

FCC PART 15C TEST REPORT FOR CERTIFICATION
On Behalf of

HUNAN GREATWALL COMPUTER SYSTEM CO., LTD

10.1 ANDROID TABLET WITH DETACHABLE KEYBOARD

Model Number: TBBVNC10005209

Additional Model: ONA19TB007, 100005209

FCC ID: 2APUQW1028

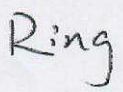
Prepared for:	HUNAN GREATWALL COMPUTER SYSTEM CO., LTD
	Hunan GreatWall Industrial Park, Tianyi Science and Technology City,
	Xiangyun Middle Road, Tianyuan District, Zhuzhou, Hunan Province
Prepared By:	EST Technology Co., Ltd.
	Chilingxiang, Qishantou, Santun, Houjie, Dongguan, Guangdong, China
Tel: 86-769-83081888-808	

Report Number:	ESTE-R1901072-5
Date of Test:	Sep. 03~20, 2019
Date of Report:	Sep. 24, 2019

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EST Technology Co., Ltd.

Applicant:	HUNAN GREATWALL COMPUTER STSTEM CO., LTD		
Address:	Hunan GreatWall Industrial Park, Tianyi Science and Technology City, Xiangyun Moddle Road, Tianyuan District, Zhuzhou, Hunan Province		
Manufacturer:	HUNAN GREATWALL COMPUTER STSTEM CO., LTD		
Address:	Hunan GreatWall Industrial Park, Tianyi Science and Technology City, Xiangyun Moddle Road, Tianyuan District, Zhuzhou, Hunan Province		
E.U.T:	10.1 ANDROID TABLET WITH DETA CHABLE KEYBOARD		
Model Number:	TBBVNC10005209		
Additional Model:	ONA19TB007, 100005209 Note: only the model number, IC, PCB and screen are different, the others are the same.		
Power Supply:	DC 5V From Adapter Input AC 100~240V, 50/60Hz, 0.3A DC 3.7V From battery		
Test Voltage:	DC 5V From Adapter Input AC 120V/60Hz, 0.3A DC 5V From Adapter Input AC 240V/50Hz, 0.3A		
Trade Name:	onn.	Serial No.:	-----
Date of Receipt:	Sep. 03, 2019	Date of Test:	Sep. 03~20, 2019
Test Specification:	FCC Rules and Regulations Part 15 Subpart C:2018 ANSI C63.10:2013		
Test Result:	The device described above is tested by EST Technology Co., Ltd. The measurement results were contained in this test report and EST Technology Co., Ltd. was assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT to be technically compliance with the FCC Rules and Regulations Part 15 Subpart C requirements. This report applies to above tested sample only and shall not be reproduced in part without written approval of EST Technology Co., Ltd.		
Prepared by:	Reviewed by:	Date: Sep 24, 2019 Approved by:	
 _____ Ring / Assistant	 _____ Tony / Engineer	 _____ Iceman Hu / Manager	
Other Aspects: This report base on the previous report with report number: ESTE-R1901072-1, a new model number has been added to this report. Because the added model number electrical and mechanical self has not changed, only the screen, and PCB have been Changed, so just re-tested Radiated Emissions (30-1000Mhz), other test item needn't re-tested. (IC model: SMTJ9A6ZZ5D6DKFRL-107BT PA071 -107BT and SMTJ96VZZ7D6EKKFB-107FT PA054-107BT/FT); (EMMC: MEMA016G 16GB 1 153-FBGA ISOCOM); (DDRIII: L5TC4G83AFR-PBA 512M FBGA78); (Screen: SAT101AT40I32R1-26228M017IN-CC) Abbreviations: OK/P=passed fail/F=failed n.a/N=not applicable E.U.T=equipment under tested			
This test report is based on a single evaluation of one sample of above mentioned products ,It is not permitted to be duplicated in extracts without written approval of EST Technology Co., Ltd.			

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

Product Name	:	10.1 ANDROID TABLET WITH DETACHABLE KEYBOARD
FCC ID	:	2APUQW1028
Model Number	:	TBBVNC10005209
Operation frequency	:	2402MHz~2480MHz
Number of channel	:	40
Antenna	:	Internal antenna (Antenna Gain: 1.5 dBi)
Modulation	:	BLE: GFSK
Sample Type	:	Prototype production

2. SUMMARY OF TEST

2.1. Summary of test result

Description of Test Item	Standard	Results
Power Line Conducted Emission	FCC Part 15: 15.207 ANSI C63.10:2013	N/A
Radiated Emission	FCC Part 15: 15.209 ANSI C63.10:2013 KDB 558074	PASS
Band Edge Compliance	FCC Part 15: 15.247 ANSI C63.10:2013 KDB 558074	N/A
6dB Bandwidth	FCC Part 15: 15.247 ANSI C63.10:2013 KDB 558074	N/A
Peak Output Power	FCC Part 15: 15.247 ANSI C63.10:2013 KDB 558074	N/A
Power Spectral Density	FCC Part 15: 15.247 ANSI C63.10:2013 KDB 558074	N/A
Antenna requirement	FCC Part 15: 15.203	N/A
Note: KDB 558074 D01 15.247 Meas Guidance v05		

2.2. Test Facilities

EMC Lab

: Certificated by CNAS, CHINA
Registration No.: L5288
Date of registration: November 13, 2017

Certificated by FCC, USA
Designation Number: CN1215
Test Firm Registration Number: 722932
Date of registration: November 21, 2017

Certificated by A2LA, USA
Registration No.: 4366.01
Date of registration: November 07, 2017

Certificated by Industry Canada
CAB identifier No.: CN0035
Date of registration: January 04, 2019

Certificated by VCCI, Japan
Registration No.: R-13663; C-14103
Date of registration: July 25, 2017
This Certificate is valid until: July 24, 2020

Certificated by TUV Rheinland, Germany
Registration No.: UA 50413872 0001
Date of registration: July 31, 2018

Certificated by TUV/PS, Shenzhen
Registration No.: SCN1017
Date of registration: January 27, 2011

Certificated by Intertek ETL SEMKO
Registration No.: 2011-RTL-L2-64
Date of registration: April 28, 2011

Certificated by Nemko, Hong Kong
Registration No.: 175193
Date of registration: May 4, 2011

Name of Firm : EST Technology Co., Ltd.

Site Location : Chilingxiang, Qishantou, Santun, Houjie, Dongguan, Guangdong, China

2.3. Measurement uncertainty

Test Item	Uncertainty
Uncertainty for Conduction emission test	$\pm 3.48\text{dB}$
Uncertainty for spurious emissions test (30MHz-1GHz)	$\pm 4.60\text{ dB(Polarize: H)}$
	$\pm 4.68\text{ dB(Polarize: V)}$
Uncertainty for spurious emissions test (1GHz to 18GHz)	$\pm 4.96\text{dB}$
Uncertainty for radio frequency	7×10^{-8}
Uncertainty for conducted RF Power	0.20dB
Uncertainty for Power density test	0.26dB

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

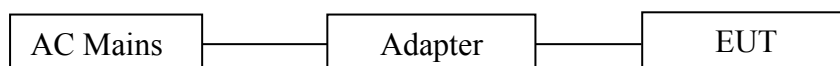
2.4. Assistant equipment used for test

2.4.1. Adapter

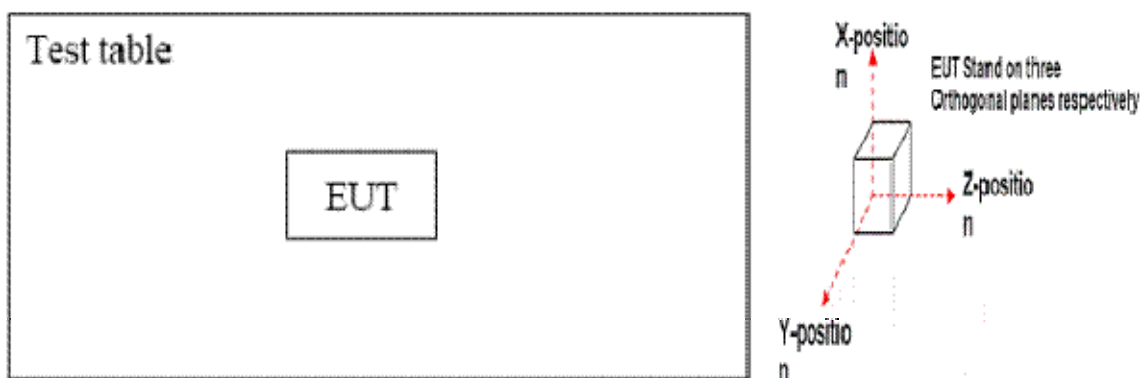
Manufacturer : onn
 M/N : BSY01J3050200U U
 Input : AC 100-240V, 50/60Hz, 0.3A
 Output : DC 5V, 2.0A

2.5. Block Diagram

For radiated emissions test: EUT was placed on a turn table, which is 0.8 (or 1.5) meter high above ground. EUT was beset into Bluetooth test mode by software before test.



(EUT: 10.1" ANDROID TABLET WITH DETACHABLE KEYBOARD)



2.6. Test mode

A special test software was used to control EUT work in Continuous TX mode(100% duty cycle), and select test channel, wireless mode and data rate.

Mode	Channel	Frequency
BT 4.0-BLE GFSK	Low	2402MHz
	Middle	2440MHz
	High	2480MHz

2.7. Channel List

Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
1	2402	2	2404
3	2406	4	2408
5	2410	6	2412
7	2414	8	2416
9	2418	10	2420
11	2422	12	2424
13	2426	14	2428
15	2430	16	2432
17	2434	18	2436
19	2438	20	2440
21	2442	22	2444
23	2446	24	2448
25	2450	26	2452
27	2454	28	2456
29	2458	30	2460
31	2462	32	2464
33	2466	34	2468
35	2470	36	2472
37	2474	38	2476
39	2478	40	2480

2.8. Test Equipment

2.8.1. For conducted emission test

Equipment	Manufacturer	Model No.	Serial No.	Calibration Body	Last Cal.	Next Cal.
EMI Test Receiver	Rohde & Schwarz	ESHS30	832354	CEPREI	June 14,19	1 Year
Artificial Mains Network	Rohde & Schwarz	ENV216	101260	CEPREI	June 14,19	1 Year
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	101100	CEPREI	June 14,19	1 Year
Test Software	Audix	e3-6.111221a	N/A	N/A	N/A	N/A

2.8.2. For radiated emission test(9 kHz-30MHz)

Equipment	Manufacturer	Model No.	Serial No.	Calibration Body	Last Cal.	Next Cal.
EMI Test Receiver	Rohde & Schwarz	ESR7	101780	CEPREI	June 14,19	1 Year
Active Loop Antenna	SCHWARZB ECK	FMZB 1519B	1519B-088	N/A	June 14,19	1 Year
Test Software	Audix	e3-6.111221a	N/A	N/A	N/A	N/A

2.8.3. For radiated emissions test (30-1000MHz)

Equipment	Manufacturer	Model No.	Serial No.	Calibration Body	Last Cal.	Next Cal.
EMI Test Receiver	Rohde & Schwarz	ESR7	101780	CEPREI	June 14,19	1 Year
Bilog Antenna	Teseq	CBL 6111D	27090	CEPREI	June 14,19	1 Year
Test Software	Audix	e3-6.111221a	N/A	N/A	N/A	N/A

2.8.4. For radiated emission test(above 1GHz)

Equipment	Manufacturer	Model No.	Serial No.	Calibration Body	Last Cal.	Next Cal.
Horn Antenna	SCHWARZB ECK	BBHA 9120 D	BBHA9120D1002	CEPREI	June 14,19	1 Year
Horn Antenna	SCHWARZB ECK	BBHA9170	BBHA9170242	CEPREI	June 14,19	1 Year
Signal Amplifier	SCHWARZB ECK	BBV9718	9718-212	CEPREI	June 14,19	1 Year
Spectrum Analyzer	Rohde & Schwarz	FSV	103173	CEPREI	June 14,19	1 Year
PSA Series Spectrum Analyzer	Agilent	E4447A	MY50180031	CEPREI	June 14,19	1 Year
Test Software	Audix	e3-6.111221a	N/A	N/A	N/A	N/A

2.8.5. For connect EUT antenna terminal test

Equipment	Manufacturer	Model No.	Serial No.	Calibration Body	Last Cal.	Next Cal.
Spectrum Analyzer	Rohde & Schwarz	FSV	103173	CEPREI	June 14,19	1 Year
Spectrum Analyzer	Agilent	E4408B	MY44211 139	CEPREI	June 14,19	1 Year

4 RADIATED EMISSION TEST

4.1 Limit

4.1.1 15.209 limits

Frequency (MHz)	Field Strength($\mu\text{V/m}$)	Distance(m)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

- Remark : (1) Emission level $\text{dB}\mu\text{V} = 20 \log \text{Emission level } \mu\text{V/m}$
 (2) The smaller limit shall apply at the cross point between two frequency bands.
 (3) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.

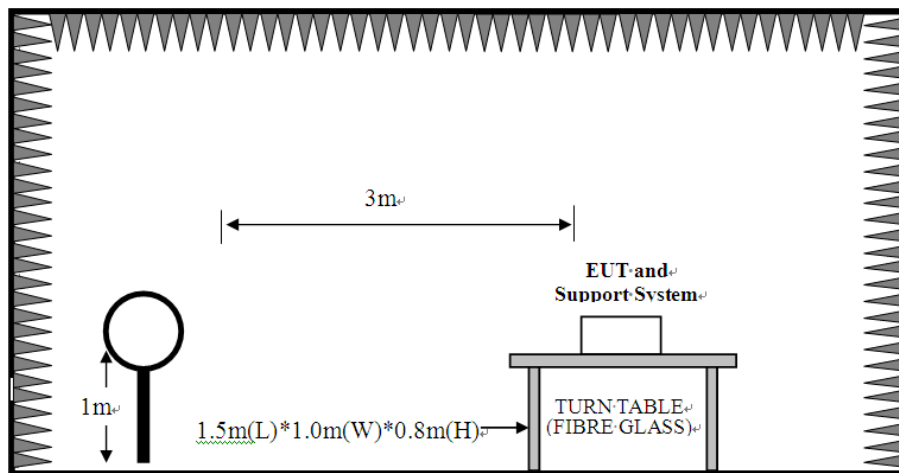
4.1.2 15.205 Restricted bands of operation

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	(²)

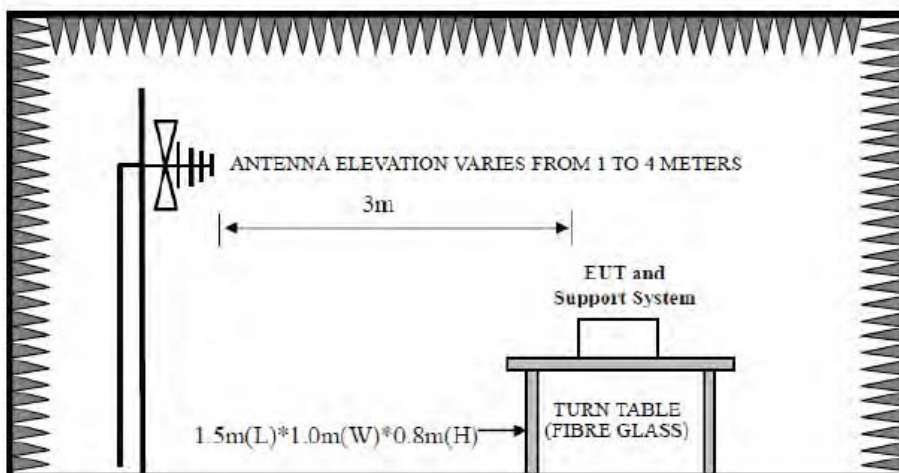
All the emissions appearing within 15.205 restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits.

4.2. Block Diagram of Test setup

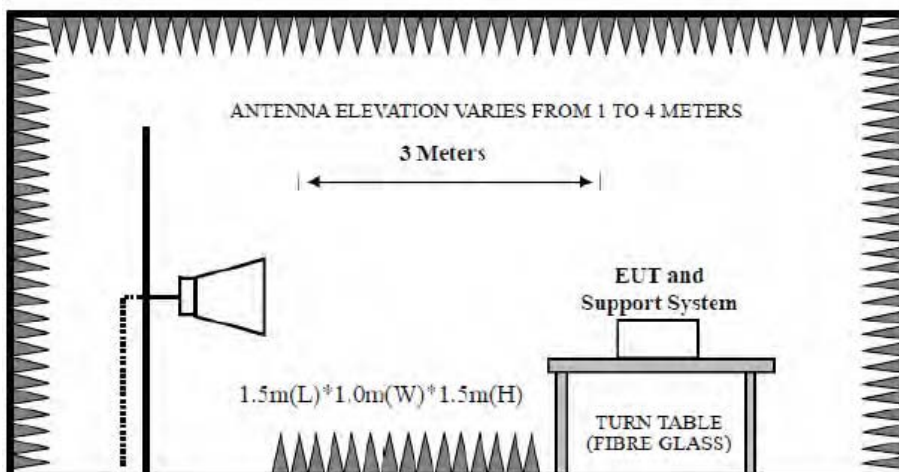
9kHz~30MHz



30~1000MHz



Above 1GHz



4.3. Test Procedure

EUT was placed on a turn table, which is 0.8 meter high above ground for 9kHz~1000MHz test, and which is 1.5 meter high above ground for above 1GHz test. The turn table can rotate 360 degrees to determine the position of the maximum emission level. Power on the EUT and let it working in test mode, then test it. EUT is set 3 meters away from the receiving antenna, which is mounted on a antenna tower. The antenna can be moved up and down between 1 meter and 4 meters to find out the maximum emission level. Both horizontal and vertical polarization of the antenna are set on test.

The test frequency analyzer system was set to Peak Detect (300Hz RBW in 9kHz to 150kHz and 10kHz RBW in 150kHz to 30MHz) Function and Specified Bandwidth with Maximum Hold Mode.

The bandwidth of the EMI test receiver (R&S ESVS10) is set at 120kHz for frequency range from 30MHz to 1000 MHz.

The bandwidth of the Spectrum's VBW is set at 1MHz and RBW is set at 1MHz for peak emissions measurement above 1GHz and 1MHz RBW, 10Hz VBW for average emissions measure above 1GHz

PEAK detector, 1MHz/1MHz for PAEK measurement,

PEAK detector, 1MHz/10Hz for Average measurement

The frequency range from 30MHz to 10th harmonic (25GHz) are checked.

4.4. Test Result

PASS.

All the emissions from 30MHz to 25 GHz were comply with 15.209 limits.

Note: 1、 For emissions above 1GHz, if peak level comply with average limit, then the average level is deemed to comply with average limit.

2、 The frequency 2402MHz 、 2440MHz and 2480 MHz is fundamental frequency which no limit, the limit on plots is automatically generated by the software, it's not fundamental limit, we can't remove it.

4.5. Test Data

9 kHz – 30 MHz

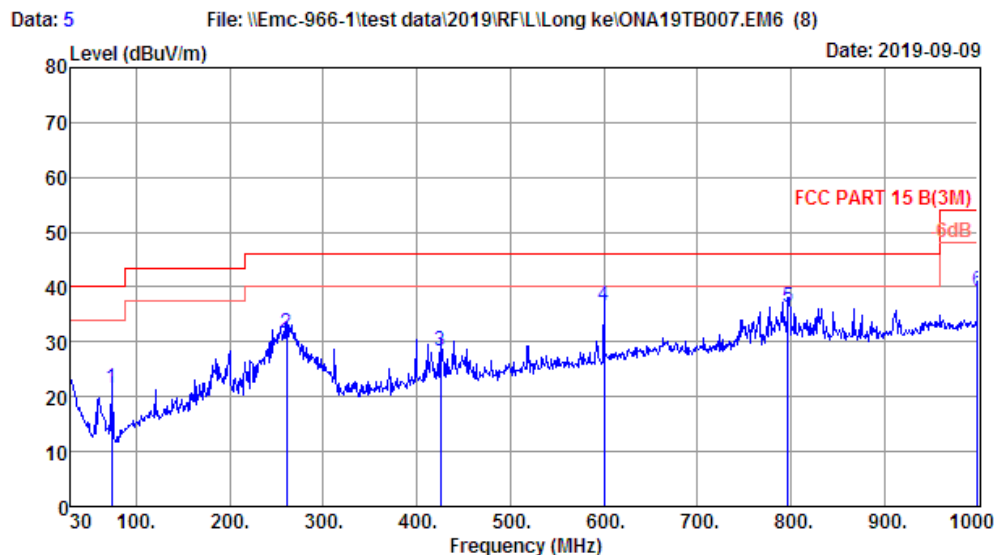
Pass

Note: The amplitude of spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.

30-1000 MHz

EST Technology

Chilingxiang, Qishantou, Santun,
Houjie, Dongguan, Guangdong, China
Tel: +86-769-83081888
Fax: +86-769-83081878



Site no. : 3# 966 chamber Data no. : 5
 Dis. / Ant. : 3m 37062 Ant. pol. : HORIZONTAL
 Limit : FCC PART 15 B(3M)
 Env. / Ins. : Temp:23.6'; Humi:56%; Press:101.52kPa
 Engineer : Frank
 EUT : 10.1 ANDROID TABLET WITH DETA CHABLE
 Power : KEYBOARD
 M/N : DC 5V From Adapter Input AC 120V/60Hz
 Test Mode : TBBVNC100005209
 TX Mode

	Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	73.65	6.66	0.57	14.34	21.57	40.00	18.43	QP
2	260.86	13.58	1.70	16.25	31.53	46.00	14.47	QP
3	425.76	16.82	2.30	9.22	28.34	46.00	17.66	QP
4	600.36	20.40	2.97	13.20	36.57	46.00	9.43	QP
5	797.27	22.84	3.59	9.79	36.22	46.00	9.78	QP
6	1000.00	25.80	4.31	9.17	39.28	54.00	14.72	QP

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
 2. Margin= Limit - Emission Level.
 3. The emission levels that are 20dB below the official limit are not reported.

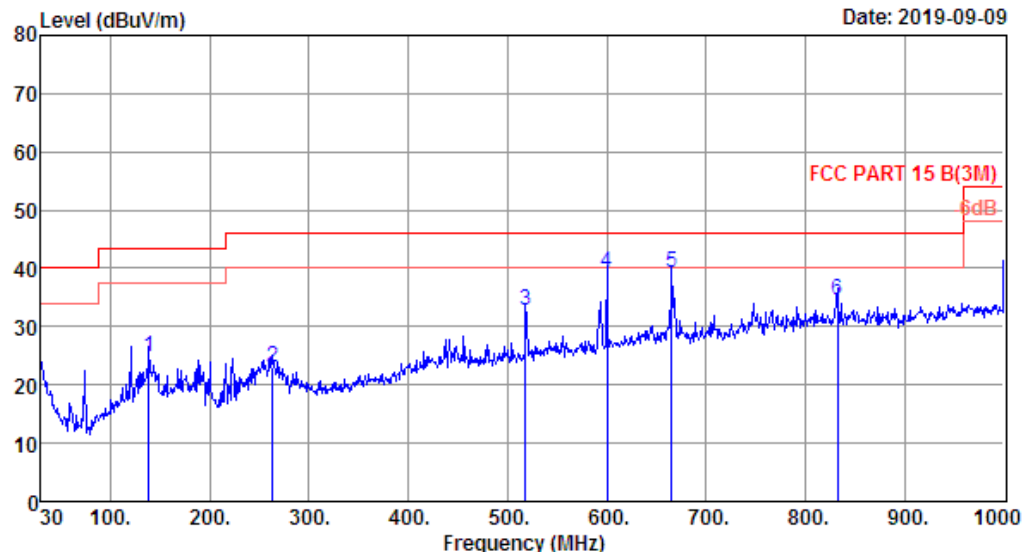
EST Technology

Chilingxiang, Qishantou, Santun,
Houjie, Dongguan, Guangdong, China
Tel: +86-769-83081888
Fax: +86-769-83081878

Data: 6

File: \\Emc-966-1\test data\2019\RFIL\Long ke\ONA19TB007.EM6 (8)

Date: 2019-09-09



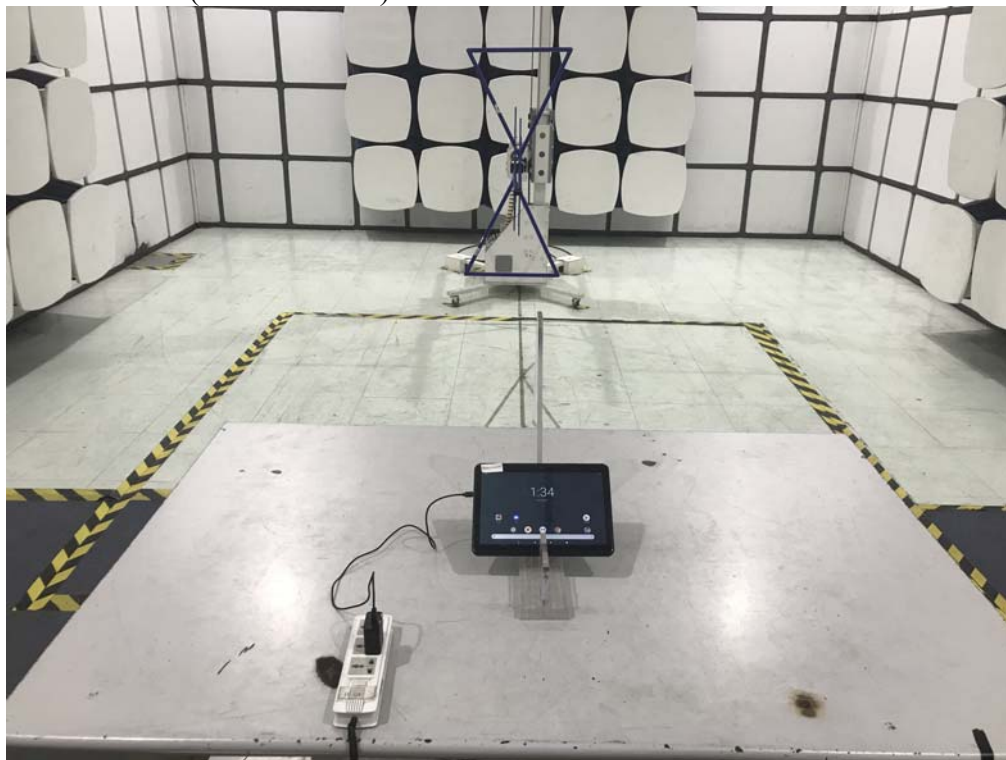
Site no. : 3# 966 chamber Data no. : 6
 Dis. / Ant. : 3m 37062 Ant. pol. : VERTICAL
 Limit : FCC PART 15 B(3M)
 Env. / Ins. : Temp:23.6'; Humi:56%; Press:101.52kPa
 Engineer : Frank
 EUT : 10.1 ANDROID TABLET WITH DETA CHABLE
 Power : KEYBOARD
 M/N : DC 5V From Adapter Input AC 120V/60Hz
 Test Mode : TBBVNC100005209
 TX Mode

	Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	138.64	12.32	1.02	11.33	24.67	43.50	18.83	QP
2	263.77	13.52	1.71	7.87	23.10	46.00	22.90	QP
3	517.91	18.42	2.73	11.67	32.82	46.00	13.18	QP
4	600.36	20.40	2.97	16.02	39.39	46.00	6.61	QP
5	665.35	21.65	3.22	14.46	39.33	46.00	6.67	QP
6	832.19	23.42	3.71	7.35	34.48	46.00	11.52	QP

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
 2. Margin= Limit - Emission Level.
 3. The emission levels that are 20dB below the official limit are not reported.

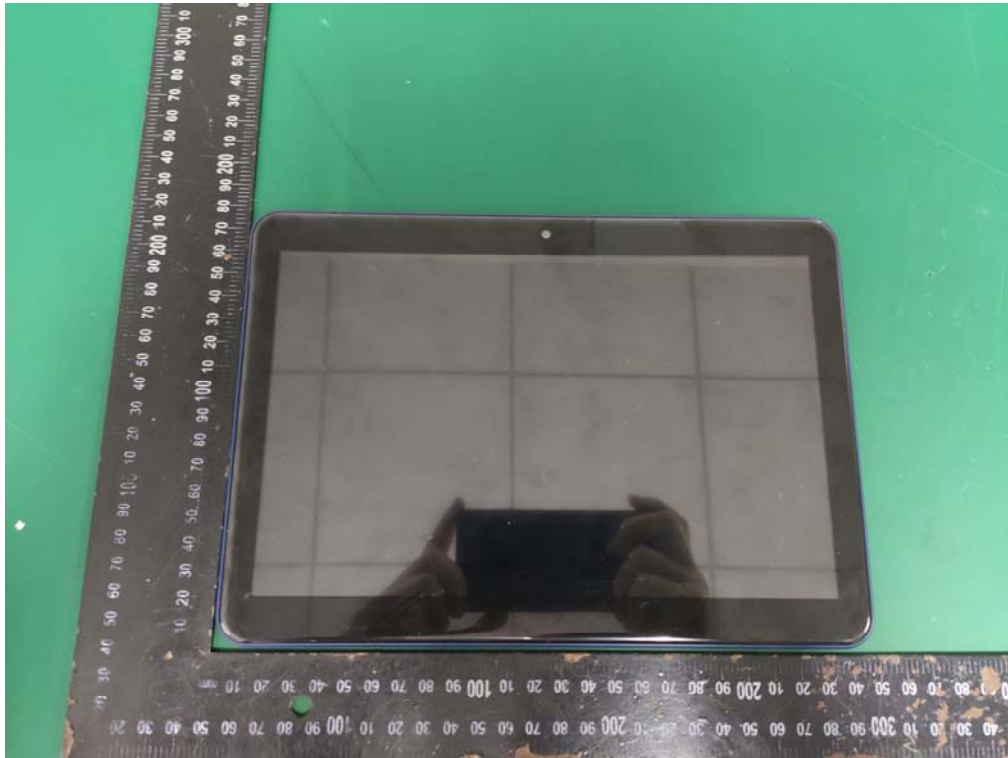
5 TEST SETUP PHOTO

Radiated Test (30-1000 MHz)

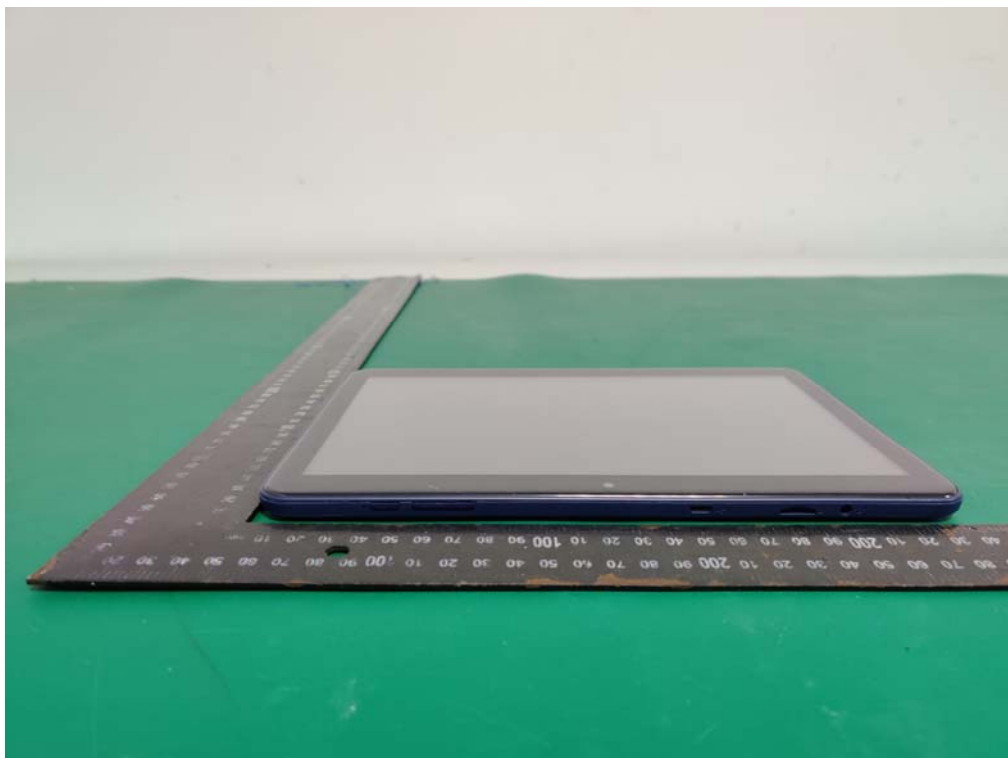
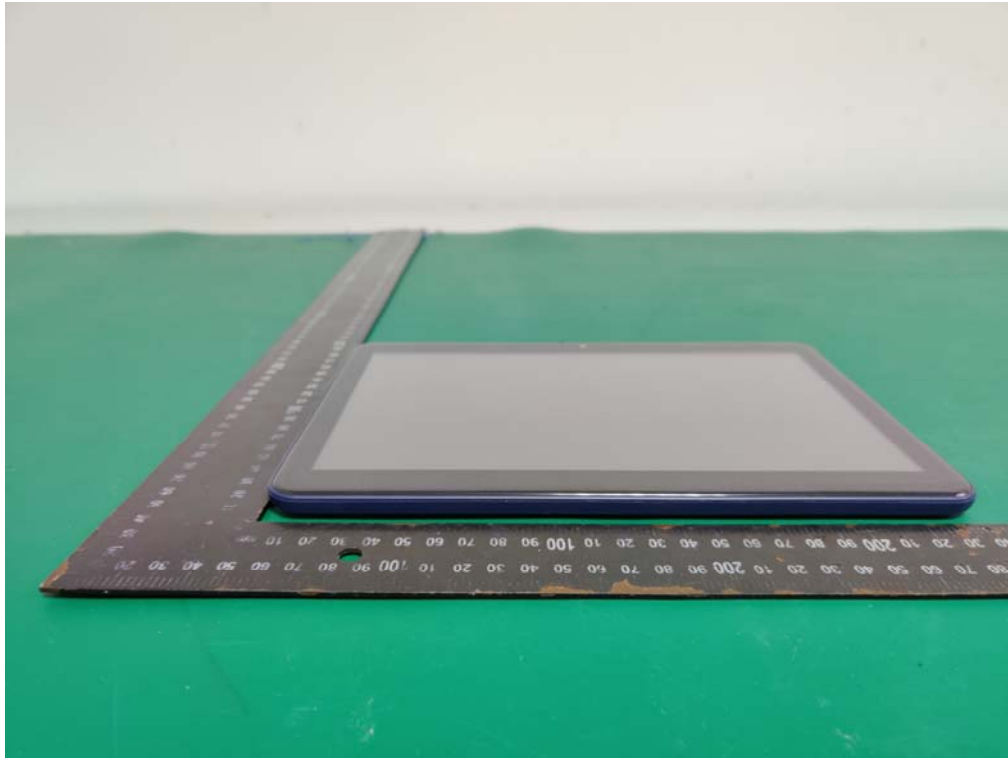


6 PHOTO EUT

External Photos
M/N: TBBVNC10005209



External Photos
M/N: TBBVNC10005209



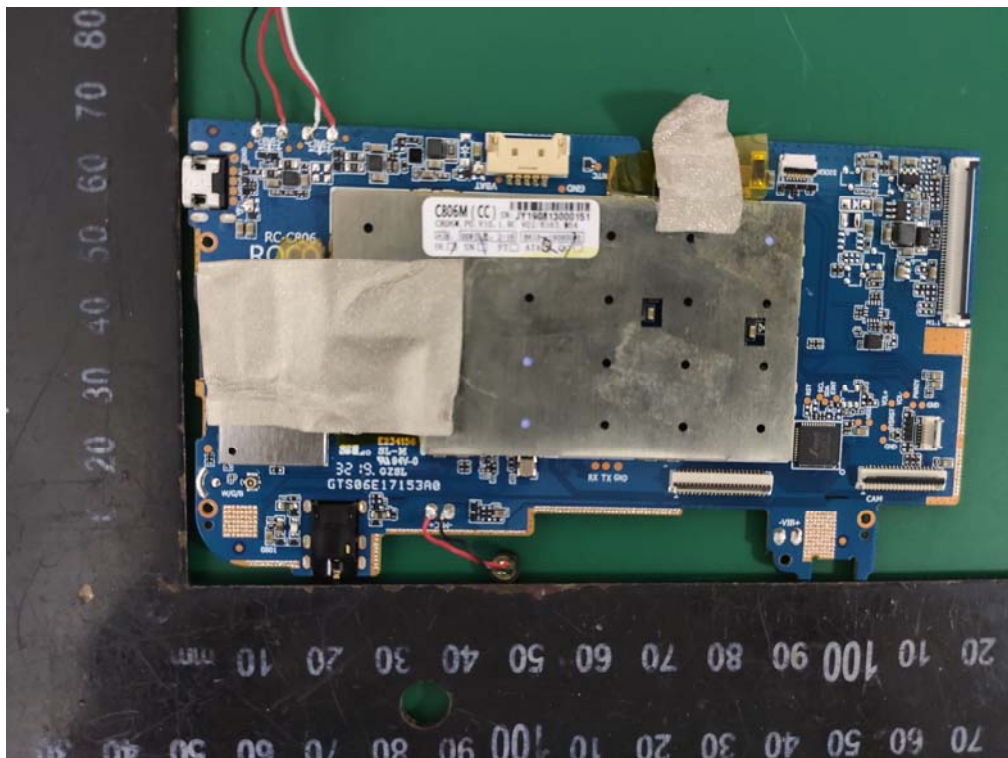
External Photos
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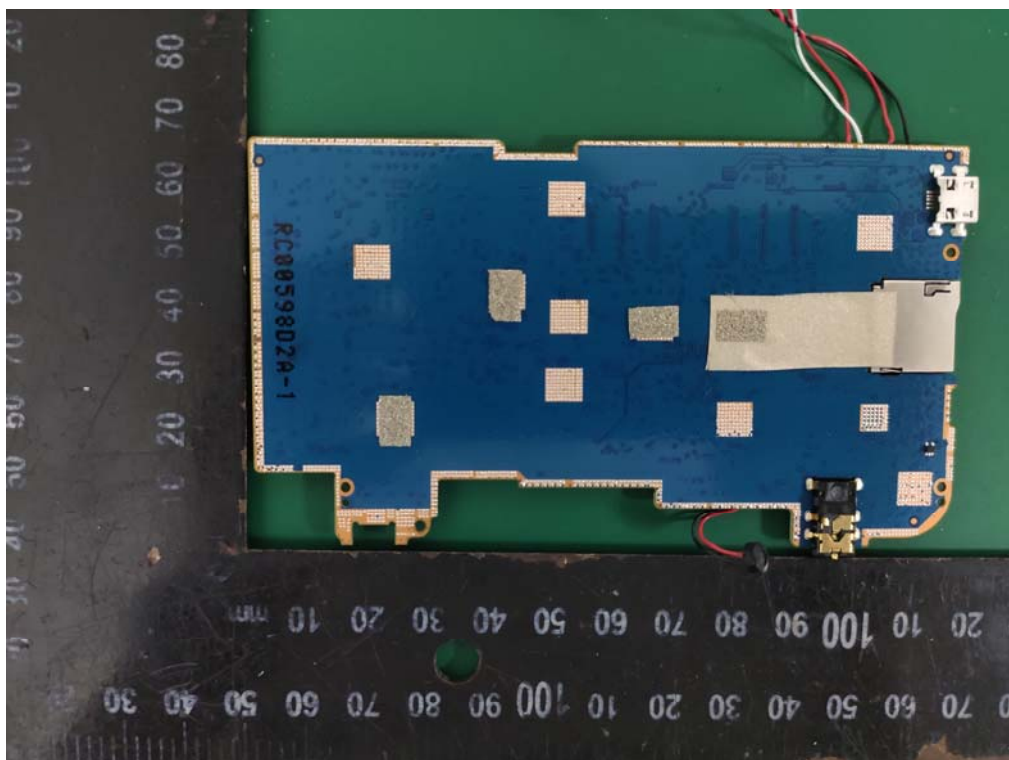
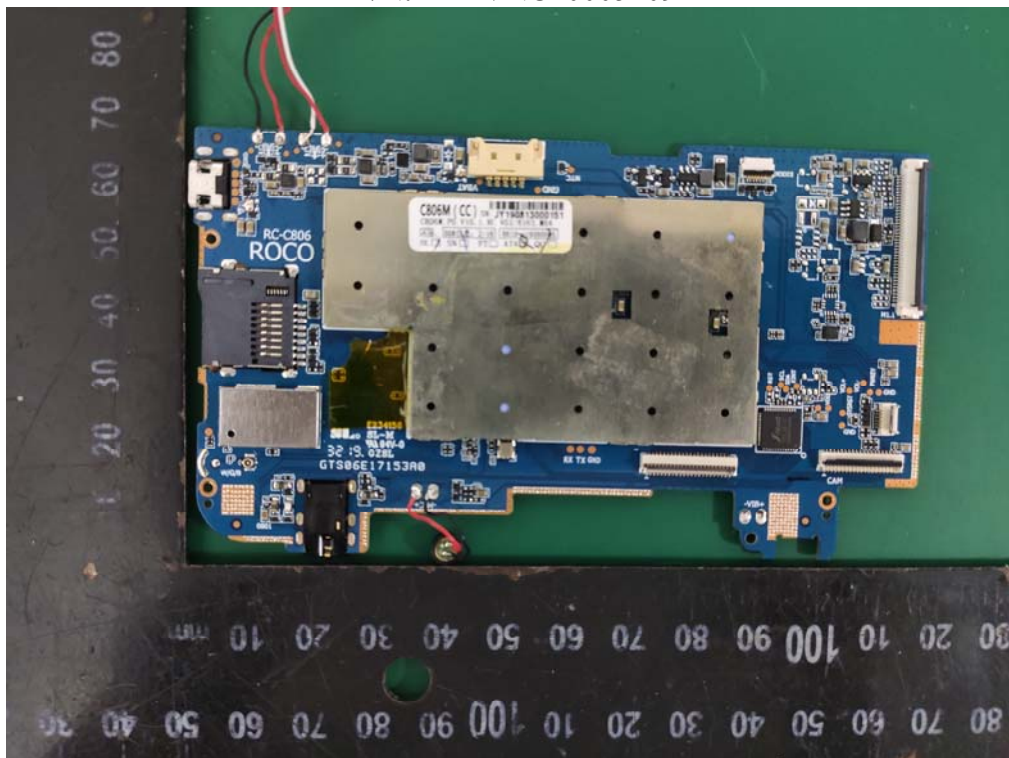
External Photos
M/N: TBBVNC10005209



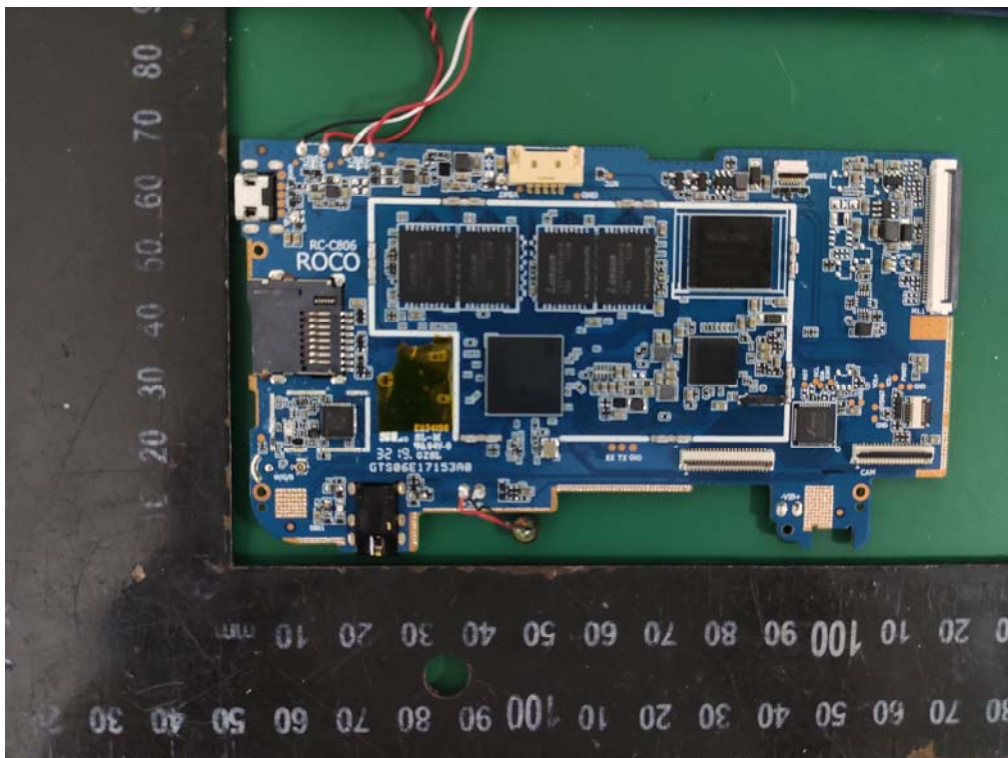
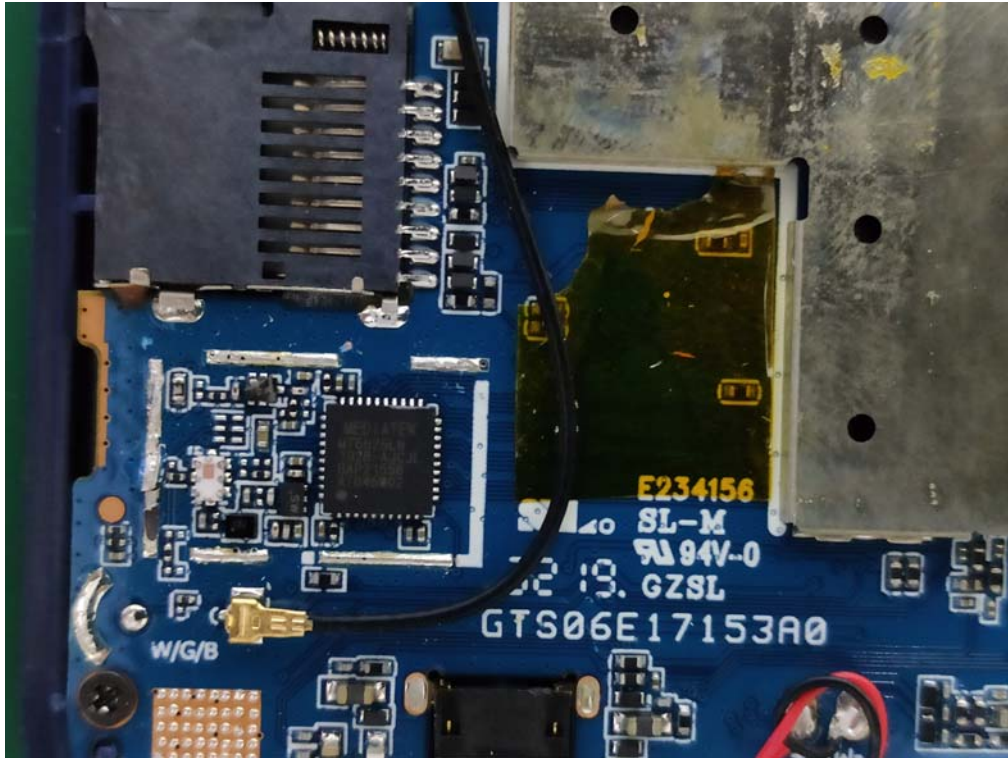
Internal Photos
M/N: TBBVNC10005209



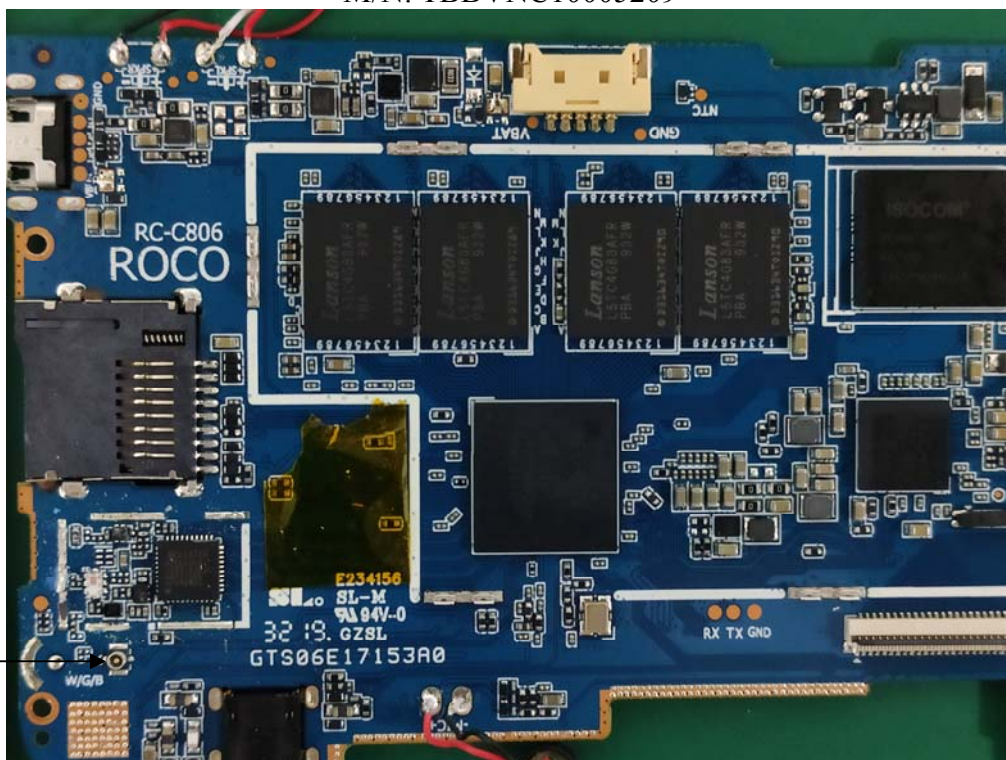
Internal Photos
M/N: TBBVNC10005209



Internal Photos
M/N: TBBVNC10005209



Internal Photos
M/N: TBBVNC10005209



RF
Antenna Port