TCT 通测检测 TESTING CENTRE TECHNOLOGY

TEST REPORT

FCC ID: SY4-B01010

Product: Handheld GNSS Data Collector

Model No.: HCE320

Additional Model No.: N/A

Trade Mark: CHCNAV

Report No.: TCT180111E031

Issued Date: Mar. 01, 2018

Issued for:

Shanghai Huace Navigation Technology LTD.

Building C,599 Gaojing Road,Qingpu District, Shanghai, China

Issued By:

Shenzhen Tongce Testing Lab.

1B/F., Building 1, Yibaolai Industrial Park, Qiaotou, Fuyong, Baoan District, Shenzhen, Guangdong, China

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1. Test Certification

Product:	Handheld GNSS Data Collector
Model No.:	HCE320
Additional Model No.:	N/A
Trade Mark:	CHCNAV
Applicant:	Shanghai Huace Navigation Technology LTD.
Address:	Building C,599 Gaojing Road,Qingpu District, Shanghai, China
Manufacturer:	Shanghai Huace Navigation Technology LTD.
Address:	Building C,599 Gaojing Road,Qingpu District, Shanghai, China
Date of Test:	Dec. 29, 2017 – Mar. 01, 2018
Applicable Standards:	FCC CFR Title 47 Part 15 Subpart C Section 15.247

The above equipment has been tested by Shenzhen Tongce Testing Lab. and found compliance with the requirements set forth in the technical standards mentioned above. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Tested By:	Beryl Zhao	***Date:***	***Mar. 01, 2018***
	Beryl Zhao		
Reviewed By:	Joe Zhou	***Date:***	***Mar. 01, 2018***
	Joe Zhou		
Approved By:	Tomsin	***Date:***	***Mar. 01, 2018***
	Tomsin		

SHENZHEN TONGCE TESTING LAB TCT

Hotline: 400-6611-140 Tel: 86-755- 27673339 Fax: 86-755-27673332 http://www.tct-lab.com

2. Test Result Summary

Emission		
Test Method	**Item**	**Result**
FCC 47 CFR Part 15 Subpart B	Conducted Emission at Mains Terminals	Pass
	Radiated Emission	Pass

Note:

1. Pass: Test item meets the requirement.
2. Fail: Test item does not meet the requirement.
3. N/A: Test case does not apply to the test object.
4. The test result judgment is decided by the limit of test standard.
5. The information of measurement uncertainty is available upon the customer's request.

3. EUT Description

Product Name:	Handheld GNSS Data Collector
Model :	HCE320
Additional Model:	N/A
Trade Mark:	CHCNAV
Power Supply:	DC 3.8V by battery or DC 5V from adapter
Remark:	N/A

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4. Test Methodology

4.1. Decision of Final Test Mode

The EUT was tested together with the thereinafter additional components, and a configuration, which produced the worst emission levels, was selected and recorded in this report.
The following test mode(s) were assessed:

Test Mode
Mode 1: Data Transmitting

4.2. EUT System Operation

1. Set up EUT with the support equipments.
2. Make sure the EUT work normally during the test.

5. Setup of Equipment under Test

5.1. Description of Support Units

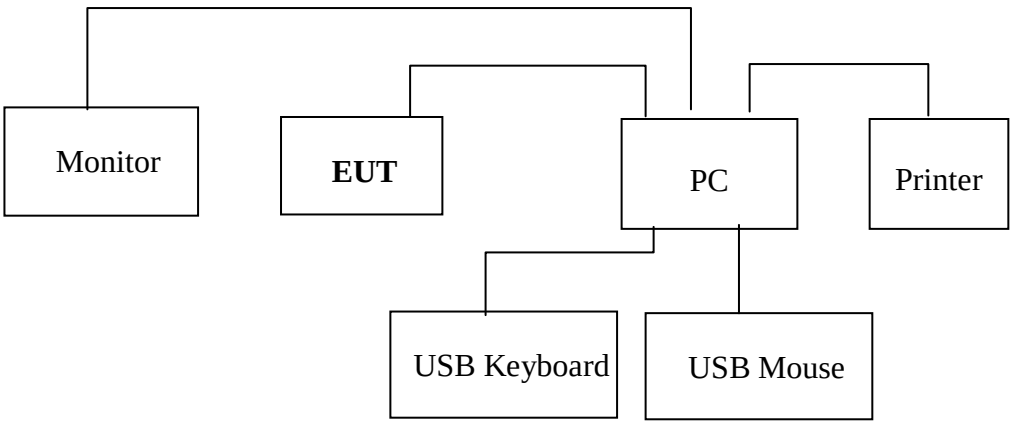
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Equipment	Model No.	Serial No.	FCC ID	Trade Name
Personal Computer	D11M	CN-0LV772-C08 87-378-H8UR	/	DELL
Monitor	E2014Hf	CN-011HFV-728 72-397-CHEM	/	DELL
USB Keyboard	SK-9625	KBUSB1580500 037E0100	/	ACER
USB Mouse	MS.11200.014	M-UAY-ACR2	/	ACER
Printer	HP1020	CNCJ410726	/	HP

Note:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

5.2. Block Diagram of connection between EUT and simulators



6. Facilities and Accreditations

6.1. Facilities

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

● FCC - Registration No.: 645098

Shenzhen Tongce Testing Lab

The 3m Semi-anechoic chamber has been registered and fully described in a report with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files.

● IC - Registration No.: 10668A-1

The 3m Semi-anechoic chamber of Shenzhen TCT Testing Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing

6.2. Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

No.	Item	MU
1.	Temperature	±0.1℃
2.	Humidity	±1.0 %
3.	Spurious Emissions, Conducted	±2.56 dB
4.	All Emissions, Radiated	±4.28 dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95 % confidence level using a coverage factor of k=2.

7. Emission Test

7.1. Conducted Emission at Mains Terminals

7.1.1. Test Specification

Test Requirement:	FCC 47 CFR Part 15 Subpart B
Test Method:	ANSI C63.4: 2014
Frequency Range:	150 kHz to 30 MHz

7.1.2. Limits

Frequency (MHz)	Class A dB(uV)		Class B dB(uV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	79	66	66 – 56[a]	56 – 46[a]
0.50 - 5.0	73	60	56	46
5.0 - 30.0	73	60	60	50
a. Decreases with the logarithm of the frequency				

7.1.3. Test Instruments

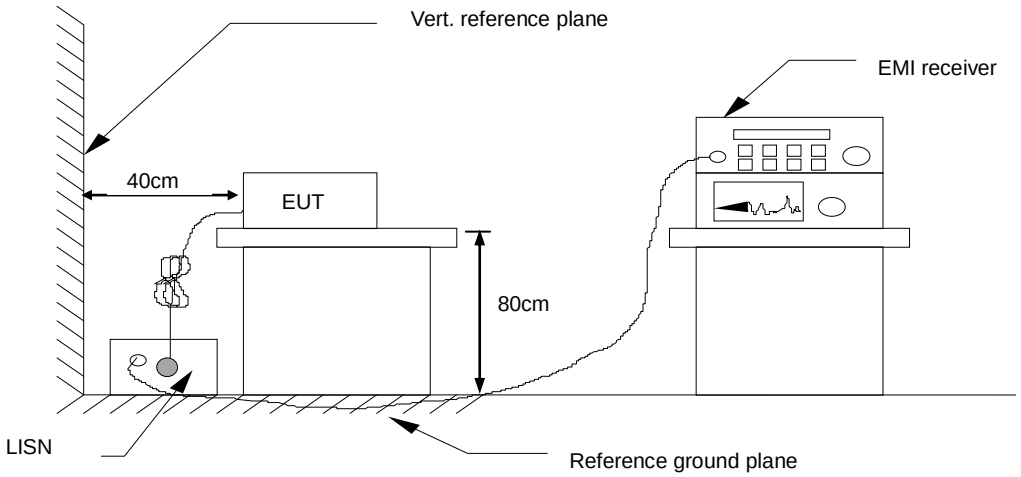
Conducted Emission Shielding Room Test Site (843)				
Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
EMI Test Receiver	R&S	ESCS30	100139	Sep. 27, 2018
LISN	Schwarzbeck	NSLK 8126	8126453	Sep. 27, 2018

Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

7.1.4. Test Method

The AMN was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane. This distance was between the closest points of the AMN and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the AMN. All power was connected to the system through Artificial Mains Network (AMN). Conducted voltage measurements on mains lines were made at the output of the AMN

7.1.5. Block Diagram of Test Setup



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

7.1.6. Test Results

Test Environment:	Temp.:	24.2 ℃	Humid.:	53 %	Press.:	96 kPa
Test Mode:	Data Transmitting					
Test Voltage:	AC 120V/60Hz					
Test Result:	Pass					

Note:

L1 = Live Line / N = Neutral Line

Freq. = Emission frequency in MHz

Reading level (dBμV) = Receiver reading

Correct Factor (dB) = LISN factor + Cable loss

Measurement (dBμV) = Reading level (dBμV) + Corr. Factor (dB)

Limit (dBμV) = Limit stated in standard

Margin (dB) = Measurement (dBμV) – Limits (dBμV)

Q.P. =Quasi-Peak AVG =average

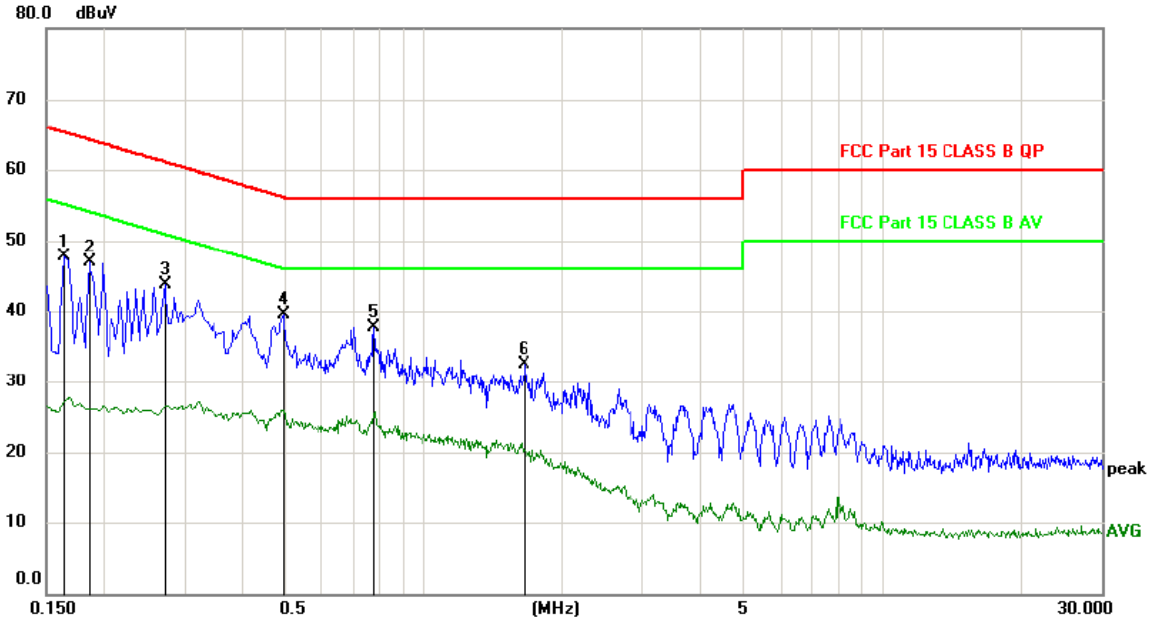
* is meaning the worst frequency has been tested in the frequency range 150 kHz to 30MHz.

Please refer to following diagram for individual

Site LAB	Phase:	*L1*	Temperature: 24.9
Limit: FCC Part 15 CLASS B QP	Power:	AC 120V/60Hz	Humidity: 47 %
EUT: Handheld GNSS Data Collector			
M/N: HCE320			
Mode: Data transmitting			
Note:			
Engineer Signature:			

Conducted Emission Measurement

File :HCE320 Data :#25 Date: 2018-1-3 Time: 14:00:28



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1635	37.98	9.73	47.71	65.28	-17.57	peak	
2		0.1860	37.08	9.74	46.82	64.21	-17.39	peak	
3		0.2714	34.01	9.76	43.77	61.07	-17.30	peak	
4	*	0.4920	29.76	9.78	39.54	56.13	-16.59	peak	
5		0.7755	27.93	9.80	37.73	56.00	-18.27	peak	
6		1.6575	22.68	9.89	32.57	56.00	-23.43	peak	

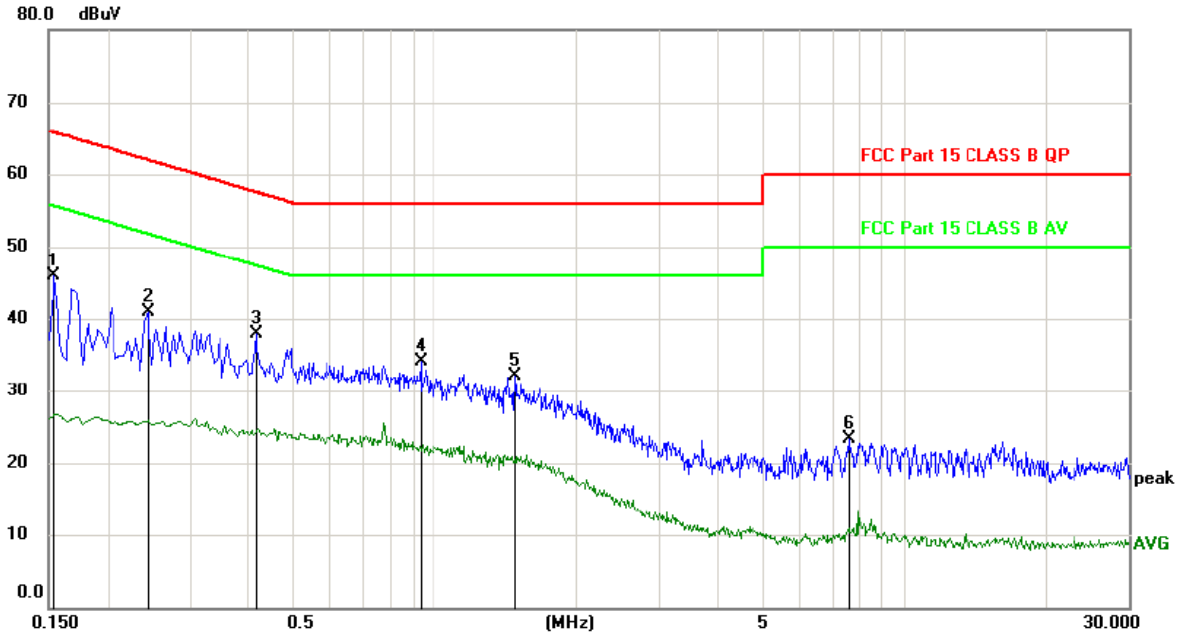
*:Maximum data x:Over limit !:over margin

Note: Measurement=Reading Level+Correc Factor. Factor=(LISN or ISN or PLC or Current Probe)Factor+Cable

Site LAB	Phase:	N	Temperature: 24.9
Limit: FCC Part 15 CLASS B QP	Power:	AC 120V/60Hz	Humidity: 47 %
EUT: Handheld GNSS Data Collector			
M/N: HCE320			
Mode: Data transmitting			
Note:			
Engineer Signature:			

Conducted Emission Measurement

File :HCE320 Data :#26 Date: 2018-1-3 Time: 14:02:01



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1545	36.17	9.73	45.90	65.75	-19.85	peak	
2		0.2445	31.14	9.76	40.90	61.94	-21.04	peak	
3	*	0.4155	28.05	9.78	37.83	57.54	-19.71	peak	
4		0.9285	24.30	9.83	34.13	56.00	-21.87	peak	
5		1.4730	22.17	9.87	32.04	56.00	-23.96	peak	
6		7.5930	13.00	10.28	23.28	60.00	-36.72	peak	

*:Maximum data x:Over limit !:over margin

Note: Measurement=Reading Level+Correc Factor. Factor=(LISN or ISN or PLC or Current Probe)Factor+Cable

Remark: The test data above 1GHz is too lower than the limit, so not show in this report.

7.2. Radiated Emission

7.2.1. Test Specification

Test Requirement:	FCC 47 CFR Part 15 Subpart B
Test Method:	ANSI C63.4: 2014
Frequency Range:	30 MHz to 1000 MHz
Measurement Distance:	3 m
Antenna Polarization:	Horizontal & Vertical

7.2.2. Limits

Frequency (MHz)	Class A (at 3m)	Class B (at 3m)
	dBuV/m	dBuV/m
30 ~ 88	49.0	40.0
88 ~ 216	53.5	43.5
216 ~ 960	56.4	46.0
960 ~ 1000	59.5	54.0

Note:

1. The lower limit shall apply at the transition frequencies.
2. Emission level dB(μV/m) = 20 log Emission level (μV/m).

7.2.3. Test Instruments

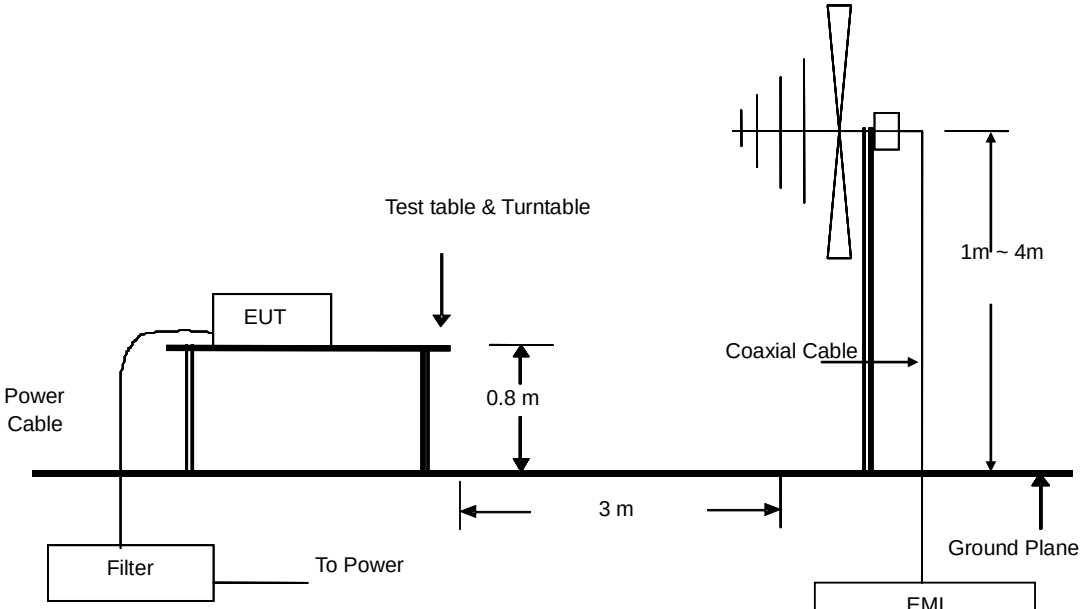
Radiated Emission Test Site (966)				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
EMI Test Receiver	R&S	ESVD	100008	Sep. 27, 2018
Spectrum Analyzer	R&S	FSEM	848597-001	Sep. 27, 2018
Amplifier	HP	8447D	2727A05017	Sep. 27, 2018
Amplifier	EM	EM30265	07032613	Sep. 27, 2018
Broadband Antenna	Schwarzbeck	VULB9163	340	Sep. 27, 2018
Horn Antenna	Schwarzbeck	BBHA 9120D	631	Sep. 27, 2018

Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

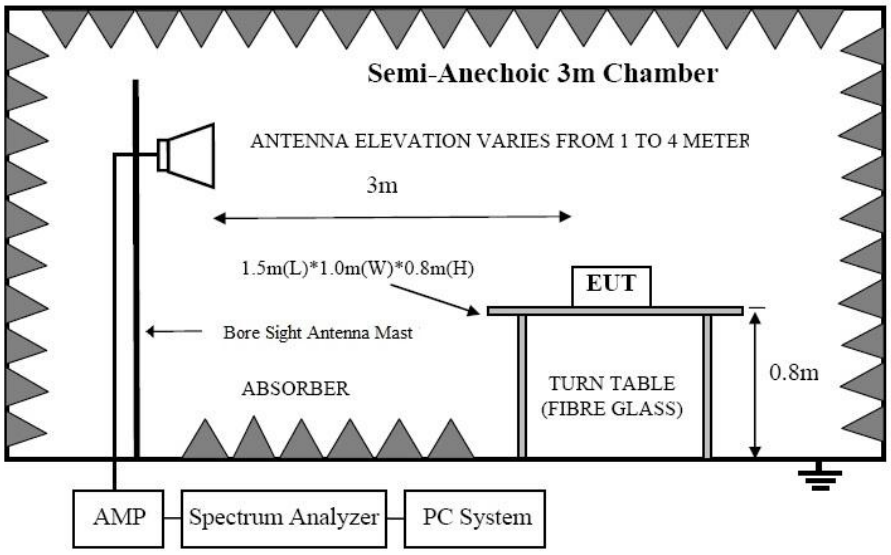
7.2.4. Test Method

Measurements were made in a 3-meter semi-anechoic chamber or Open Area Test Site that complies to CISPR 16. Preliminary (peak) measurements were performed at an antenna to EUT separation distance of 3 meter. The EUT was rotated 360° about its azimuth with the receive antenna located at various heights in horizontal and vertical polarities. Final measurements (quasi-peak) were then performed by rotating the EUT 360° and adjusting the receive antenna height from 1 to 4 m. All frequencies were investigated in both horizontal and vertical antenna polarity, where applicable. Block Diagram of Test Setup.

7.2.5. Block Diagram of Test Setup



Below 1G



Above 1G

For the actual test configuration, please refer to the related item – Photographs of the Test Configuration

7.2.6. Test Results

Test Environment:	Temp.:	23.9 ℃	Humid.:	46%	Press.:	96 kPa
Test Mode:	Data Transmitting					
Test Voltage:	AC 120V/60Hz					
Test Result:	Pass					

Freq. = Emission frequency in MHz

Reading level (dBμV) = Receiver reading

Corr. Factor (dB) = Antenna factor + Cable loss-AMP factor

Measurement (dBμV) = Reading level (dBμV) + Corr. Factor (dB)

Limit (dBμV) = Limit stated in standard

Margin (dB) = Measurement (dBμV) – Limits (dBμV))

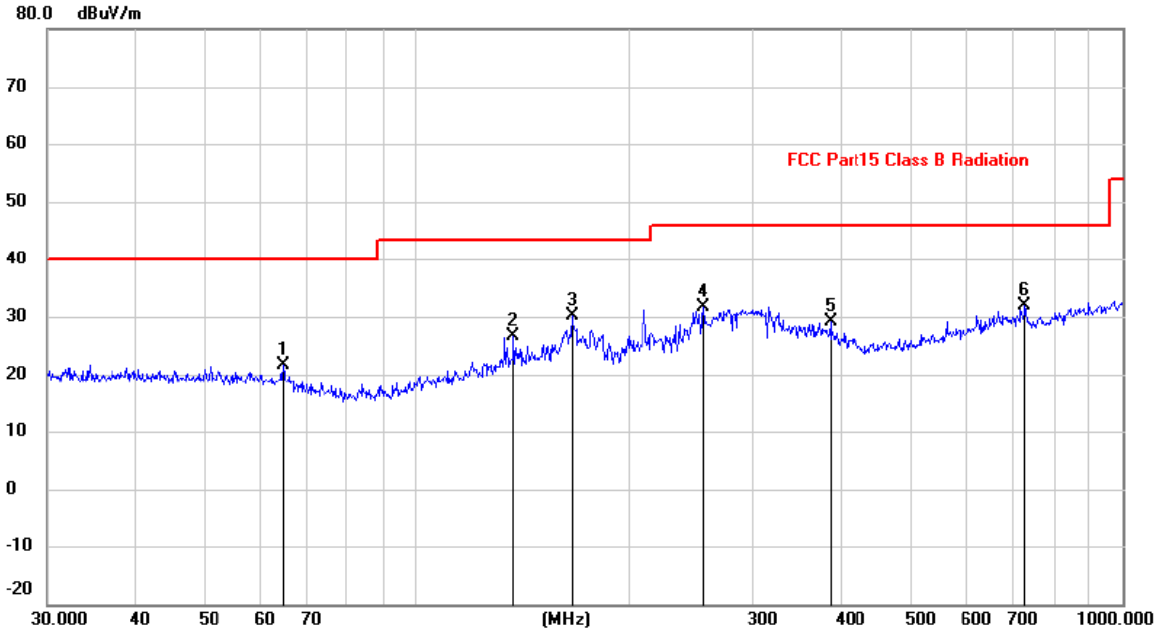
* is meaning the worst frequency has been tested in the test frequency range

Please refer to following diagram for individual

Site LAB	Polarization: *Horizontal*	Temperature:	23.9
Limit: FCC Part15 Class B Radiation	Power: DC 5V	Humidity:	46 %
EUT: Handheld GNSS Data Collector	Distance: 3m		
M/N: HCE320			
Mode: Data transmitting			
Note:			
Engineer Signature: Star Yang			

Radiated Emission Measurement

File :2018 Data :#22 Date: 2018/1/10 Time: 18:52:45



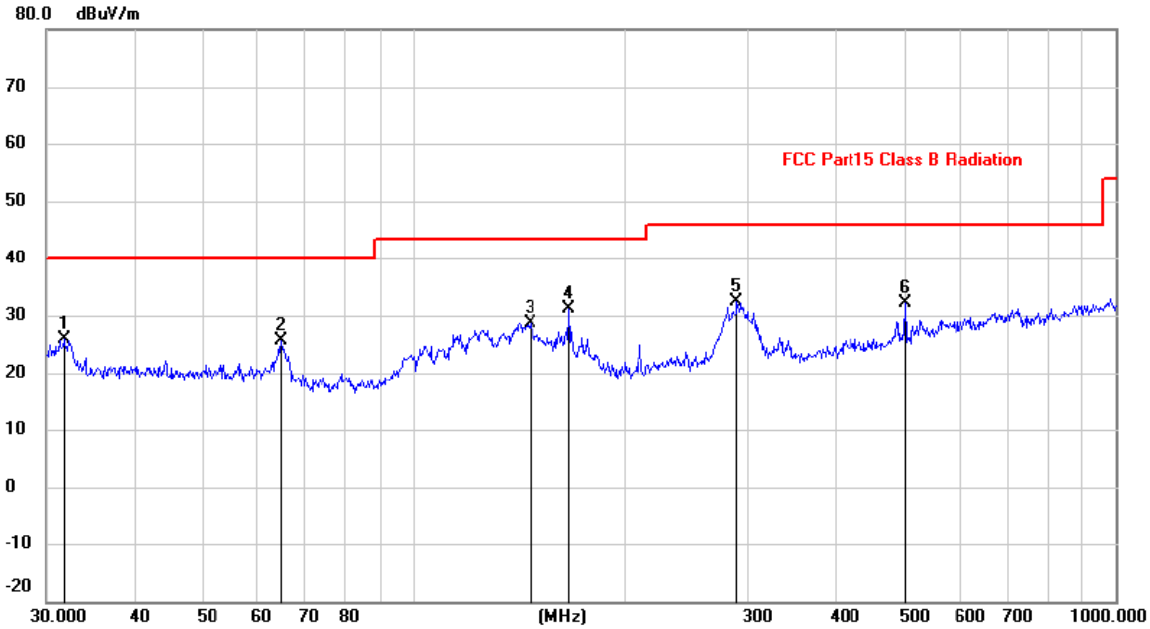
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		64.6594	9.65	11.97	21.62	40.00	-18.38	peak			
2		136.9391	13.06	13.65	26.71	43.50	-16.79	peak			
3	*	166.0680	15.95	14.09	30.04	43.50	-13.46	peak			
4		254.7284	19.50	12.18	31.68	46.00	-14.32	peak			
5		385.2805	13.69	15.39	29.08	46.00	-16.92	peak			
6		726.8052	10.60	21.33	31.93	46.00	-14.07	peak			

Note:1. *:Maximum data; x:Over limit; !:over margin.
2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.

Site LAB	Polarization: *Vertical*	Temperature:	23.9
Limit: FCC Part15 Class B Radiation	Power: DC 5V	Humidity:	46 %
EUT: Handheld GNSS Data Collector	Distance: 3m		
M/N: HCE320			
Mode: Data transmitting			
Note:			
Engineer Signature: Star Yang			

Radiated Emission Measurement

File :2018 Data :#21 Date: 2018/1/10 Time: 18:51:00



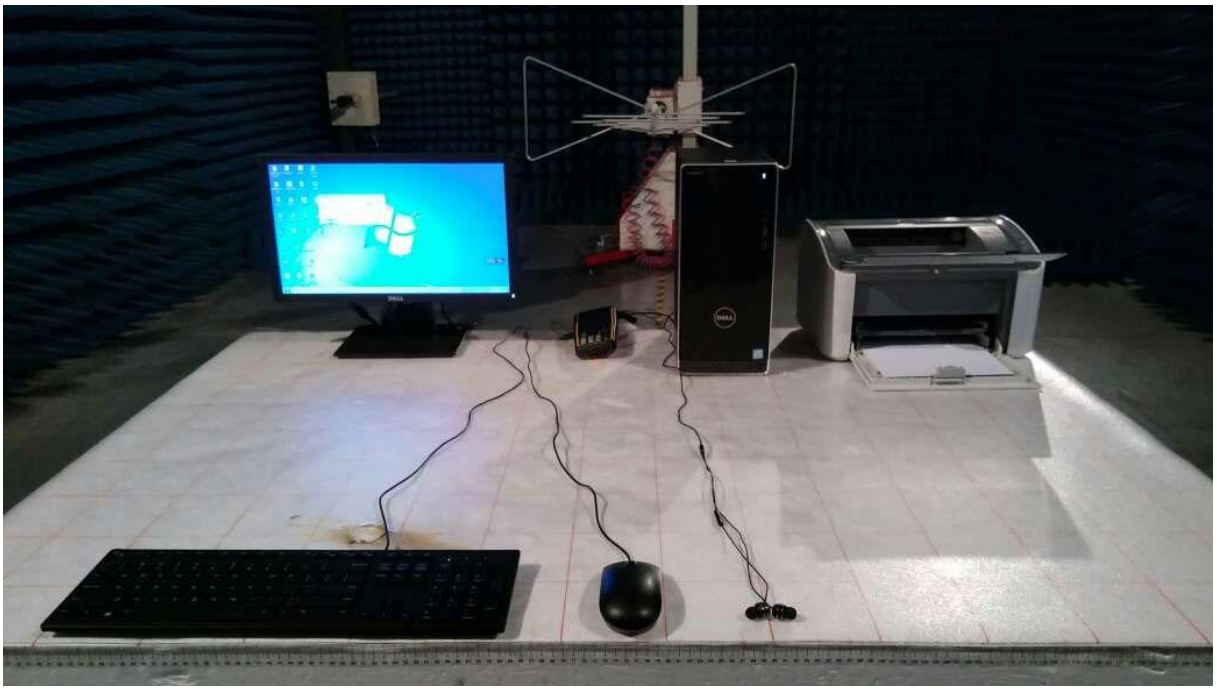
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		31.7313	12.50	13.38	25.88	40.00	-14.12	peak			
2		64.6594	13.60	11.97	25.57	40.00	-14.43	peak			
3		146.8877	14.25	14.33	28.58	43.50	-14.92	peak			
4	*	167.2368	17.05	14.00	31.05	43.50	-12.45	peak			
5		287.9904	19.29	13.09	32.38	46.00	-13.62	peak			
6		501.1790	15.00	17.22	32.22	46.00	-13.78	peak			

Note:1. *:Maximum data; x:Over limit; !:over margin.
2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.

8. Photographs of Test Configuration

Conducted Emission Test View

Radiated Emission Test View



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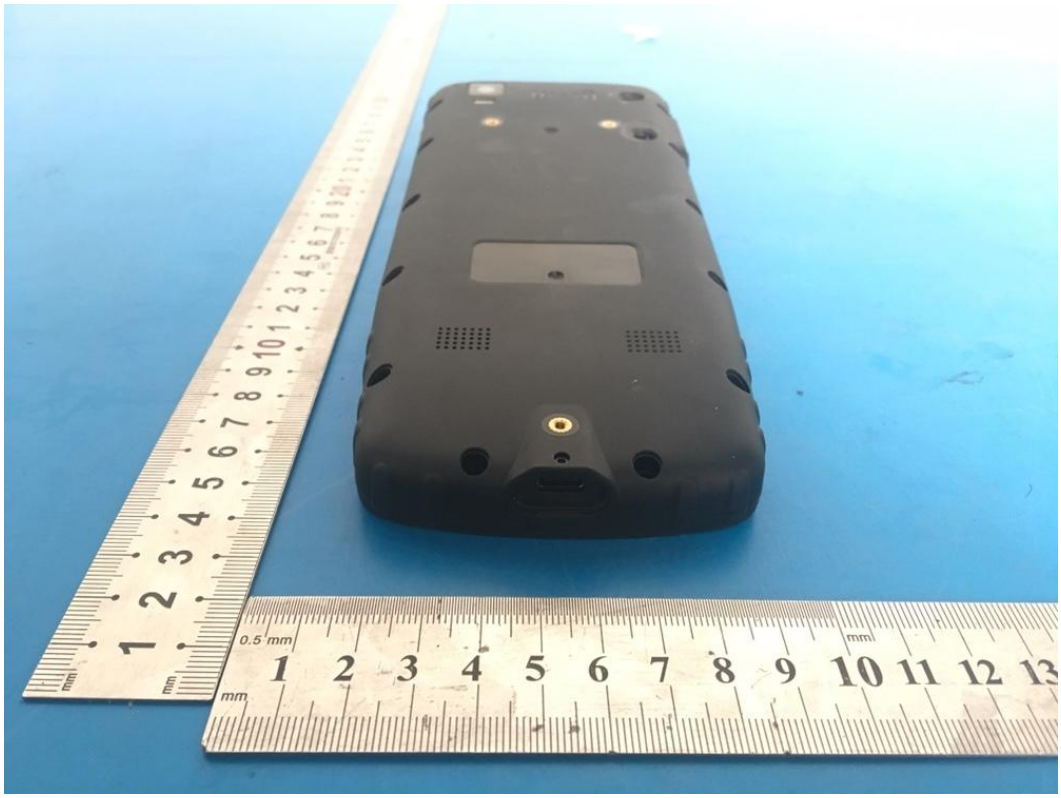
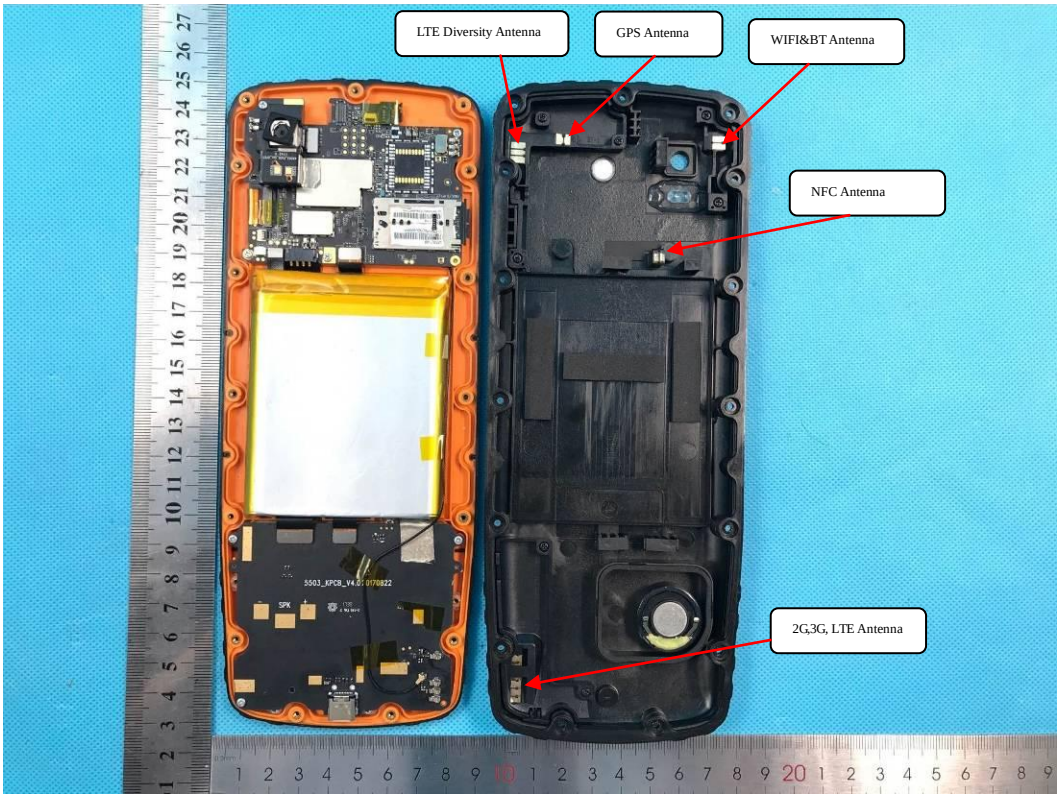
9. Photographs of EUT

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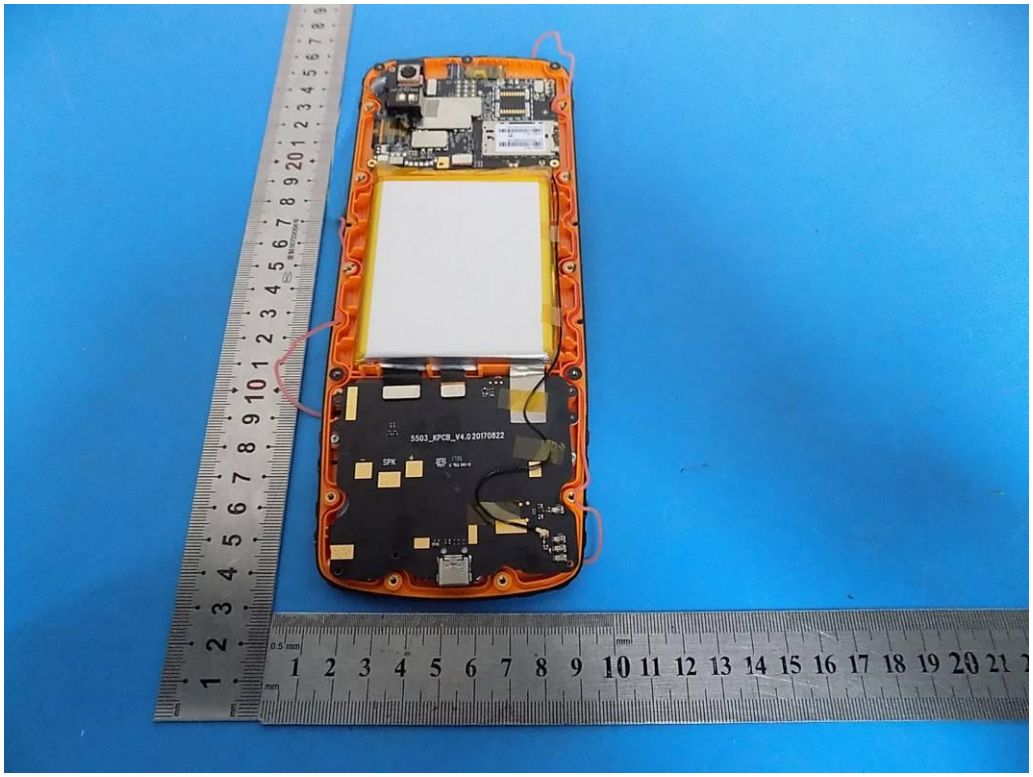
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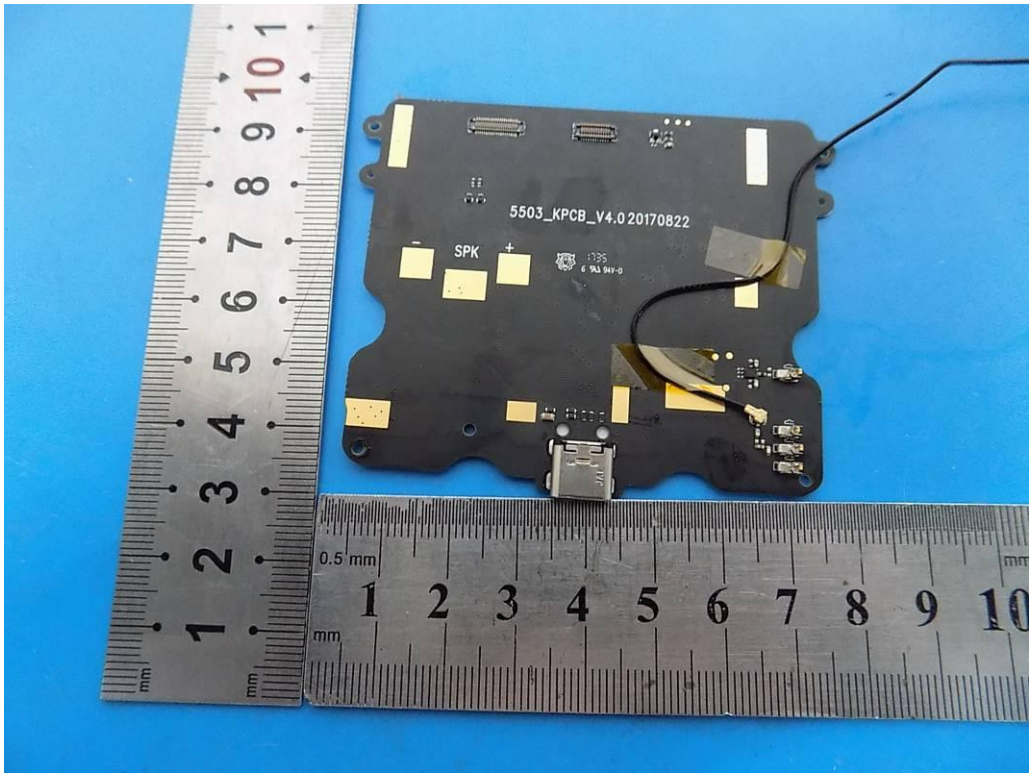
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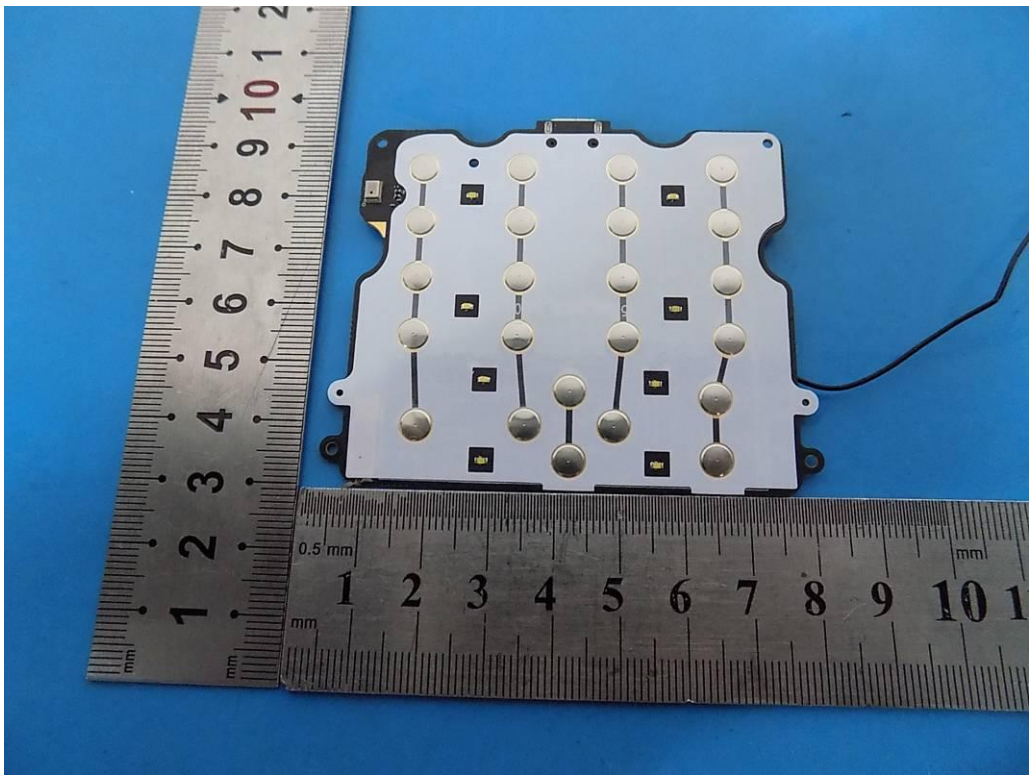
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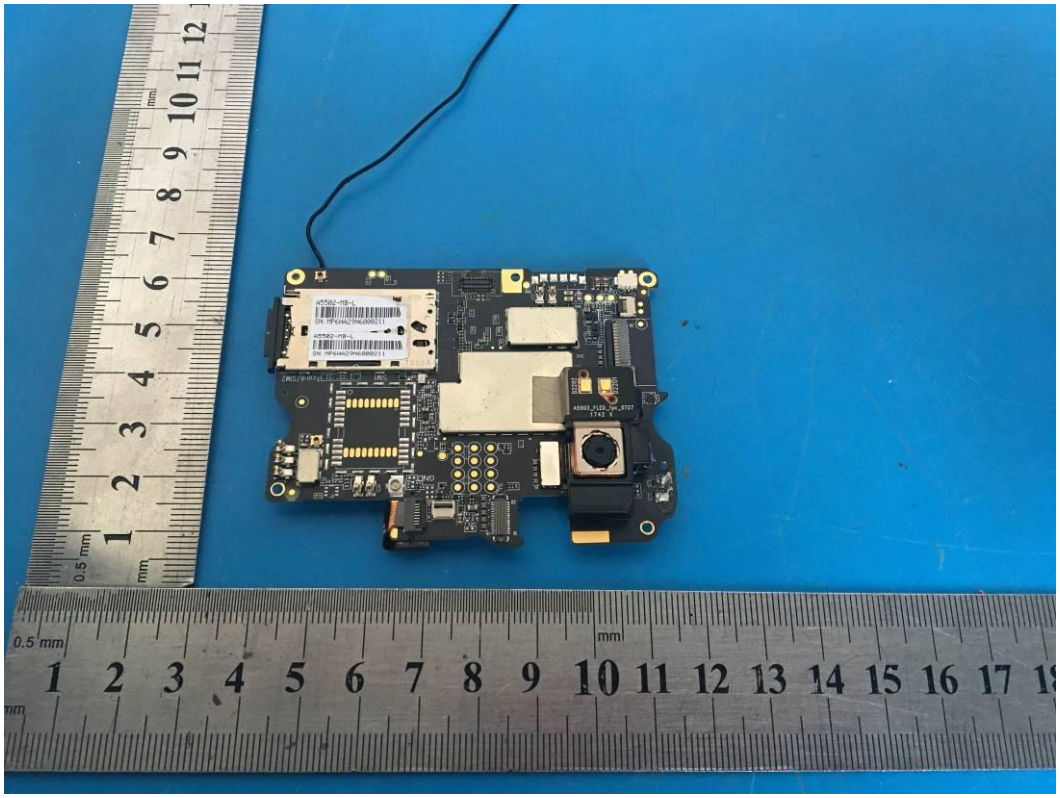

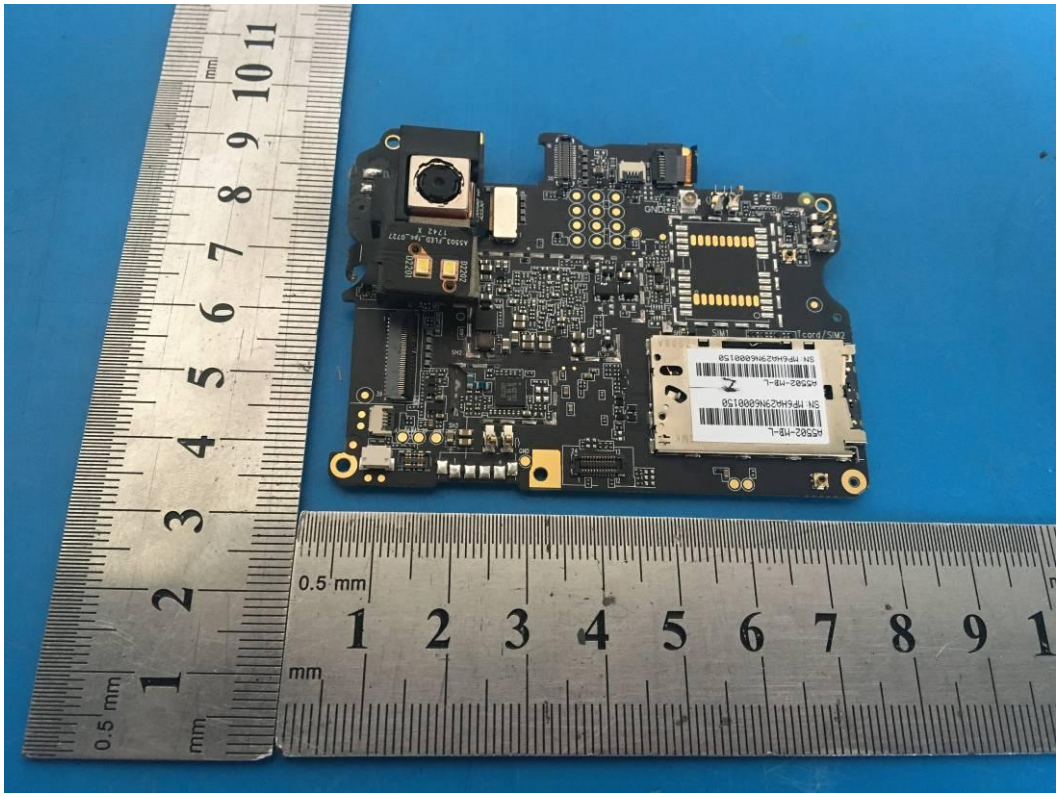

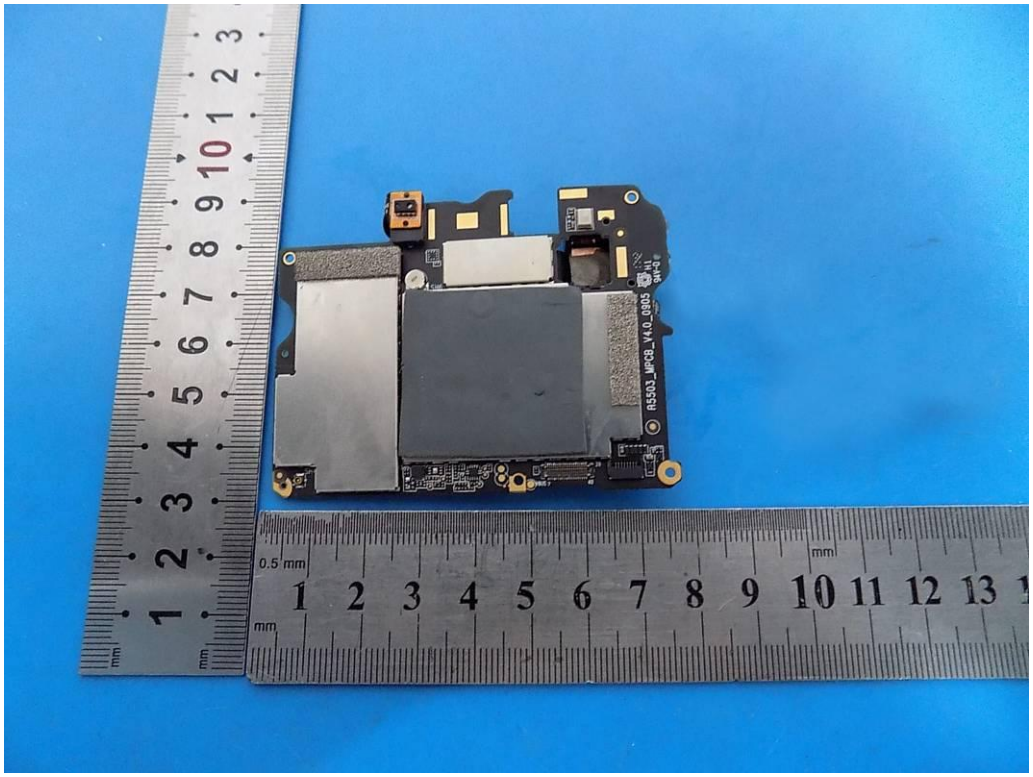
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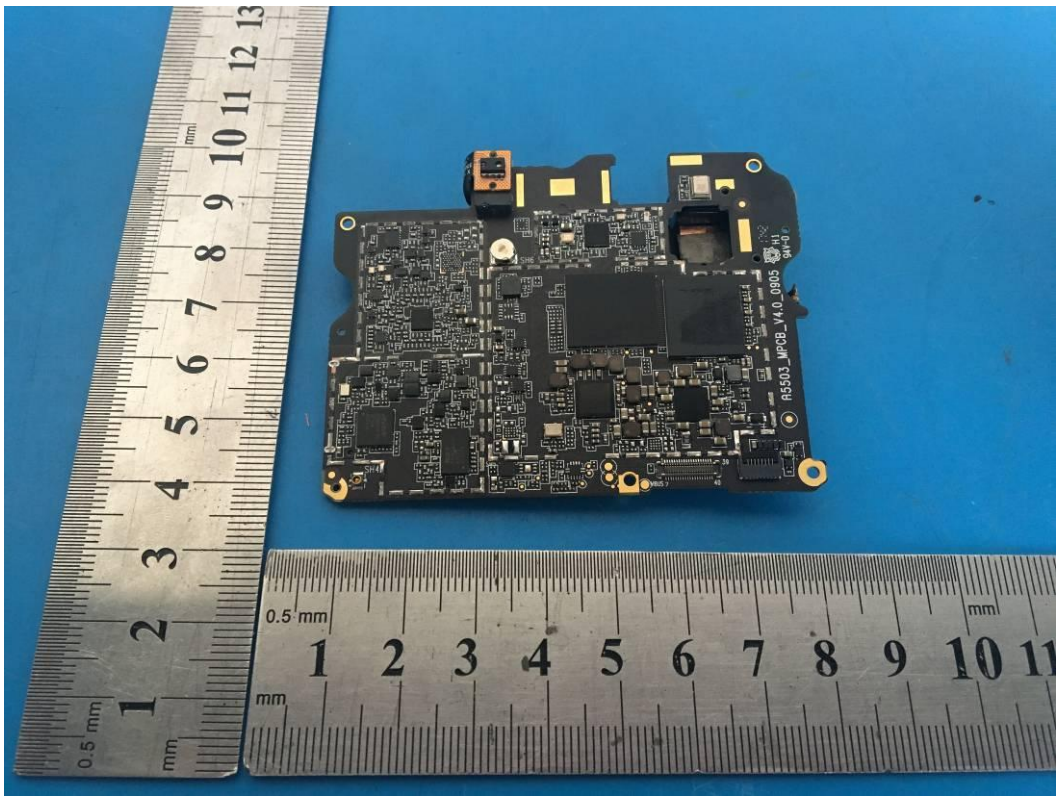
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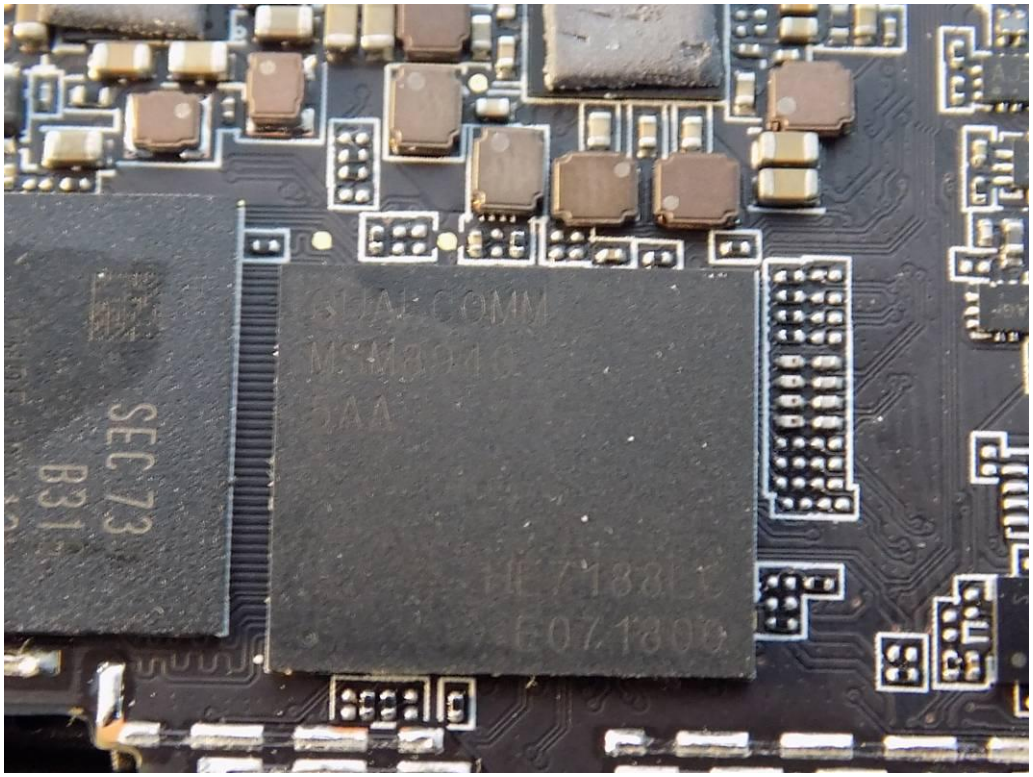
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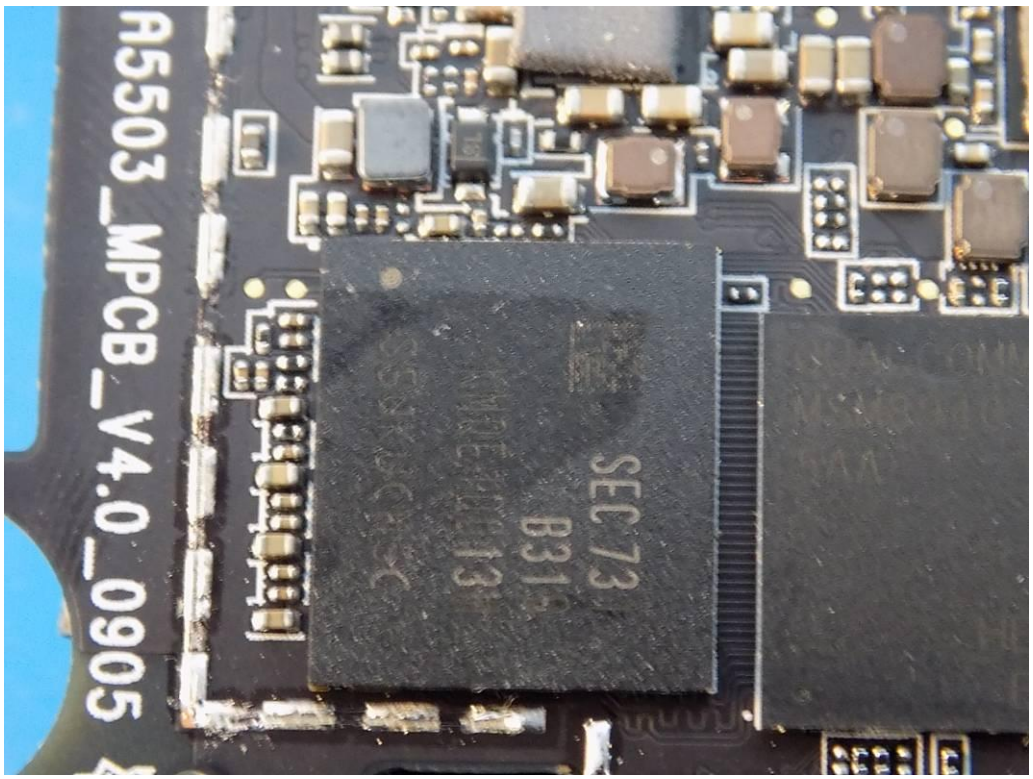
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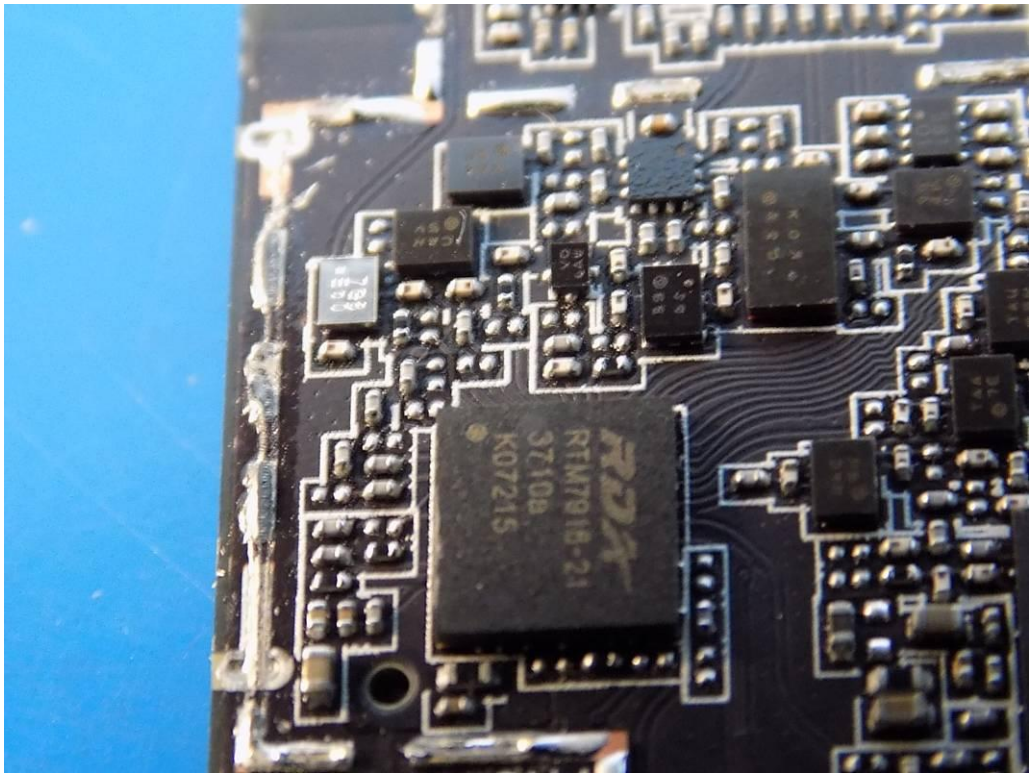
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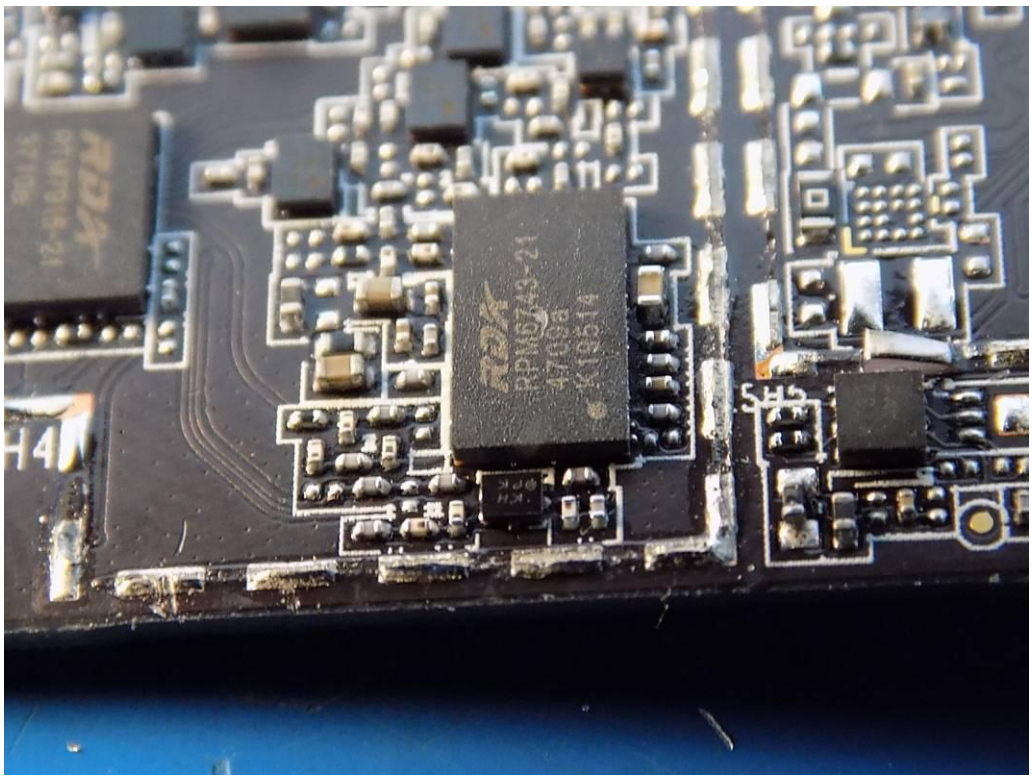
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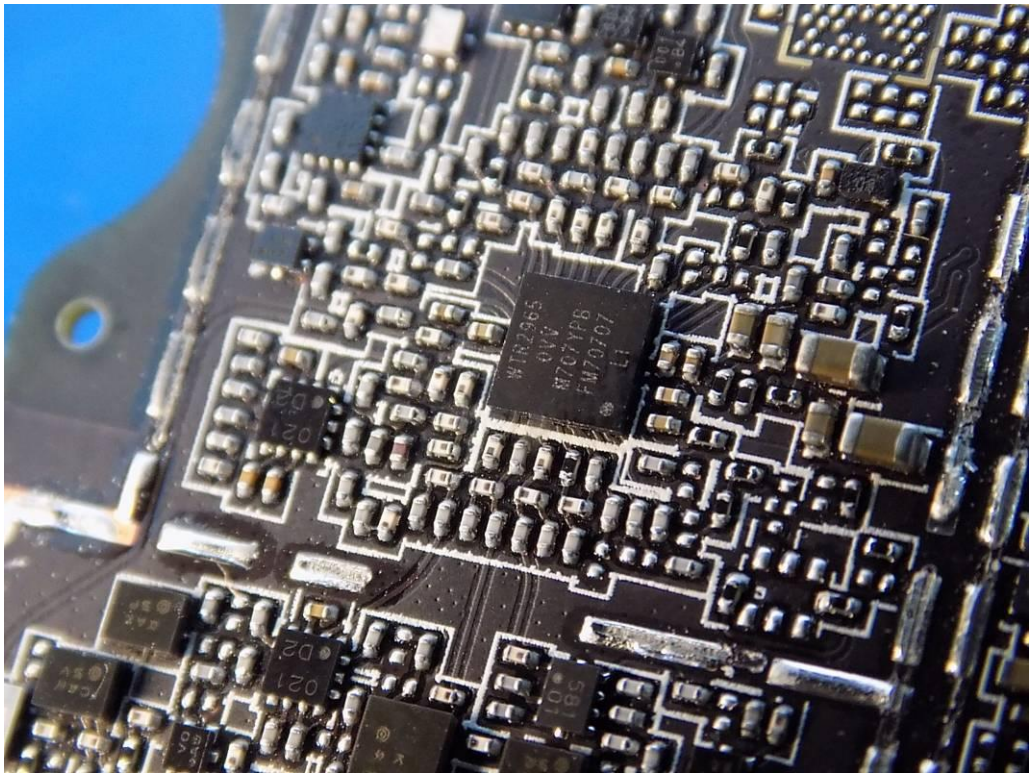

*****END OF REPORT*****

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