park East Avenue, Hong Kong Science Park, Shatin, NT, Hong Kong
EUT Name: RayNeo X2
Model Number: ARG78
Series Model Number: Refer to section 2

Issued By

Company Name: BTF Testing Lab (Shenzhen) Co., Ltd.
Address: F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China

Report Number: BTF230718E00501
Test Standards: 47 CFR Part 15, Subpart B

Test Conclusion: Pass
FCC ID: 2ACCJN067
Test Date: 2023-05-10 to 2023-07-26
Date of Issue: 2023-07-26

Prepared By: Elma.Yang
Date: 2023-07-26

Approved By: Ryan.CJ
Date: 2023-07-26



Note: All the test results in this report only related to the testing samples. Which can be duplicated completely for the legal use with approval of applicant; it shall not be reproduced except in full without the written approval of BTF Testing Lab (Shenzhen) Co., Ltd., All the objections should be raised within thirty days from the date of issue. To validate the report, you can contact us.



Test Report Number: BTF230718E00501

Revision History		
Version	Issue Date	Revisions Content
R_V0	2023-07-26	Original
<i>Note: Once the revision has been made, then previous versions reports are invalid.</i>		

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1 Introduction

1.1 Identification of Testing Laboratory

Company Name:	BTF Testing Lab (Shenzhen) Co., Ltd.
Address:	F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China

1.2 Identification of the Responsible Testing Location

Company Name:	BTF Testing Lab (Shenzhen) Co., Ltd.
Address:	F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China
FCC Registration Number:	518915
Designation Number:	CN1330

1.3 Announcement

- (1) The test report reference to the report template version v0.
- (2) The test report is invalid if not marked with the signatures of the persons responsible for preparing, reviewing and approving the test report.
- (3) The test report is invalid if there is any evidence and/or falsification.
- (4) This document may not be altered or revised in any way unless done so by BTF and all revisions are duly noted in the revisions section.
- (5) Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory.
- (6) The laboratory is only responsible for the data released by the laboratory, except for the part provided by the applicant.

2 Product Information

2.1 Application Information

Company Name:	TCL Communication Ltd.
Address:	5/F, Building 22E, 22 Science Park East Avenue, Hong Kong Science Park, Shatin, NT, Hong Kong

2.2 Manufacturer Information

Company Name:	Falcon innovations Technology (Shenzhen) Co., Ltd
Address:	5th Floor, Building D4, TCL International E City, no.1001 zhongshan Yuan Road, Nanshan District, Shenzhen, China

2.3 Factory Information

Company Name:	TCL Mobile Communication Co., LTD
Address:	No.86, Hechang 7th West Road ,Zhong Kai Hi-tech Development District, Hui Zhou, Guang Dong

2.4 General Description of Equipment under Test (EUT)

EUT Name:	TCL RayNeo X2
Test Model Number:	ARGT78
Series Model Number:	/

2.5 Technical Information

Power Supply:	DC 3.85V from battery
Power Adaptor:	/

3 Summary of Test Results

3.1 Test Standards

The tests were performed according to following standards:

47 CFR Part 15, Subpart B: Unintentional Radiators

3.2 Uncertainty of Test

Item	Measurement Uncertainty
Conducted Emission (150 kHz-30 MHz)	$\pm 2.64\text{dB}$
All emissions, radiated <1GHz/radiated >1GHz	$\pm 4.12\text{dB}/4.16\text{dB}$
The following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.	

3.3 Summary of Test Result

Item	Standard	Requirement	Result
Conducted emissions on AC mains	47 CFR Part 15, Subpart B	15.107, Class B	Pass
Radiated emissions (Below 1GHz)	47 CFR Part 15, Subpart B	15.109, Class B	Pass
Radiated emissions (Above 1GHz)	47 CFR Part 15, Subpart B	15.109, Class B	Pass

4 Test Configuration

4.1 Test Equipment List

Conducted emissions on AC mains					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Pulse Limiter	SCHWARZBECK	VTSD 9561-F	00953	2022-11-24	2023-11-23
Coaxial Switcher	SCHWARZBECK	CX210	CX210	2022-11-24	2023-11-23
V-LISN	SCHWARZBECK	NSLK 8127	01073	2022-11-24	2023-11-23
LISN	AFJ	LS16/110VAC	16010020076	2023-02-23	2024-02-22
EMI Receiver	ROHDE&SCHWARZ	ESCI3	101422	2022-11-24	2023-11-23

Radiated emissions (Below 1GHz)					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Coaxial cable Multiflex 141	Schwarzbeck	N/SMA 0.5m	517386	2023-03-24	2024-03-23
Preamplifier	SCHWARZBECK	BBV9744	00246	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF1-SMASMAM-10m	21101566	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF2-NMNM-10m	21101570	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF1-SMASMAM-1m	21101568	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF2-NMNM-1m	21101576	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF2-NMNM-2.5m	21101573	2022-11-24	2023-11-23
POSITIONAL CONTROLLER	SKET	PCI-GPIB	/	/	/
Horn Antenna	SCHWARZBECK	BBHA9170	01157	2021-11-28	2023-11-27
EMI TEST RECEIVER	ROHDE&SCHWARZ	ESCI7	101032	2022-11-24	2023-11-23
SIGNAL ANALYZER	ROHDE&SCHWARZ	FSQ40	100010	2022-11-24	2023-11-23
POSITIONAL CONTROLLER	SKET	PCI-GPIB	/	/	/
Broadband Preamplifier	SCHWARZBECK	BBV9718D	00008	2023-03-24	2024-03-23
Horn Antenna	SCHWARZBECK	BBHA9120D	2597	2022-05-22	2024-05-21
EZ EMC	Frad	FA-03A2 RE+	/	/	/
POSITIONAL CONTROLLER	SKET	PCI-GPIB	/	/	/
Log periodic antenna	SCHWARZBECK	VULB 9168	01328	2021-11-28	2023-11-27

Radiated emissions (Above 1GHz)					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Coaxial cable Multiflex 141	Schwarzbeck	N/SMA 0.5m	517386	2023-03-24	2024-03-23
Preamplifier	SCHWARZBECK	BBV9744	00246	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF1-SMASMAM-10m	21101566	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF2-NMNM-10m	21101570	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF2-NMNM-1m	21101576	2022-11-24	2023-11-23

RE Cable	REBES Talent	UF2-NMNM-2.5m	21101573	2022-11-24	2023-11-23
POSITIONAL CONTROLLER	SKET	PCI-GPIB	/	/	/
Horn Antenna	SCHWARZBECK	BBHA9170	01157	2021-11-28	2023-11-27
EMI TEST RECEIVER	ROHDE&SCHWA RZ	ESCI7	101032	2022-11-24	2023-11-23
SIGNAL ANALYZER	ROHDE&SCHWA RZ	FSQ40	100010	2022-11-24	2023-11-23
POSITIONAL CONTROLLER	SKET	PCI-GPIB	/	/	/
Broadband Preamplifier	SCHWARZBECK	BBV9718D	00008	2023-03-24	2024-03-23
Horn Antenna	SCHWARZBECK	BBHA9120D	2597	2022-05-22	2024-05-21
EZ EMC	Frad	FA-03A2 RE+	/	/	/
POSITIONAL CONTROLLER	SKET	PCI-GPIB	/	/	/
Log periodic antenna	SCHWARZBECK	VULB 9168	01328	2021-11-28	2023-11-27

4.2 Test Auxiliary Equipment

The EUT was tested as an independent device.

4.3 Test Modes

No.	Test Modes	Radiated emission	Conducted emission
TM1	On, Camera	※	※
TM2	On, Video play	/	/
TM3	Standby	/	/
TM4	Charging	/	/

Note: Mode 1 ※ is worst case mode tests, so this report only reflected the worst mode in this part.
The maximum internal operating frequency is less than 300MHz

5 Emission Test Results (EMI)

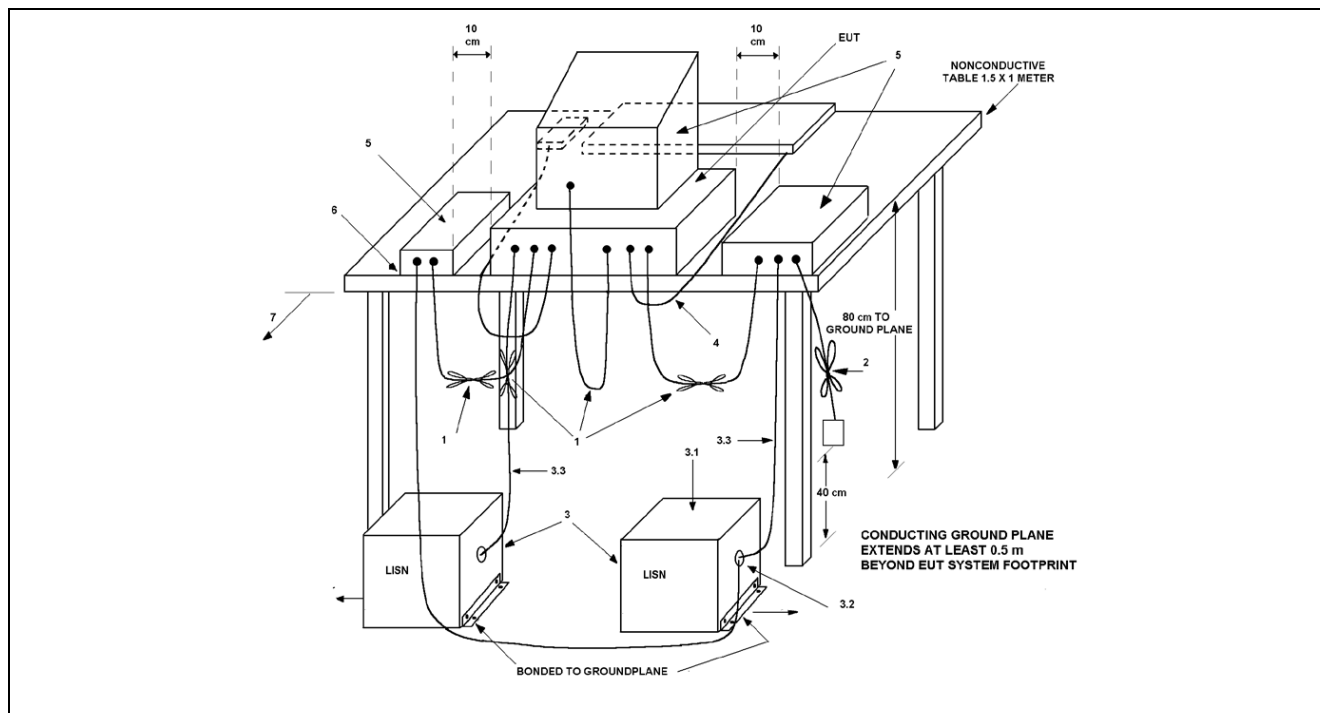
5.1 Conducted emissions on AC mains

Test Requirement:	15.107, Class B		
Test Method:	ANSI C63.4		
Test Limit:	Frequency of emission (MHz)	Conducted limit (dB μ V)	
		Quasi-peak	Average
	0.15-0.5	66 to 56*	56 to 46*
	0.5-5	56	46
	5-30	60	50
Procedure:	*Decreases with the logarithm of the frequency.		
	An initial pre-scan was performed with peak detector. Quasi-Peak or Average measurement were performed at the frequencies with maximized peak emission were detected. Remark: Level= Read Level+ Cable Loss+ LISN Factor		

5.1.1 E.U.T. Operation:

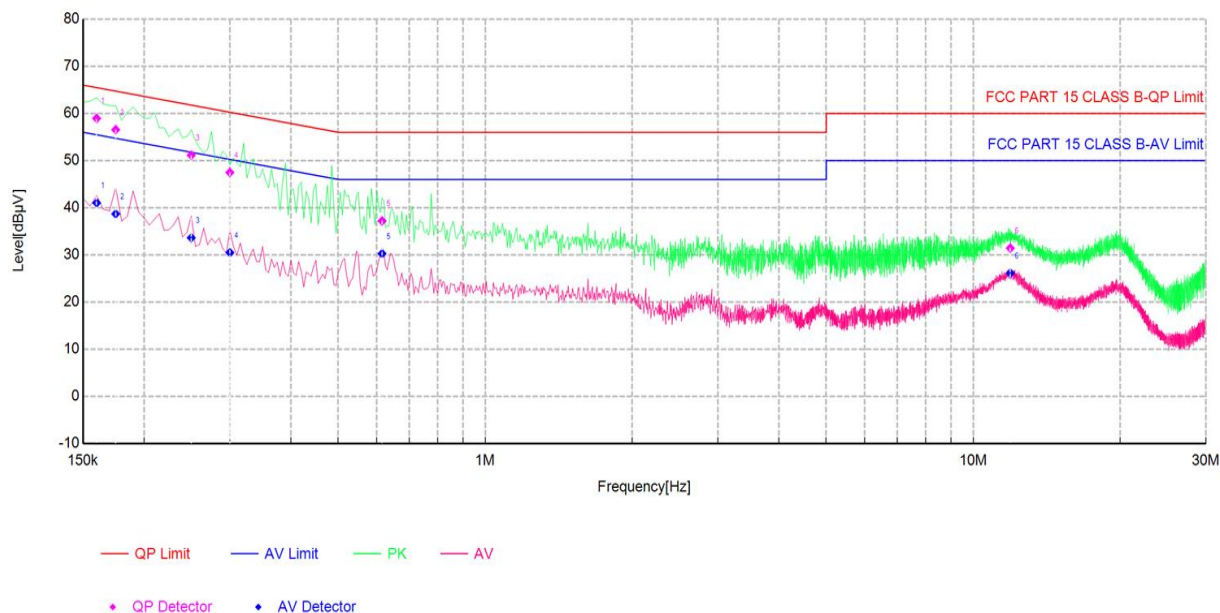
Operating Environment:	
Temperature:	24.1 °C
Humidity:	48.7 %
Atmospheric Pressure:	1010 mbar

5.1.2 Test Setup Diagram:



5.1.3 Test Data:

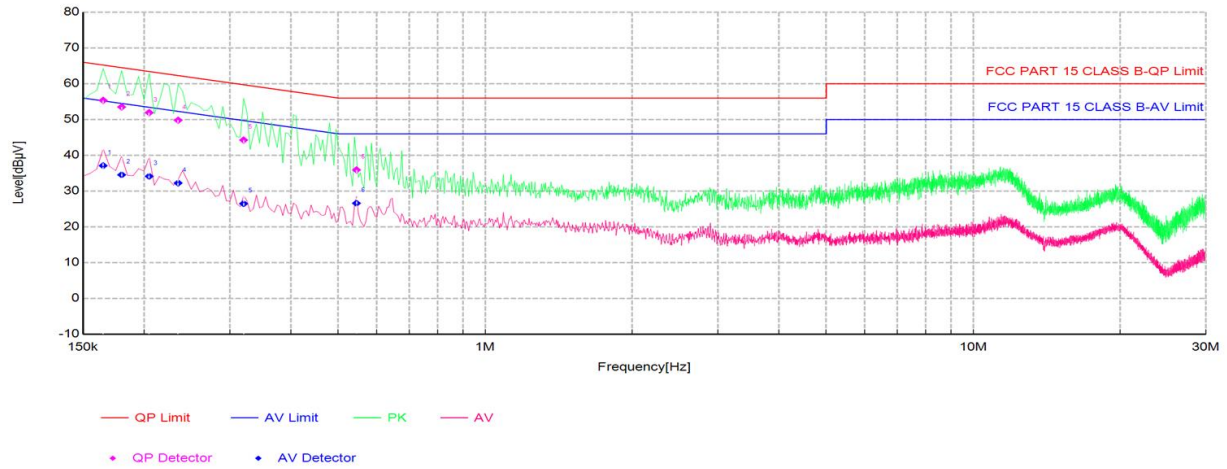
TM1 / Line: Line



Final Data List

NO.	Freq. [MHz]	Factor[dB]	QP Value [dBμV]	QP Limit [dBμV]	QP Margin [dB]	AV Value [dBμV]	AV Limit [dBμV]	AV Margin [dB]	Phase	Verdict
1	0.1600	10.05	58.94	65.46	6.52	41.03	55.46	14.43	L	PASS
2	0.1750	10.14	56.55	64.72	8.17	38.70	54.72	16.02	L	PASS
3	0.2500	10.41	51.13	61.76	10.63	33.63	51.76	18.13	L	PASS
4	0.3000	10.53	47.49	60.24	12.75	30.49	50.24	19.75	L	PASS
5	0.6150	10.25	37.19	56.00	18.81	30.27	46.00	15.73	L	PASS
6	11.9150	10.28	31.44	60.00	28.56	26.11	50.00	23.89	L	PASS

TM1 / Line: Neutral



Final Data List										
NO.	Freq. [MHz]	Factor[dB]	QP Value [dBμV]	QP Limit [dBμV]	QP Margin [dB]	AV Value [dBμV]	AV Limit [dBμV]	AV Margin [dB]	Phase	Verdict
1	0.1650	10.08	55.35	65.21	9.86	37.09	55.21	18.12	N	PASS
2	0.1800	10.18	53.50	64.49	10.99	34.54	54.49	19.95	N	PASS
3	0.2050	10.33	51.92	63.41	11.49	34.14	53.41	19.27	N	PASS
4	0.2350	10.37	49.80	62.27	12.47	32.25	52.27	20.02	N	PASS
5	0.3200	10.45	44.26	59.71	15.45	26.49	49.71	23.22	N	PASS
6	0.5450	10.27	35.92	56.00	20.08	26.60	46.00	19.40	N	PASS

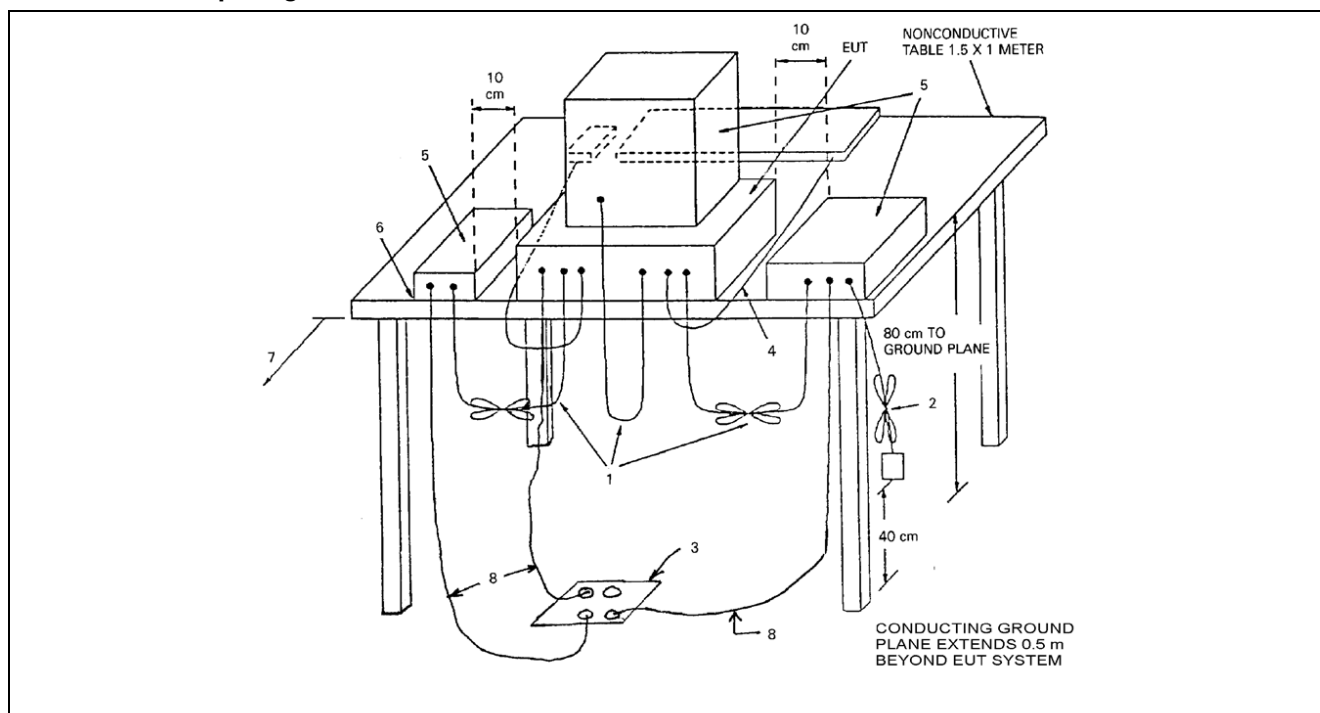
5.2 Radiated emissions (Below 1GHz)

Test Requirement:	15.109, Class B				
Test Method:	ANSI C63.4				
Test Limit:	Except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:				
	Frequency of emission (MHz)	Field strength @3m		Field strength @10m	
		(uV/m)	(dBuV/m)	(uV/m)	(dBuV/m)
	30 – 88	100	40	30	29.5
	88 – 216	150	43.5	45	33.1
	216 – 960	200	46	60	35.6
	Above 960	500	54	150	43.5
Procedure:	An initial pre-scan was performed in the chamber using the spectrum analyser in peak detection mode. Quasi-peak measurements were conducted based on the peak sweep graph. The EUT was measured by BiConiLog antenna with 2 orthogonal polarities. Remark: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor				

5.2.1 E.U.T. Operation:

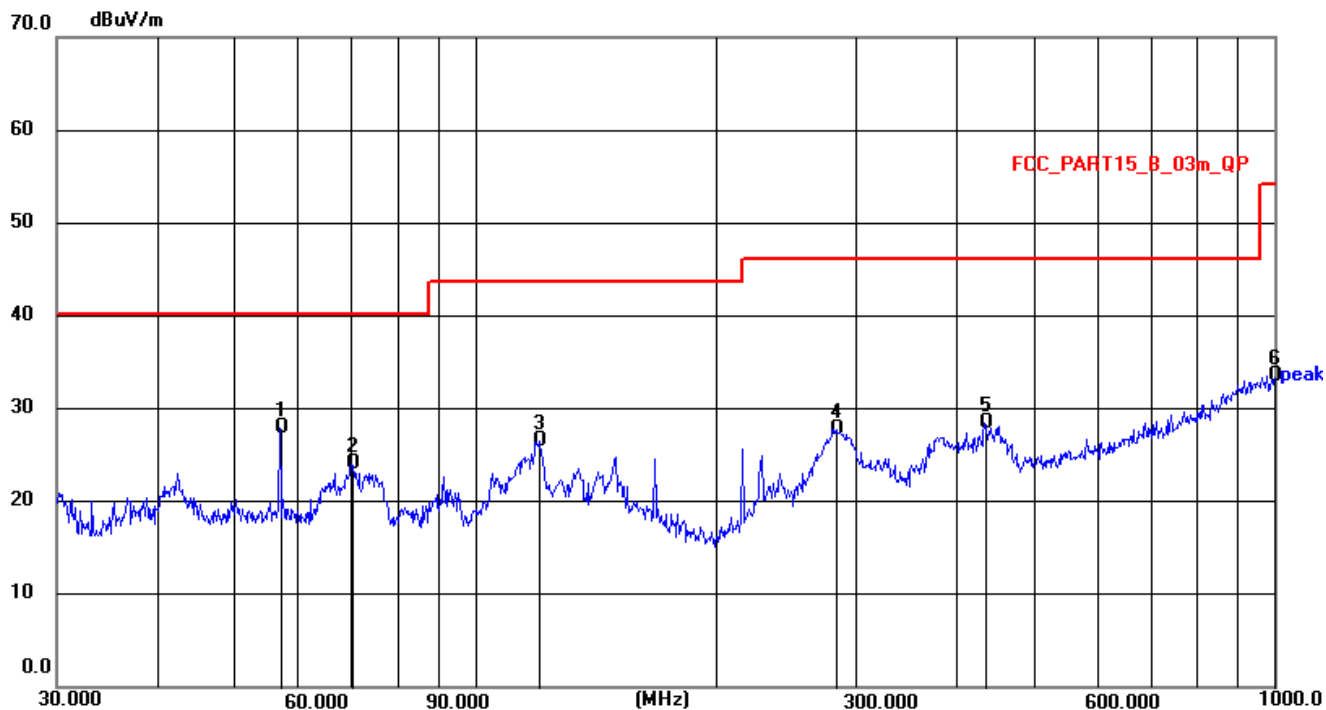
Operating Environment:	
Temperature:	24.1 °C
Humidity:	48.7 %
Atmospheric Pressure:	1010 mbar

5.2.2 Test Setup Diagram:



5.2.3 Test Data:

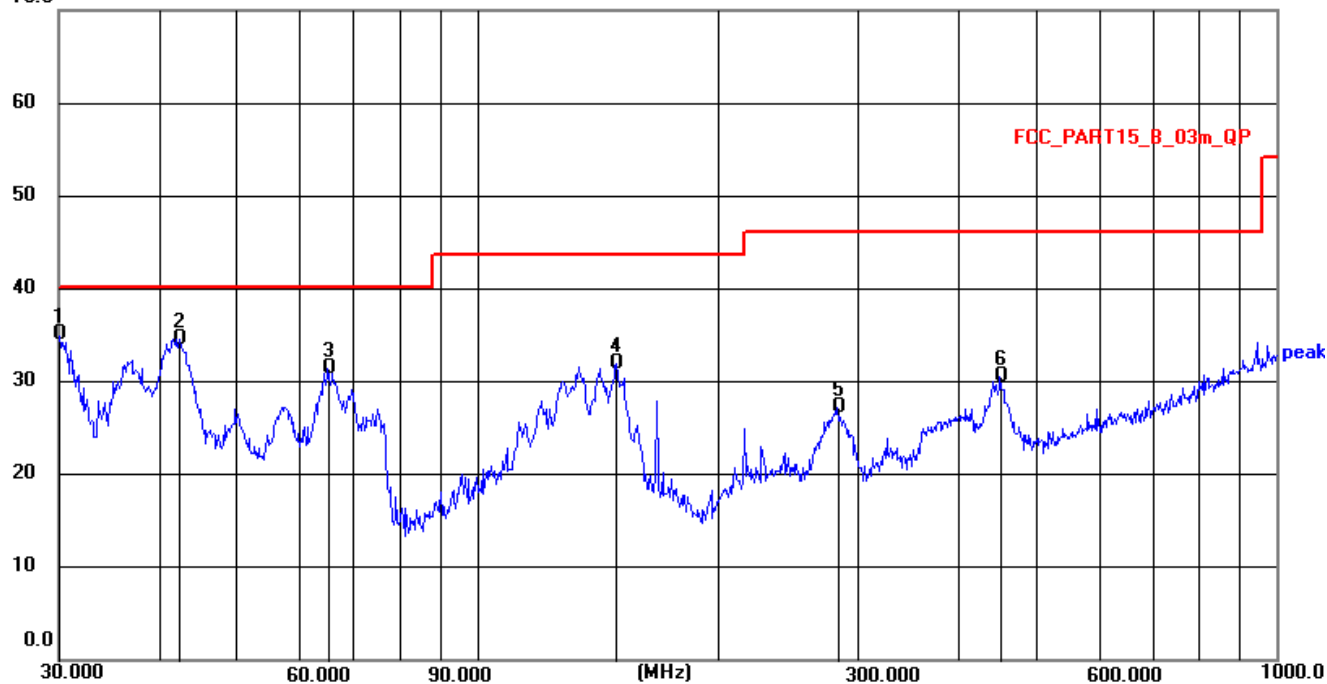
TM1 / Polarization: Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1 *	56.9912	13.81	14.12	27.93	40.00	12.07	QP			P	
2	70.0903	11.76	12.33	24.09	40.00	15.91	QP			P	
3	120.2766	12.92	13.52	26.44	43.50	17.06	QP			P	
4	282.9852	13.26	14.46	27.72	46.00	18.28	QP			P	
5	434.0651	9.81	18.57	28.38	46.00	17.62	QP			P	
6	1000.0000	6.55	27.00	33.55	54.00	20.45	QP			P	

TM1 / Polarization: Vertical

70.0 dBuV/m



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1 *	30.0000	22.71	12.44	35.15	40.00	4.85	QP			P	
2	42.4508	20.04	14.56	34.60	40.00	5.40	QP			P	
3	65.1145	18.65	12.70	31.35	40.00	8.65	QP			P	
4	149.4857	17.52	14.36	31.88	43.50	11.62	QP			P	
5	281.9946	12.52	14.70	27.22	46.00	18.78	QP			P	
6	451.1350	11.88	18.60	30.48	46.00	15.52	QP			P	

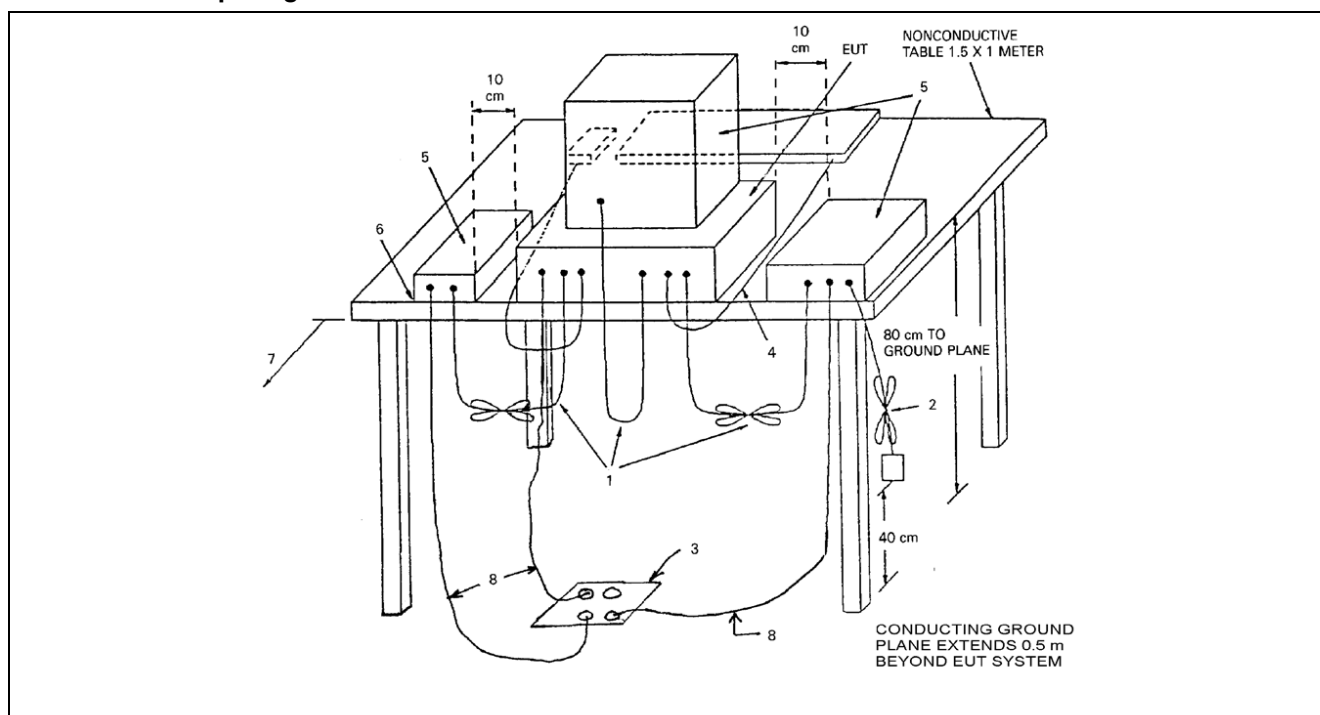
5.3 Radiated emissions (Above 1GHz)

Test Requirement:	15.109, Class B				
Test Method:	ANSI C63.4				
Test Limit:	Frequency of emission (MHz)	Field strength @3m			
		Average (uV/m)	Average (dBuV/m)	Peak (dBuV/m)	
	Above 1GHz	500	54	74	
Procedure:	An initial pre-scan was performed in the chamber using the spectrum analyser in peak detection mode. For below 1GHz test, Quasi-peak measurements were conducted based on the peak sweep graph. The EUT was measured by BiConiLog antenna with 2 orthogonal polarities. For above 1GHz test, Average measurements were conducted based on the peak sweep graph. The EUT was measured by Horn antenna with 2 orthogonal polarities. Remark: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor				

5.3.1 E.U.T. Operation:

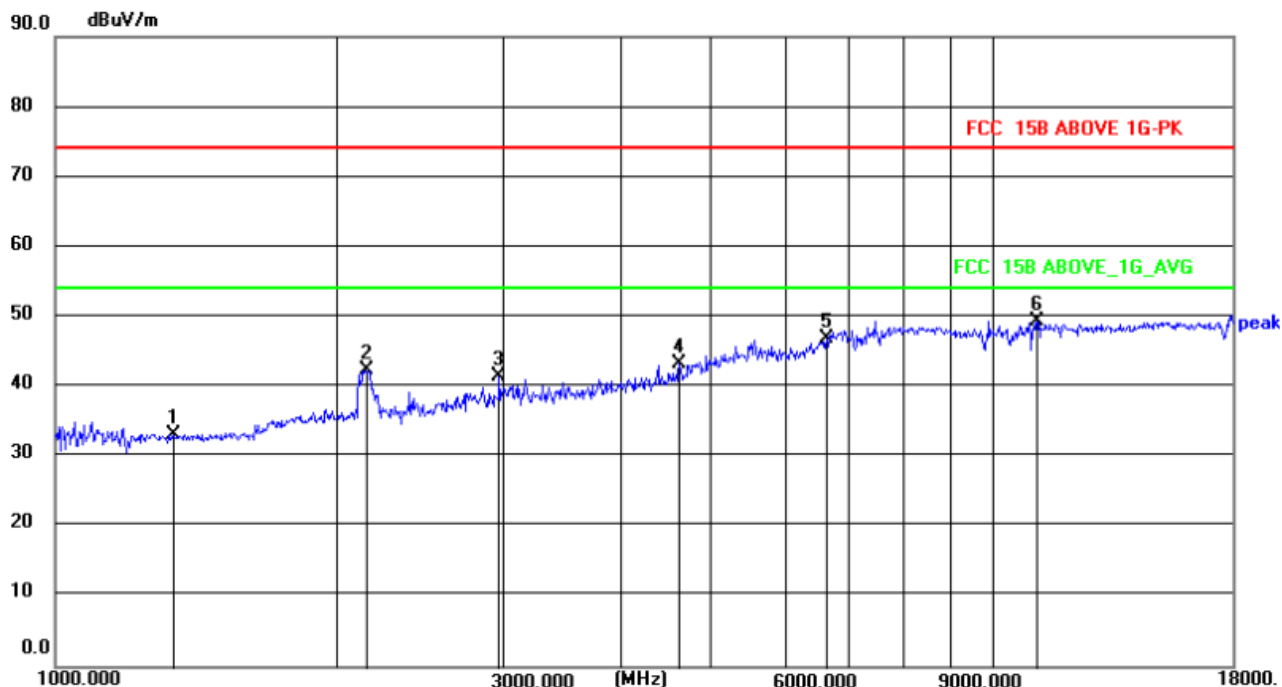
Operating Environment:	
Temperature:	22.2 °C
Humidity:	54.7 %
Atmospheric Pressure:	1010 mbar

5.3.2 Test Setup Diagram:



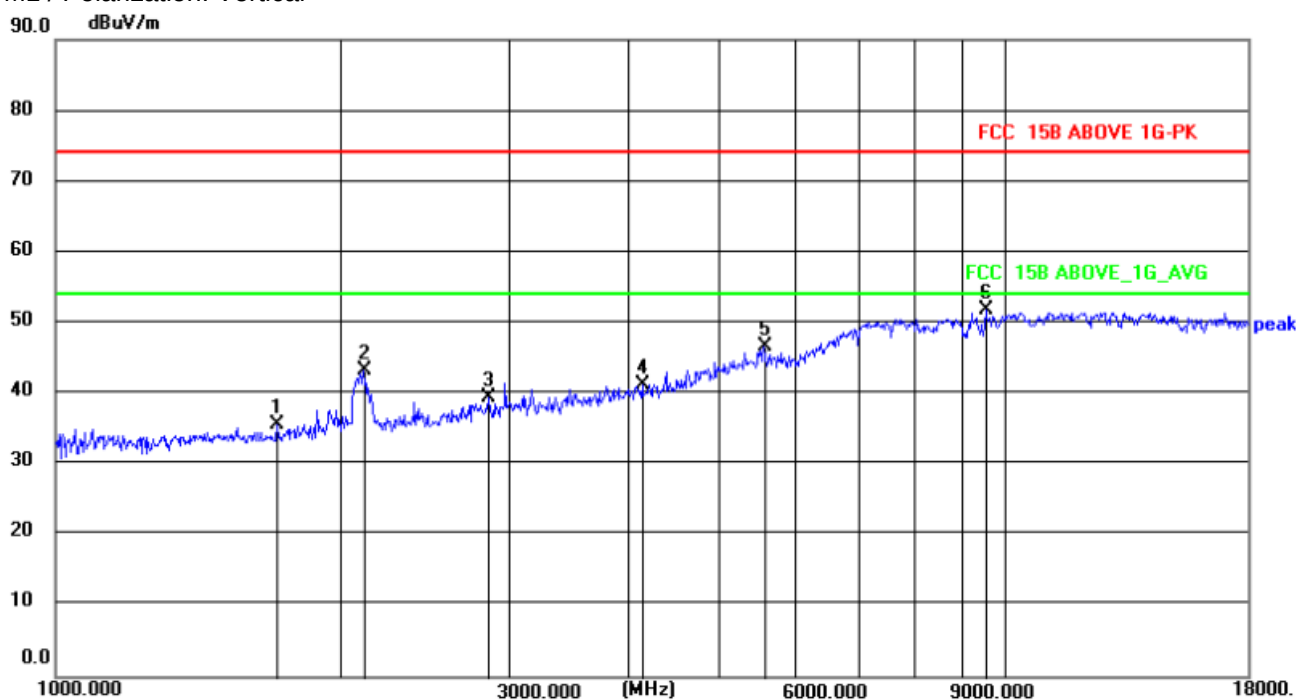
5.3.3 Test Data:

TM1 / Polarization: Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F
1	1336.686	48.34	-15.16	33.18	74.00	40.82	peak	200	105	P
2	2144.206	53.99	-11.61	42.38	74.00	31.62	peak	200	125	P
3	2975.872	49.96	-8.45	41.51	74.00	32.49	peak	200	345	P
4	4629.621	48.53	-5.15	43.38	74.00	30.62	peak	200	147	P
5	6644.381	45.48	1.53	47.01	74.00	26.99	peak	200	135	P
6 *	11169.327	40.48	8.91	49.39	74.00	24.61	peak	200	169	P

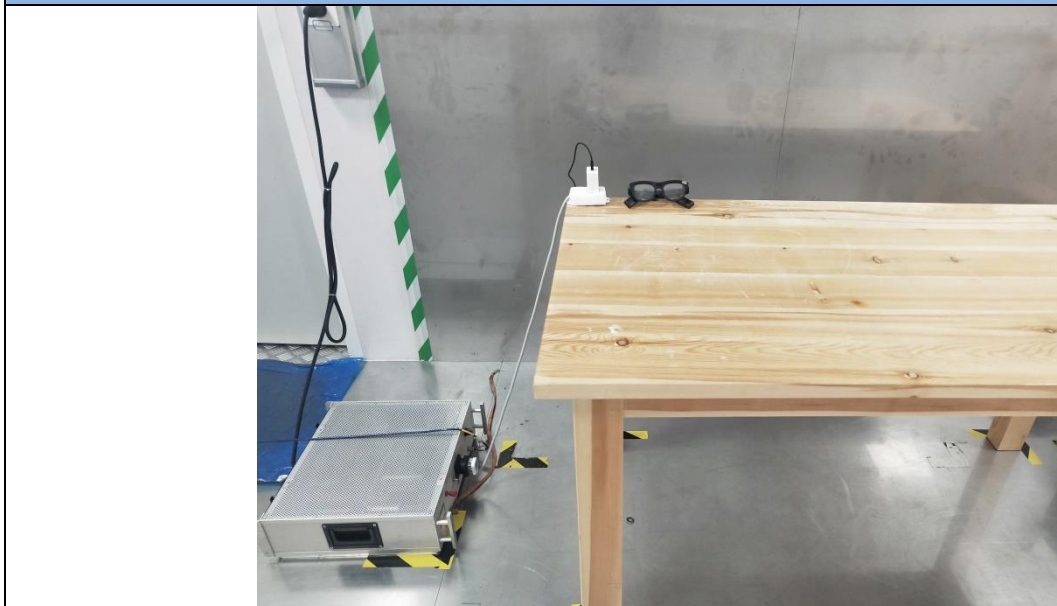
TM1 / Polarization: Vertical



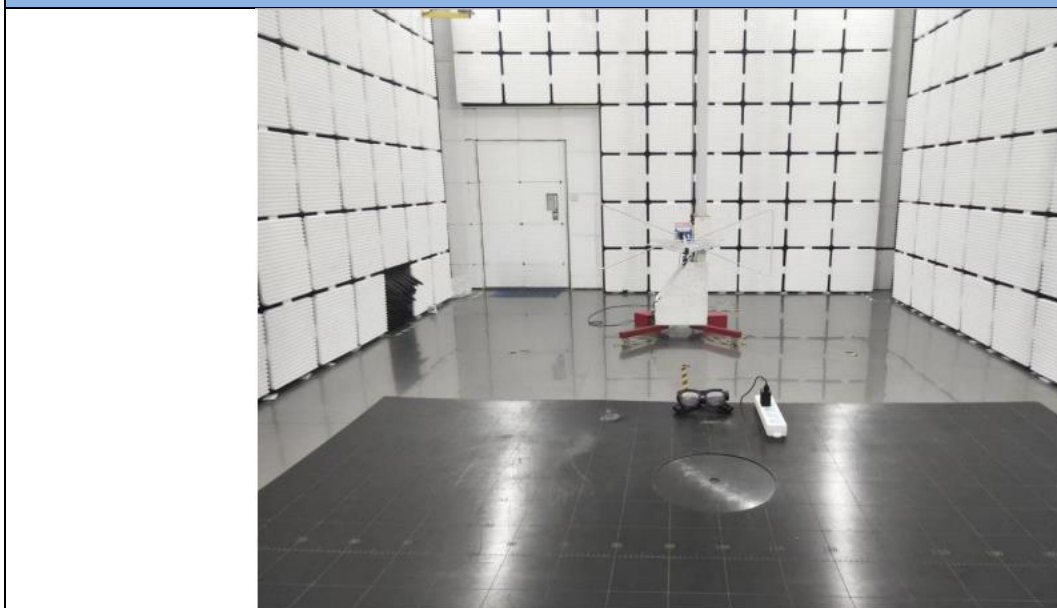
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F
1	1714.880	49.39	-13.81	35.58	74.00	38.42	peak	100	124	P
2	2109.779	55.01	-11.69	43.32	74.00	30.68	peak	100	196	P
3	2858.683	48.49	-8.99	39.50	74.00	34.50	peak	100	175	P
4	4149.260	47.57	-6.30	41.27	74.00	32.73	peak	100	136	P
5	5576.800	48.95	-2.31	46.64	74.00	27.36	peak	100	179	P
6 *	9558.017	46.90	4.87	51.77	74.00	22.23	peak	100	135	P

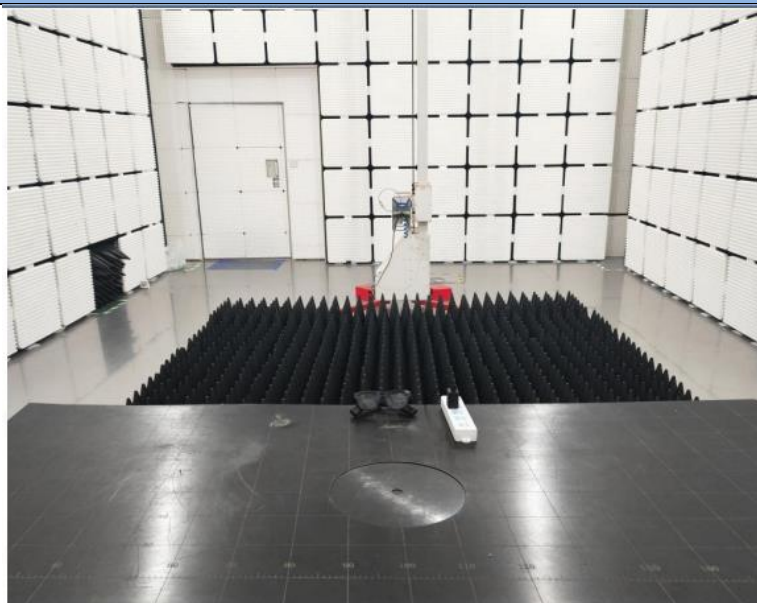
6 Test Setup Photos

Conducted emissions on AC mains



Radiated emissions (Below 1GHz)



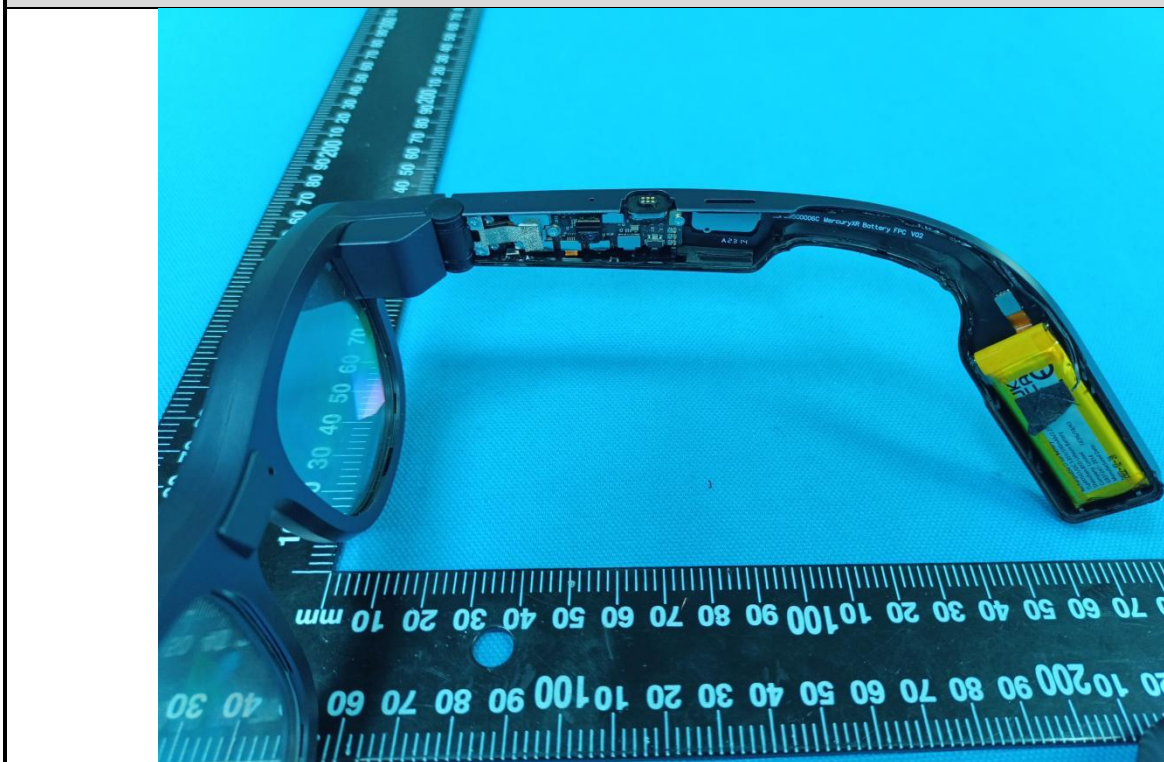
Radiated emissions (Above 1GHz)

7 EUT Constructional Details (EUT Photos)

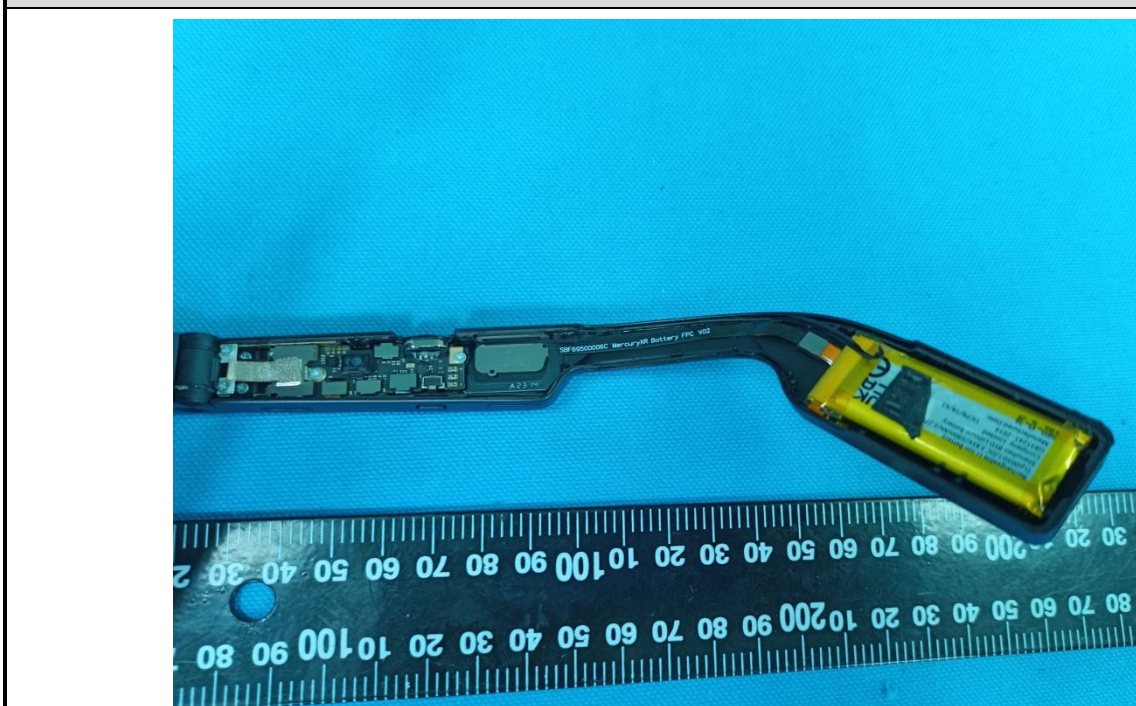
External



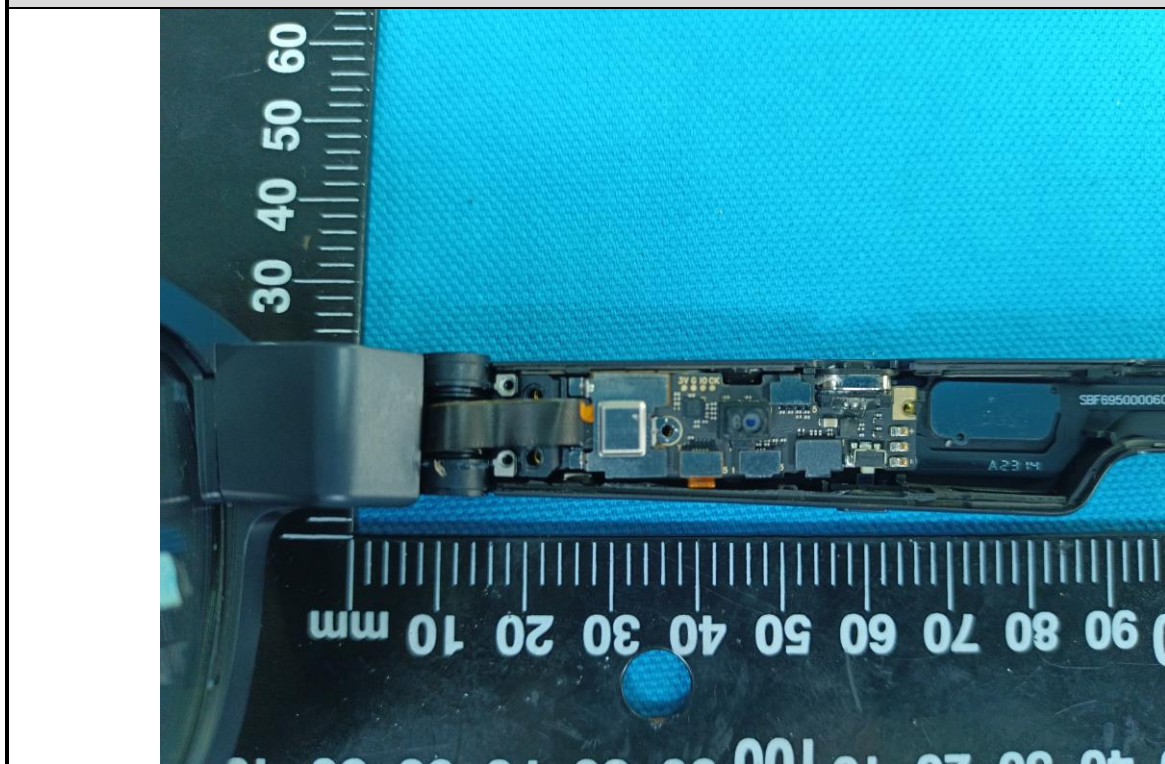
EUT Photo



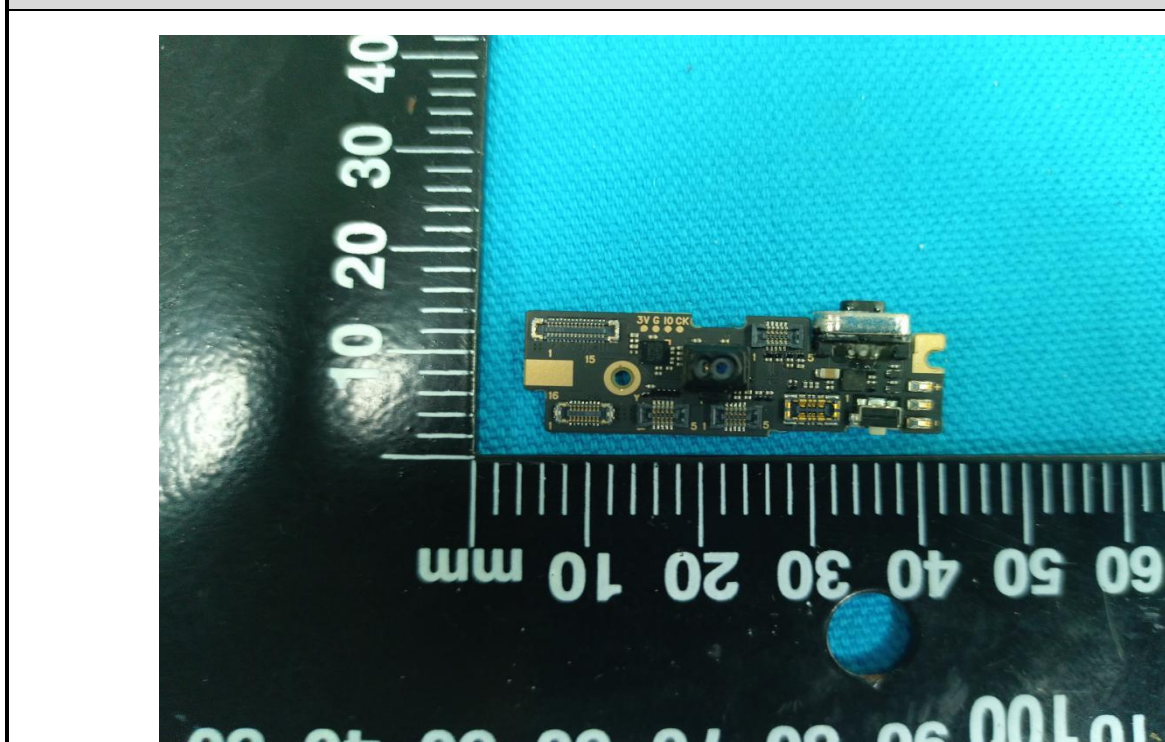
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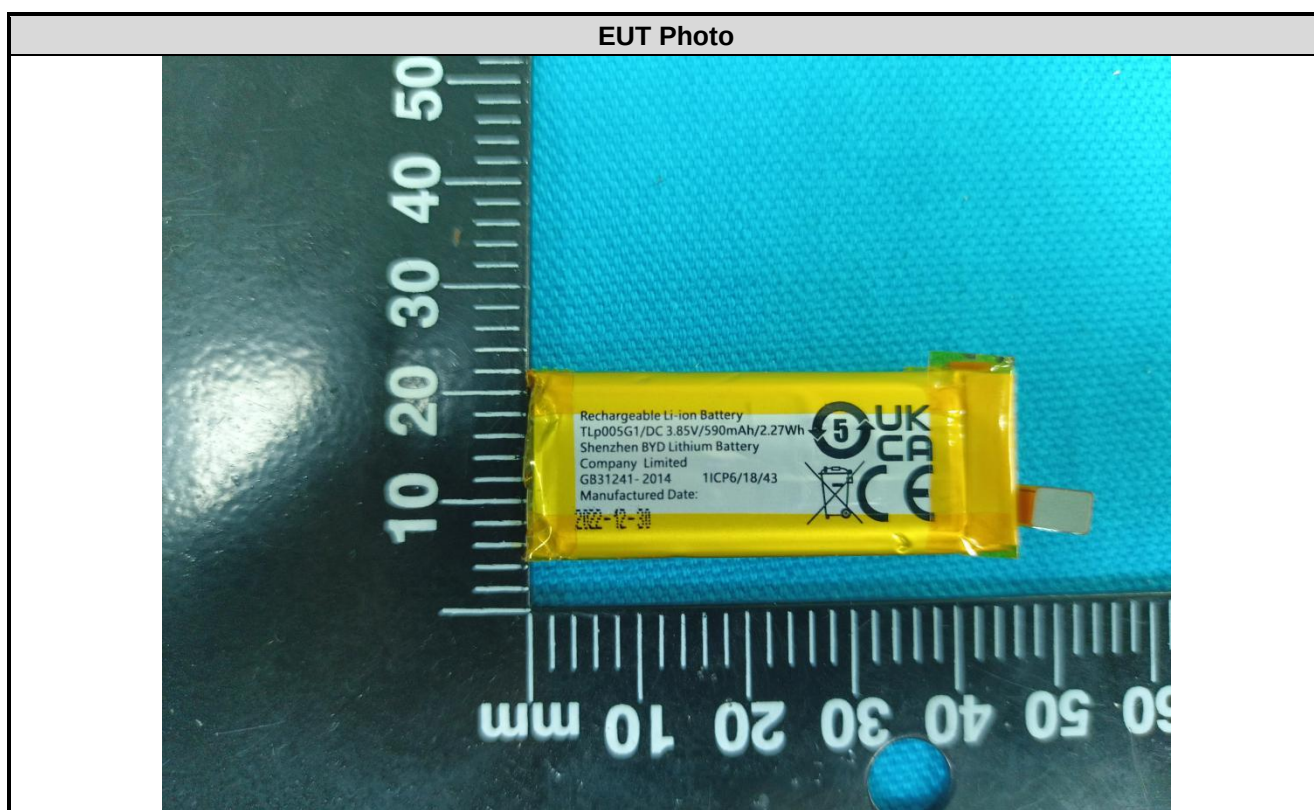
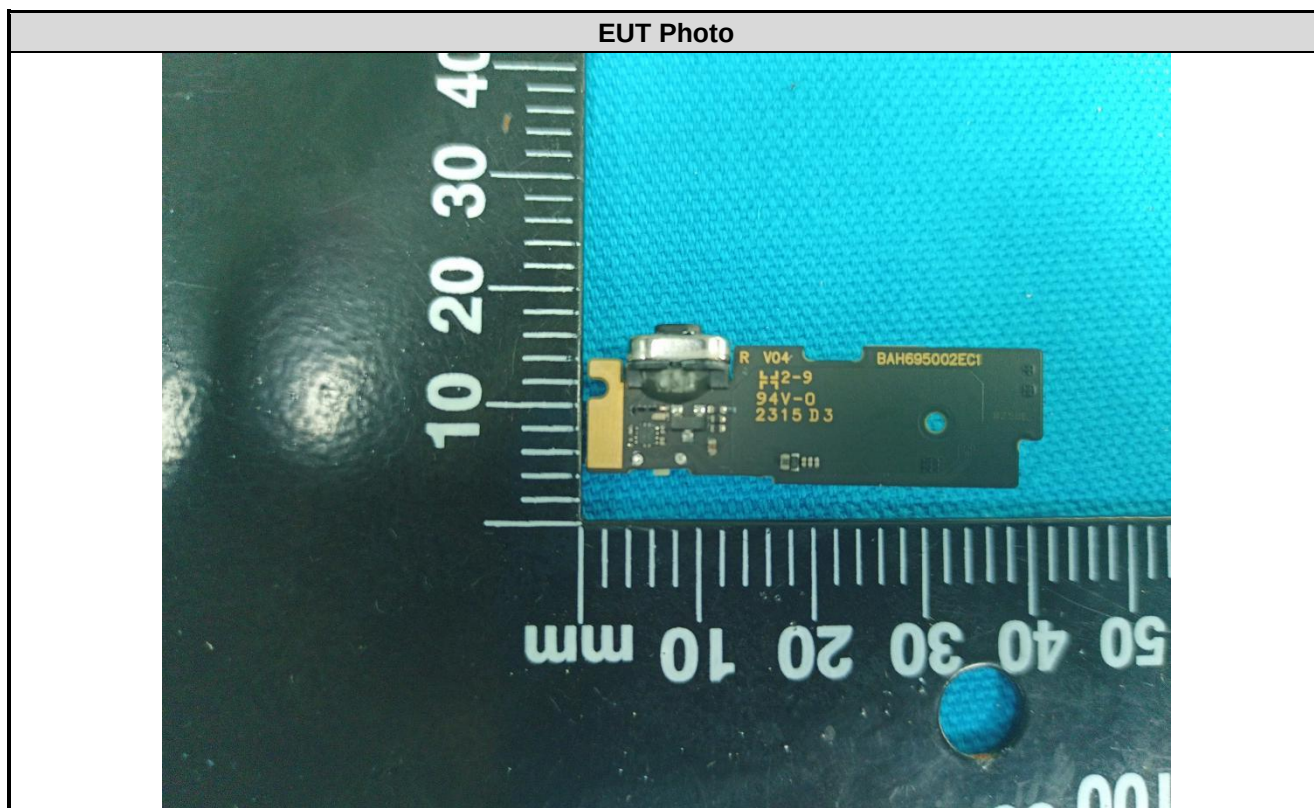


EUT Photo

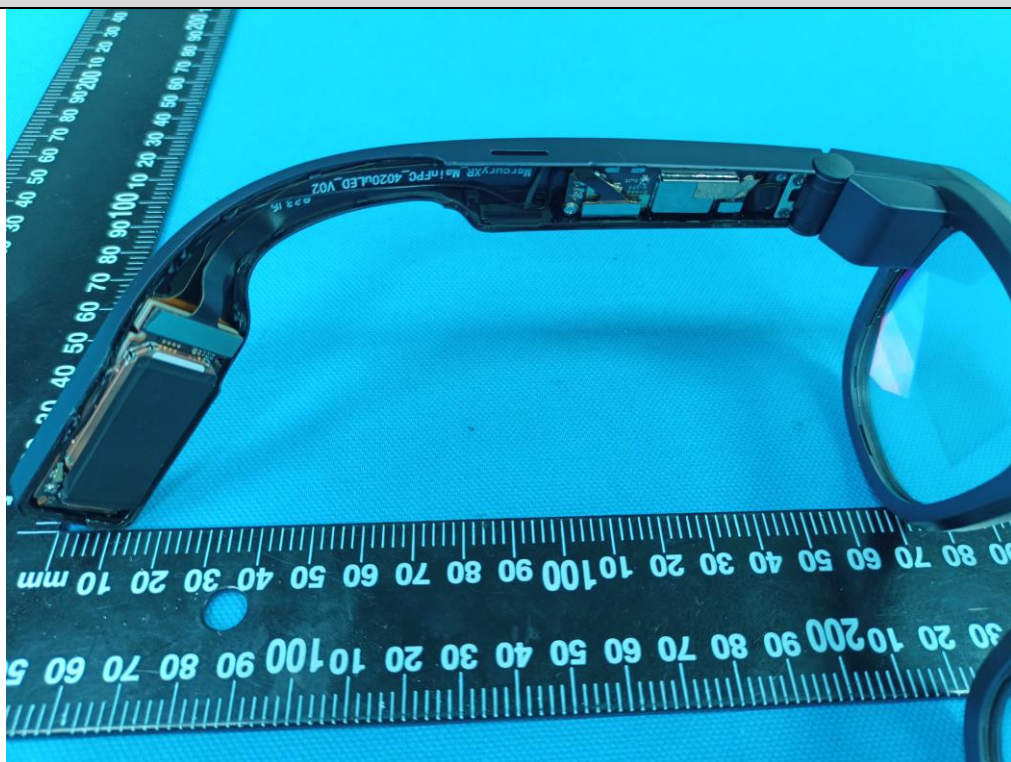


EUT Photo

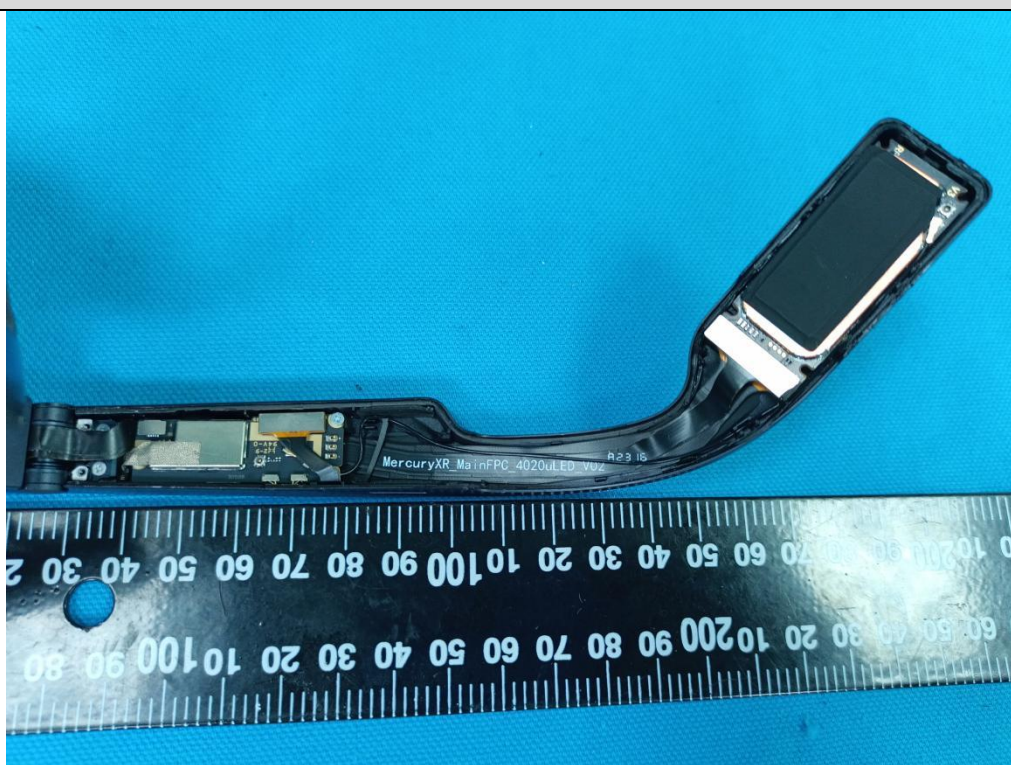




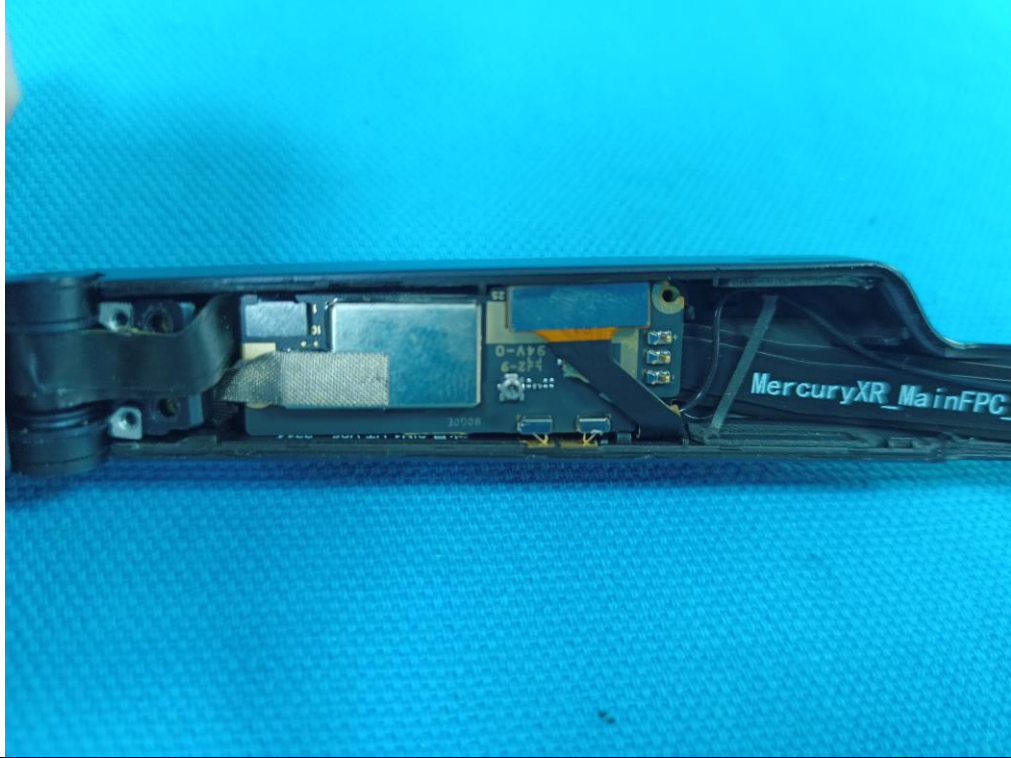
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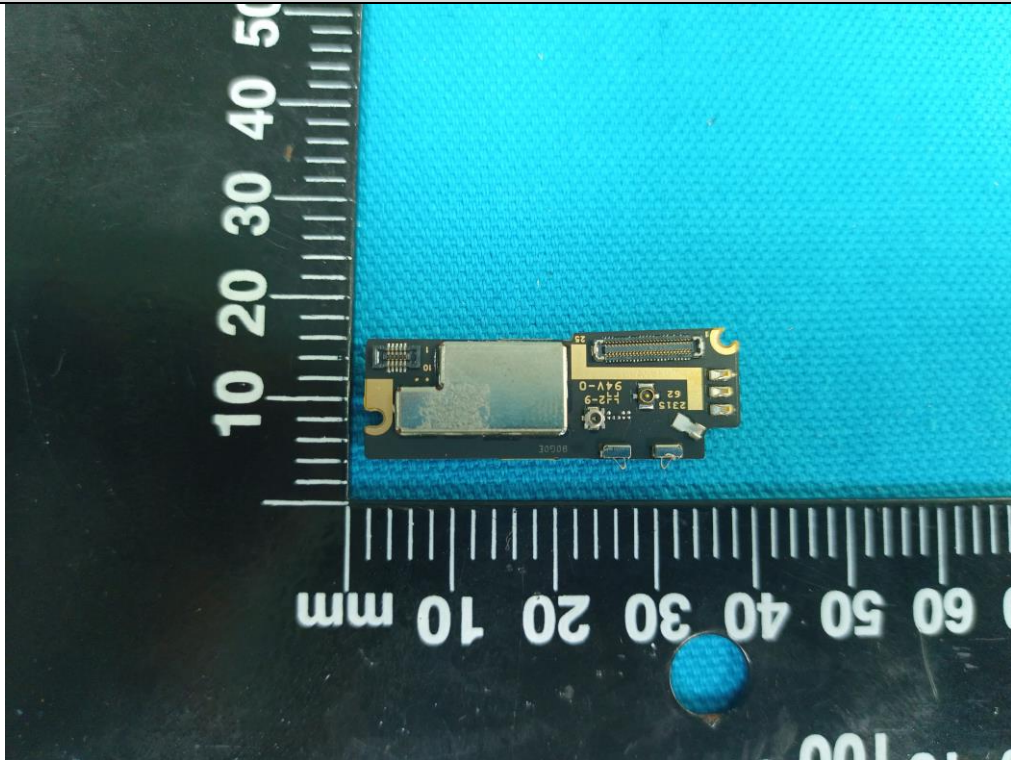
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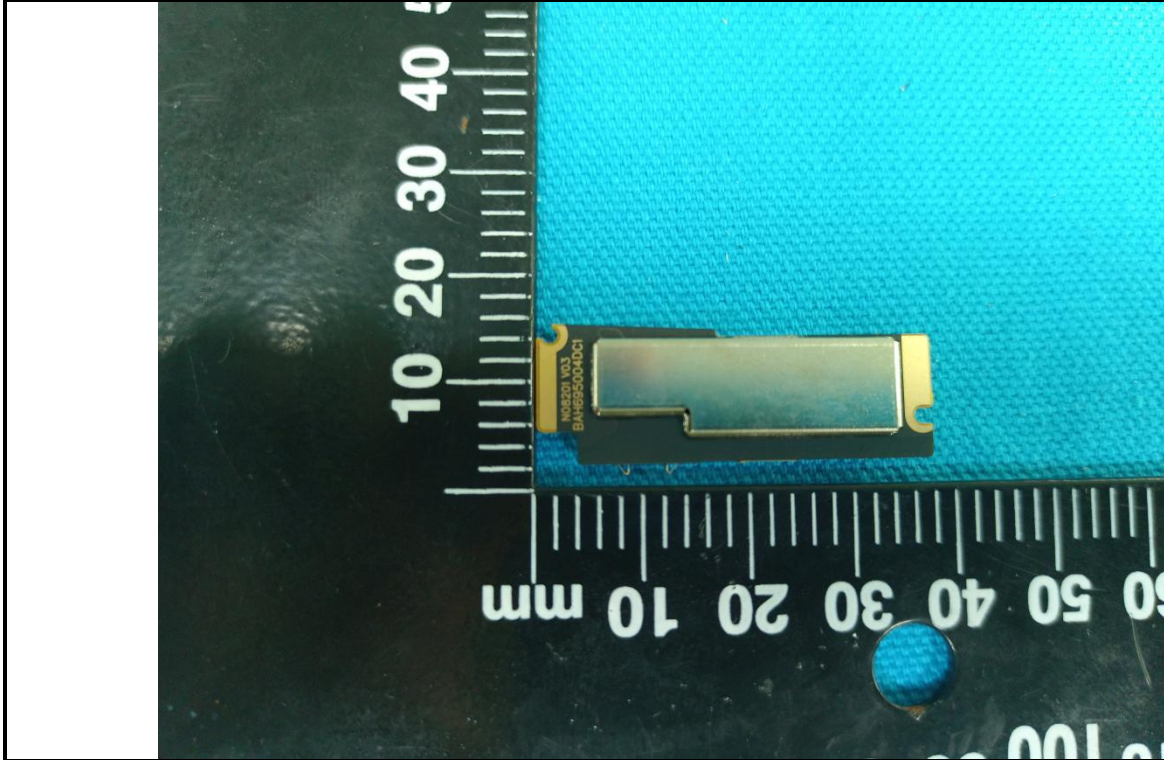
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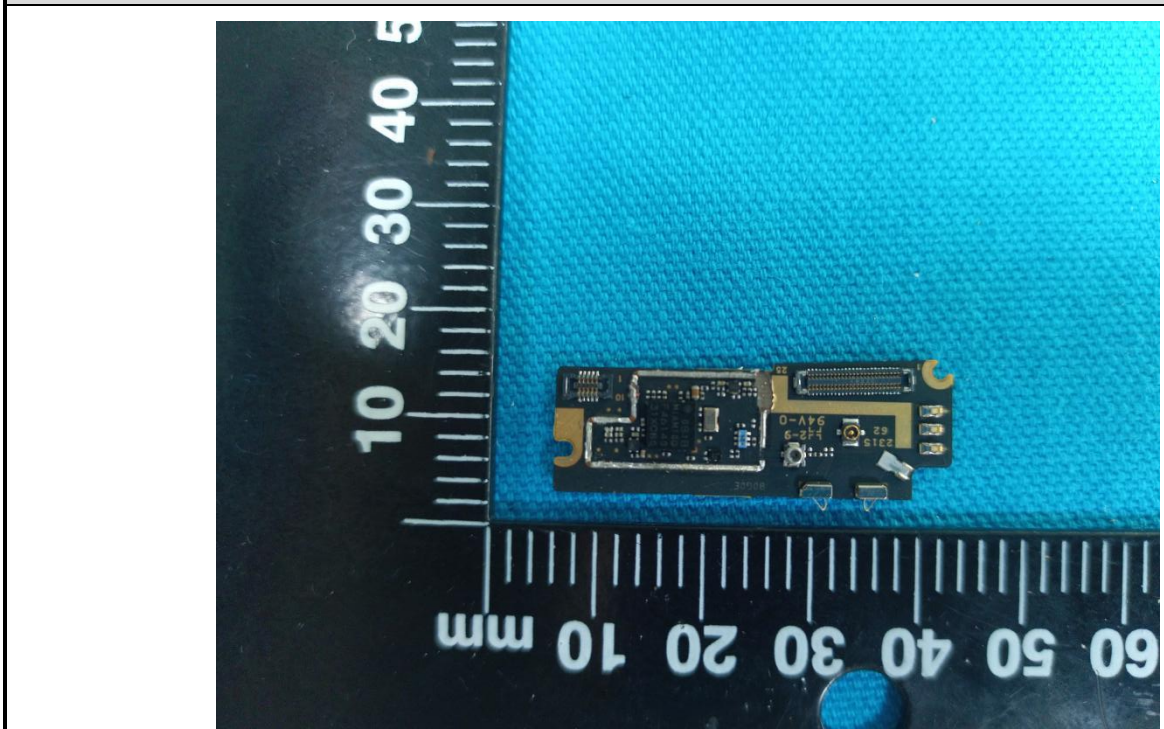
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EUT Photo



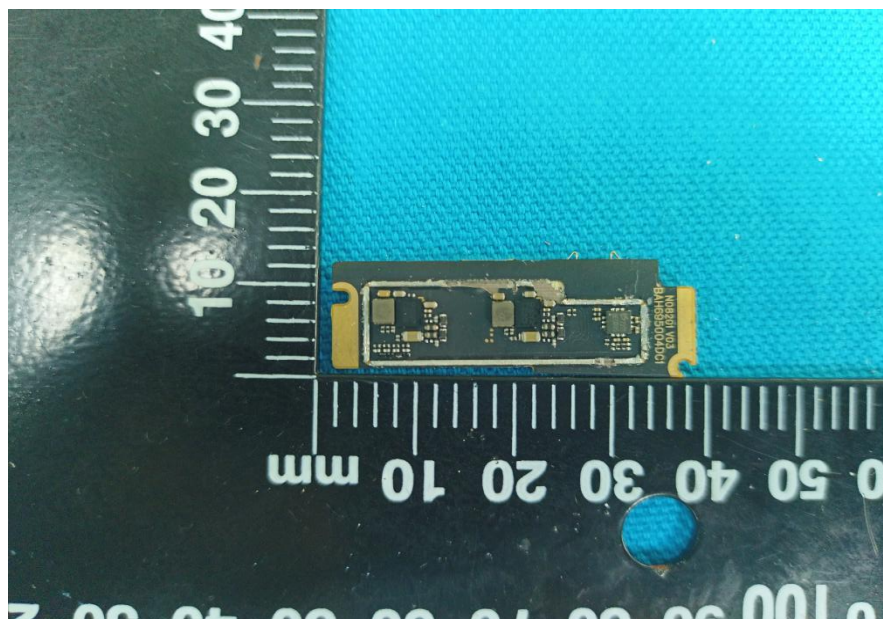
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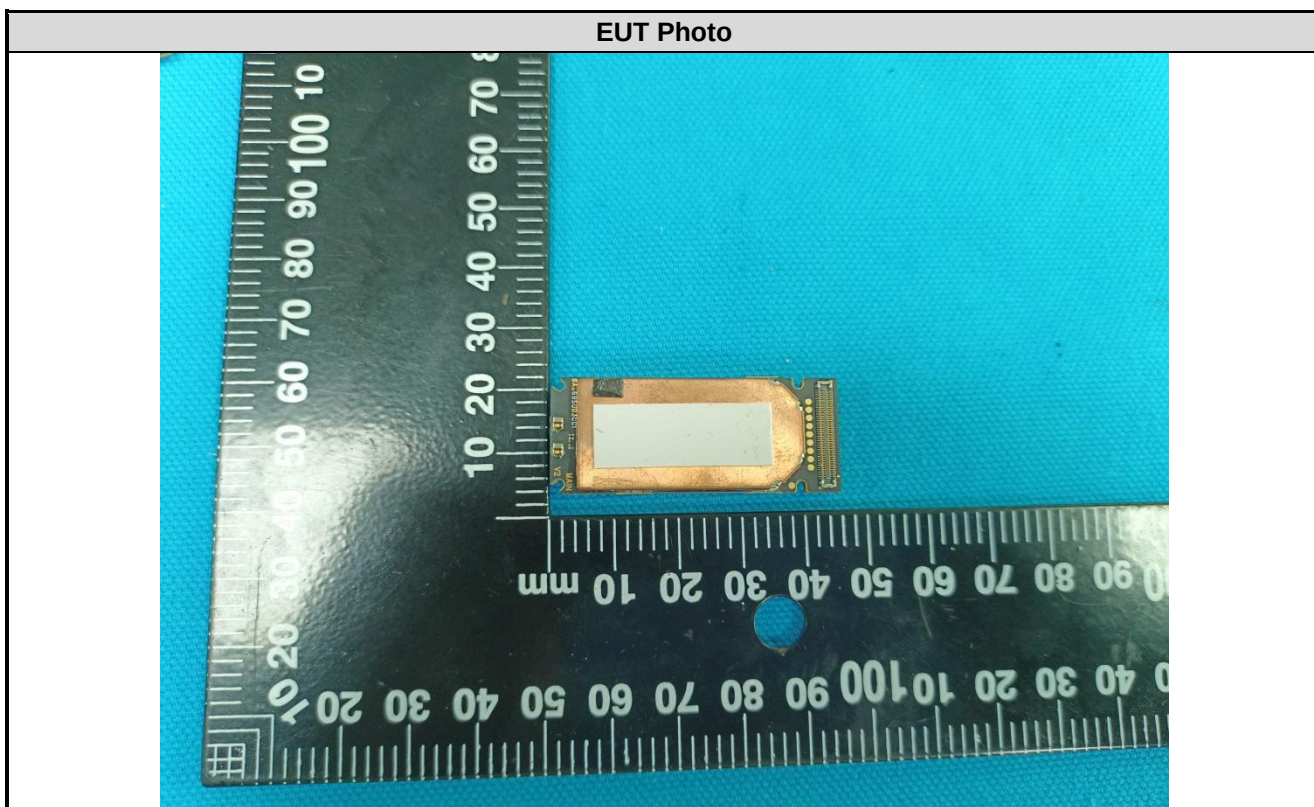
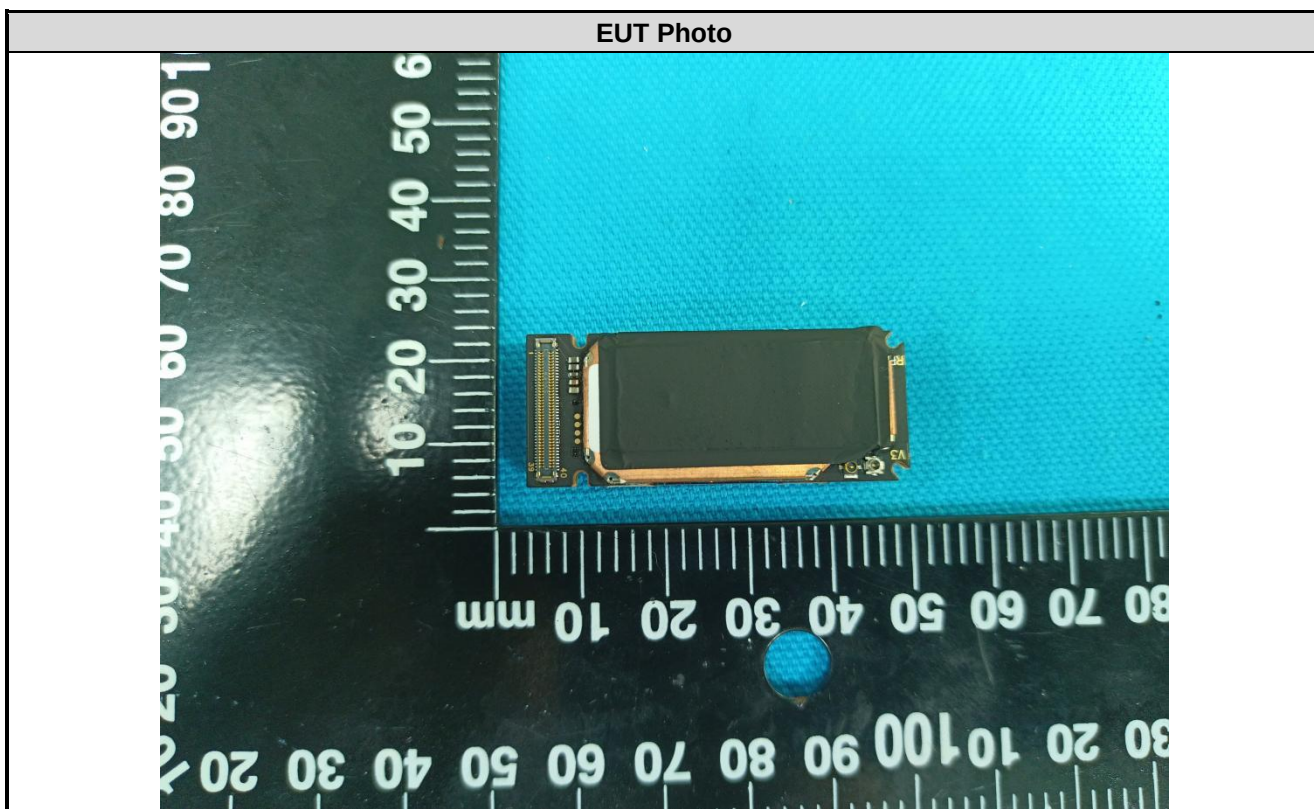


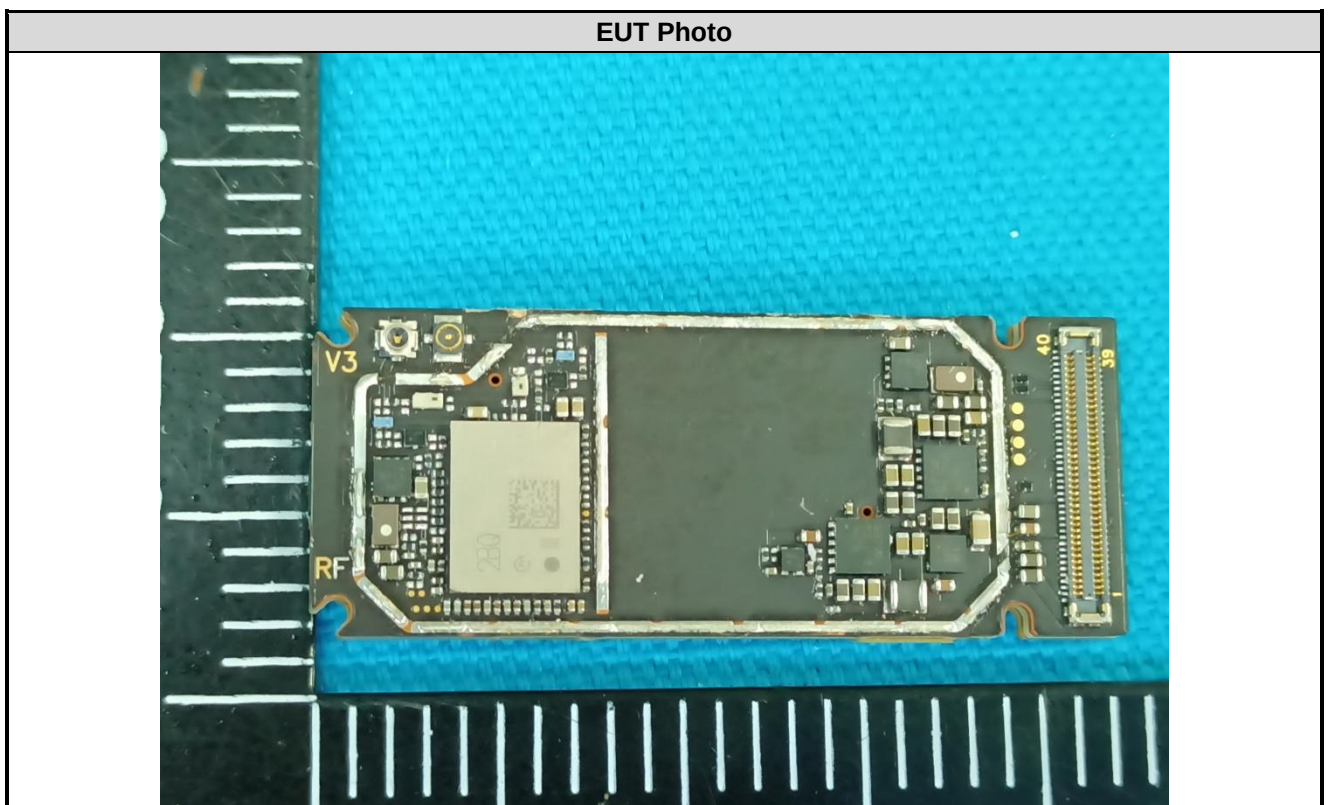
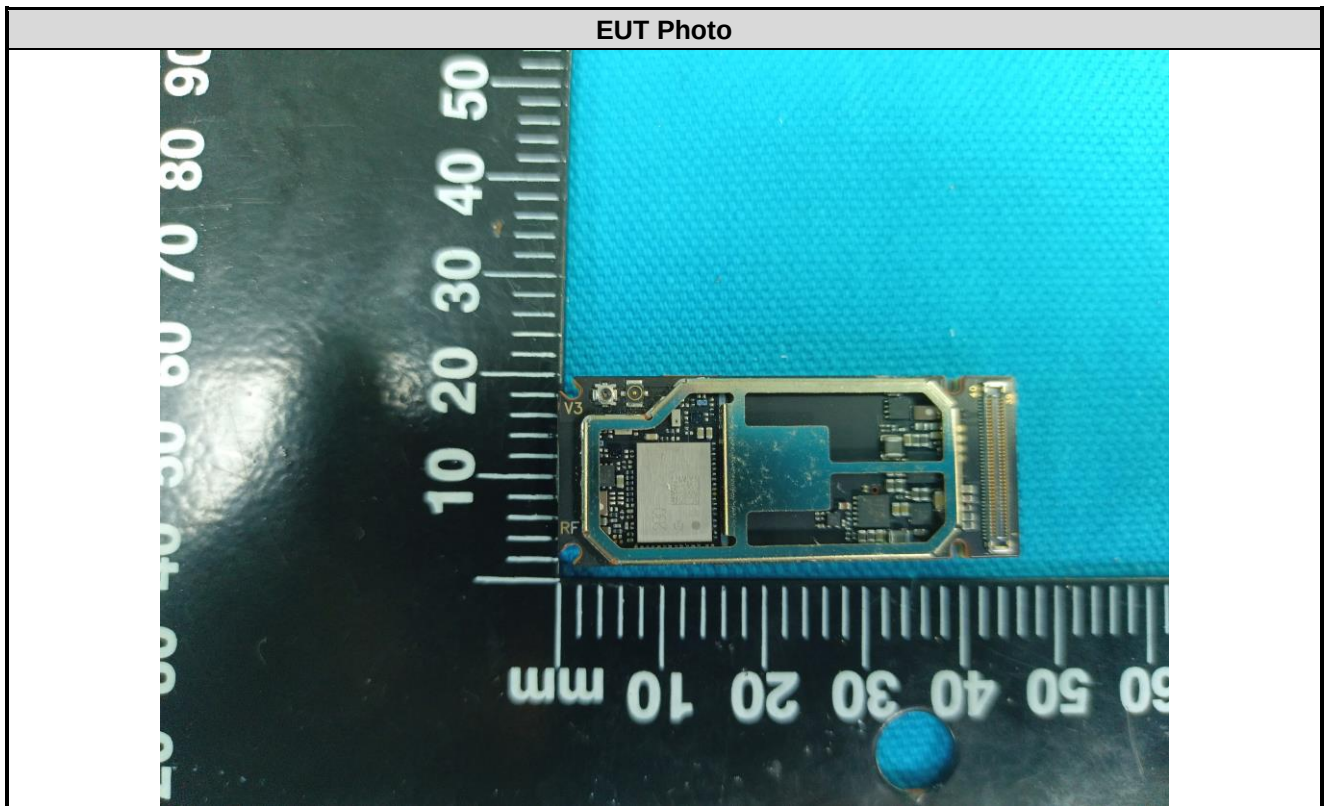
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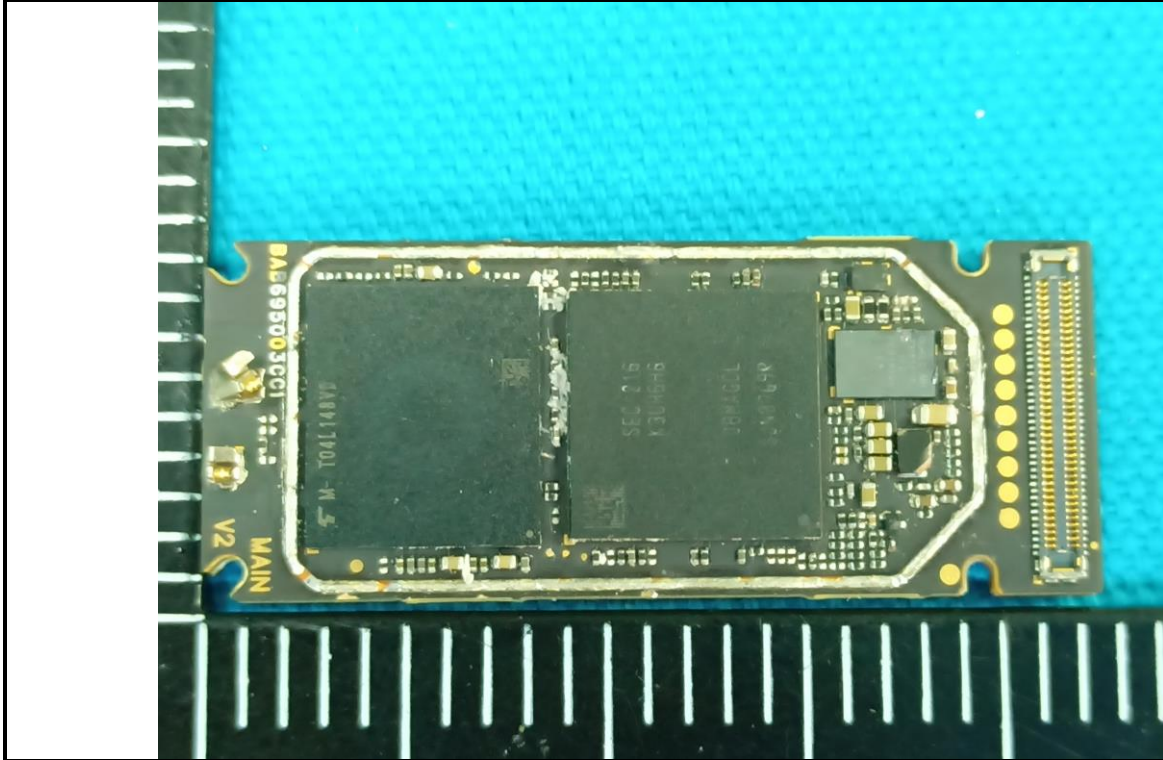
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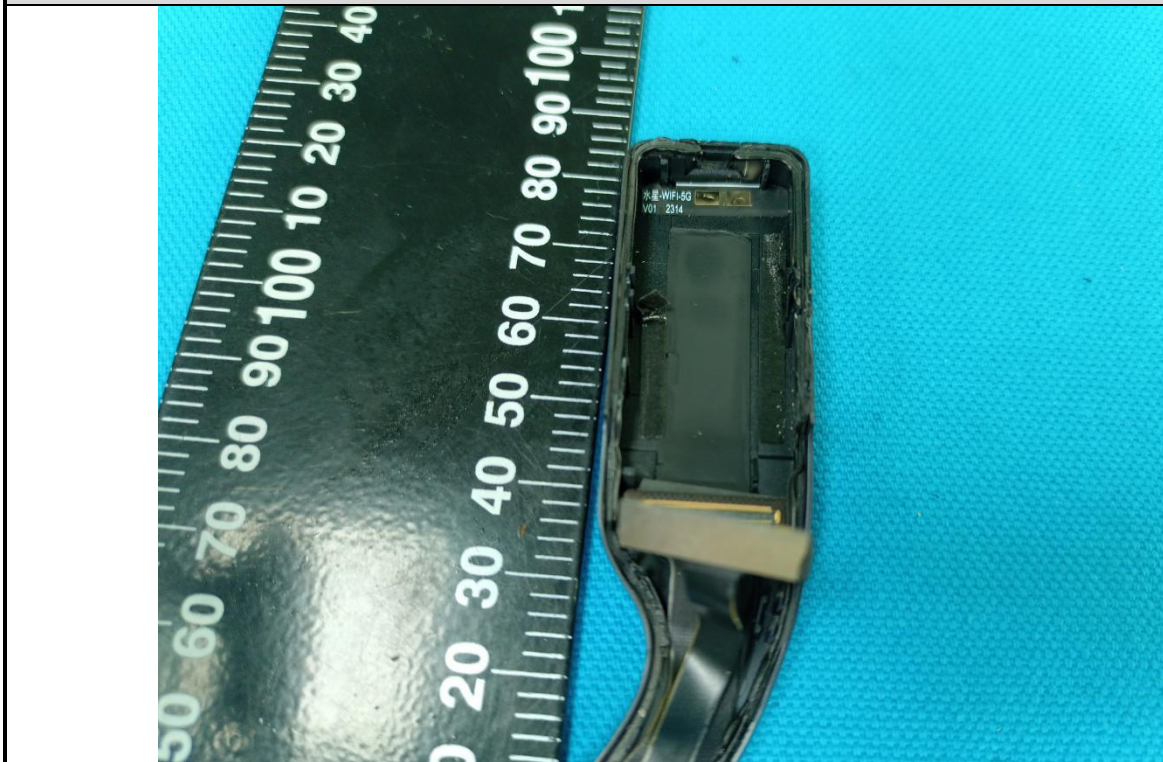




EUT Photo



EUT Photo





Test Report Number: BTF230718E00501



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