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## FCC PART 15B REPORT

Report No: STS1502002E01

Issued for

DOPPIO MOBILE INTERNATIONAL LIMITED

1011A, 10/F., Harbour Centre Tower 1, No.1 Hok Cheung St.,  
Hung Hom, Kowloon, Hong Kong.

Product Name:	THUNDER PLUS
Brand Name:	doppio
Model No.:	DP5108
Series Model:	N/A
FCC ID:	N2GDP5108
Test Standard:	FCC Part 15B

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Shenzhen STS Test Services Co., Ltd.

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**Report Revise Record**

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Jan.30, 2015	Valid	Original Report





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## 1. VERIFICATION OF CONFORMITY

<b>Applicant</b>	DOPPIO MOBILE INTERNATIONAL LIMITED
<b>Address</b>	1011A, 10/F., Harbour Centre Tower 1, No.1 Hok Cheung St., Hung Hom, Kowloon, Hong Kong.
<b>Manufacturer</b>	DOPPIO MOBILE (SHENZHEN) LIMITED
<b>Address</b>	Room313, 3th Floor, Building 10 Jiale Building, NO.11 YanNan Road,Futian District, Shenzhen
<b>Product Designation</b>	THUNDER PLUS
<b>Brand Name</b>	doppio
<b>Test Model</b>	DP5108
<b>Measurement Procedure</b>	ANSI C63.4: 2003
<b>Date of test</b>	Jan.05, 2015 to Jan.30, 2015
<b>Deviation</b>	None
<b>Condition of Test Sample</b>	Normal
<b>Report Template</b>	STSRT-US-IT/AC

The above equipment was tested by Shenzhen STS Test Services Co., Ltd. for compliance with the requirements set forth in the FCC Rules and Regulations Part 15, the measurement procedure according to ANSI C63.4:2003. This said equipment in the configuration described in this report shows the maximum emission levels emanating from equipment are within the compliance requirements.

The test results of this report relate only to the tested sample identified in this report.

Testing Engineer :

(Jin Ming)

Report writing :

(Sunny zheng)

Authorized  
Signatory :

(Bovey Yang)





## 2. SYSTEM DESCRIPTION

### EUT test procedure:

1. Connect EUT and peripheral devices (PC) through USB port.
2. Power on the EUT, use the software to transfer data between EUT and PC.
3. Make sure the EUT operates normally during the test.

### Test Mode

TEST MODE DESCRIPTION		
NO.	TEST MODE DESCRIPTION	WORST
1	USB (connection for data transferring)	V
Note: 1.V means EMI worst mode 2 .Other modes have been verified through VOC mode.		

## 3. MEASUREMENT UNCERTAINTY

The uncertainty is calculated using the methods suggested in the “Guide to the Expression of Uncertainty in Measurement” (GUM) published by ISO.

Conducted measurement: +/- 2.75dB

Radiated measurement: +/- 3.2Db

### Summary Of Test Results

FCC Rules	Description Of Test	Result
§15.107	Conduction Emission	Compliant
§15.109	Radiated Emission	Compliant



#### 4. PRODUCT INFORMATION

Housing Type	Plastic
EUT Input Rating	DC 3.7V by battery
Adapter Input	AC 100-240V 50/60Hz, 0.2A
Adapter Output	DC5V/1A

I/O Port Information (☒Applicable ☐Not Applicable)

I/O Port of EUT			
I/O Port Type	Q'TY	Cable	Tested with
USB Port	1	1.0 m, unshielded	1
Earphone Port	1	1.0 m, unshielded	1





## 5. SUPPORT EQUIPMENT

Device Type	Manufacturer	Model Name	Serial No.	Data Cable	Power Cable
MacBook	Apple	A1465	--	1	1.5m unshielded

**Note:** All the above equipment/cables were placed in worse case positions to maximize emission signals during emission test.





## 6. TEST FACILITY

<b>Site</b>	Shenzhen STS Test Services Co., Ltd.
<b>Location</b>	1/F, Building 2, Zhuoke Science Park, Chongqing Road, Fuyong, Baoan District, Shenzhen, China
<b>Description</b>	The test site is constructed and calibrated to meet the FCC requirements in documents ANSI C63.4:2003.
<b>Site Filing</b>	FCC Registration No.: 842334
<b>Instrument Tolerance</b>	All measuring equipment is in accord with ANSI C63.4 requirements that meet industry regulatory agency and accreditation agency requirement.

### ALL TEST EQUIPMENT LIST

#### Radiation Test equipment

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last Calibration	Calibrated Until
Universal Radio Communication Tester	R&S	CMU200	112012	2014.10.25	2015.10.24
Bilog Antenna	TESEQ	CBL6111D	34678	2014.10.25	2015.10.24
Test Cable	N/A	R-01	N/A	2014.10.25	2015.10.24
Test Cable	N/A	R-02	N/A	2014.10.25	2015.10.24
EMI Test Receiver	R&S	ESCI	101427	2014.10.25	2015.10.24
Antenna Mast	EM	SC100_1	N/A	N/A	N/A
Turn Table	EM	SC100	060531	N/A	N/A
50Ω Switch	Anritsu Corp	MP59B	6200983705	2014.07.06	2015.07.05
Spectrum Analyzer	Aglient	E4407B	MY50140340	2014.10.25	2015.10.24
Horn Antenna	Schwarbeck	BBHA 9120D	9120D-963	2014.10.25	2015.10.24
Pre-Amplifier	DASY 5	NO. WL-42W	9638	2014.10.25	2015.10.24

#### Conduction Test equipment

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last Calibration	Calibrated Until
EMI Test Receiver	R&S	ESPI	102086	2014.10.25	2015.10.24
LISN	R&S	ENV216	101242	2014.10.25	2015.10.24
LISN	EMCO	3810/2NM	000-23625	2014.10.25	2015.10.24
Absorbing clamp	R&S	MDS-21	100668	2014.10.27	2015.10.26
Temperature & Humidity Chamber	Mieo	HH660	N/A	2014.10.27	2015.10.26
Conduction Cable	EM	C01	N/A	2014.10.25	2015.10.24
Clamp Cable	EM	C02	N/A	2014.10.25	2015.10.24



## 7. FCCLINE CONDUCTED EMISSION TEST

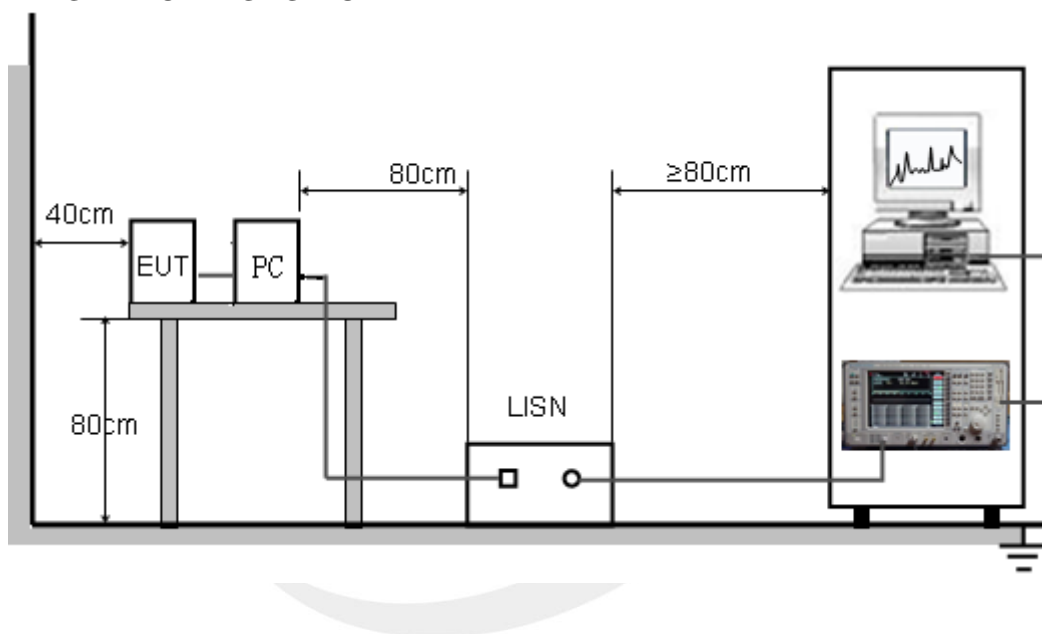
### 7.1. LIMITS OF LINE CONDUCTED EMISSION TEST

Frequency	Maximum RF Line Voltage	
	Q.P.( dBuV)	Average( dBuV)
150kHz-500kHz	66-56	56-46
500kHz-5MHz	56	46
5MHz-30MHz	60	50

**Note:**

1. The lower limit shall apply at the transition frequency.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50MHz.

### 7.2. BLOCK DIAGRAM OF TEST SETUP





### 7.3. PROCEDURE OF LINE CONDUCTED EMISSION TEST

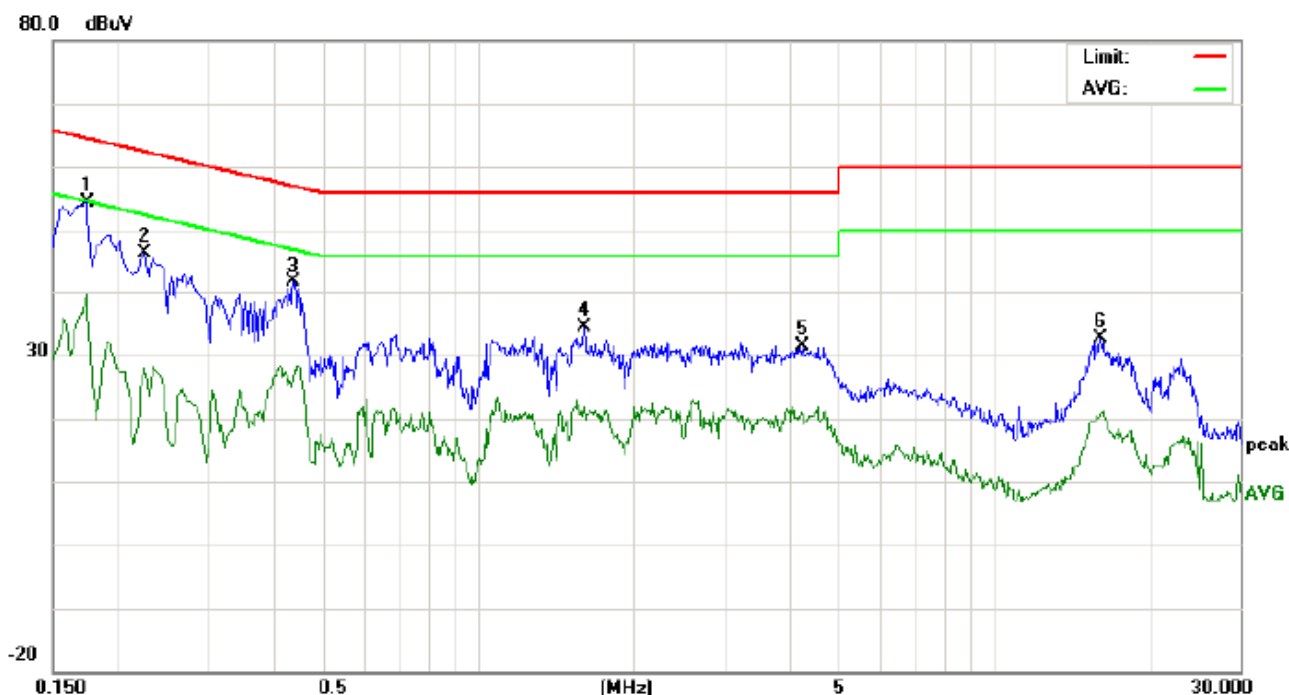
- (1) The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.4 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
- (2) Support equipment, if needed, was placed as per ANSI C63.4.
- (3) All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.
- (4) The EUT received DC5V power from PC with receive AC120V/60Hz power from a LISN.
- (5) The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
- (6) Analyzer / Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.
- (7) During the above scans, the emissions were maximized by cable manipulation.
- (8) A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions.
- (9) Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less -2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.

The test data of the worst case condition (mode 1) was reported on the Summary Data page.



## 7.4. TEST RESULT OF LINE CONDUCTED EMISSION TEST

## LINE CONDUCTED EMISSION TEST-L



Site: Conduction

Phase: L1

Temperature: 26

Limit: FCC Class B Conduction(QP)

Power: AC 120V/60Hz

Humidity: 60 %

EUT: THUNDER PLUS

M/N: DP5108

Mode: USB

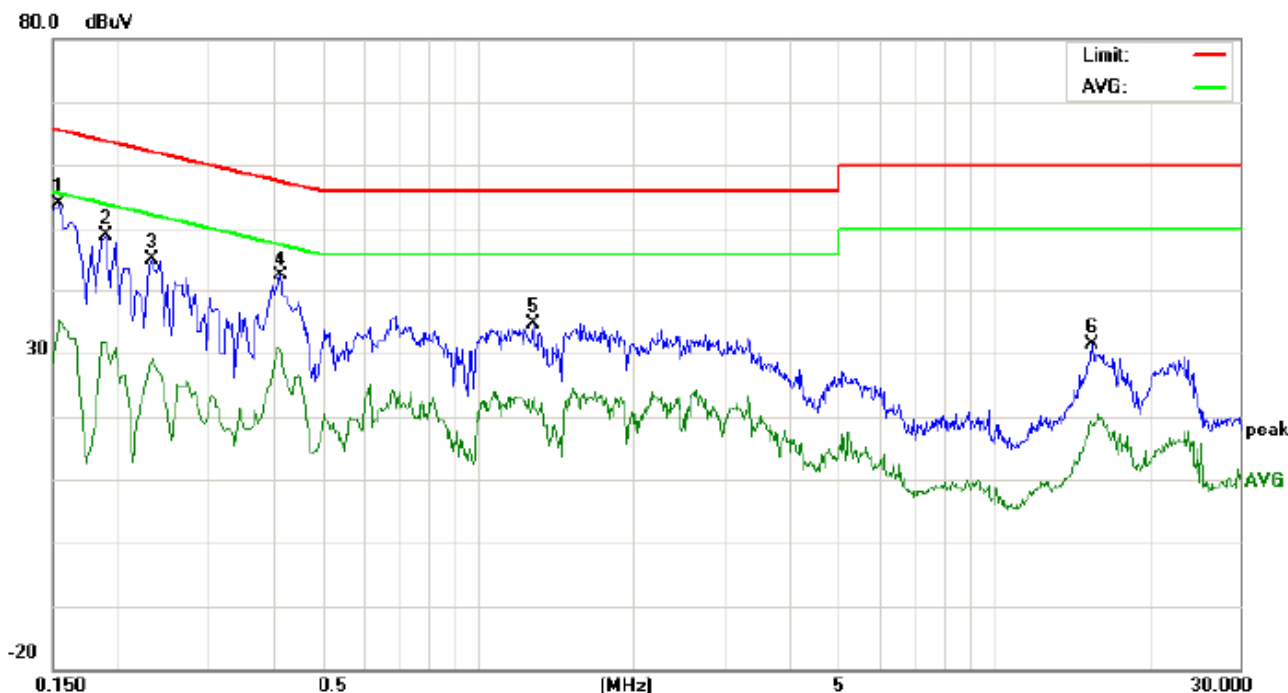
Note:

No.	Freq. (MHz)	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV)			Limit (dBuV)		Margin (dB)		P/F	Comment
		Peak	QP	AVG		Peak	QP	AVG	QP	AVG	QP	AVG		
1	0.1740	44.31		29.36	10.19	54.50		39.55	64.76	54.76	-10.26	-15.21	P	
2	0.2260	36.10		17.52	10.24	46.34		27.76	62.59	52.59	-16.25	-24.83	P	
3	0.4380	31.29		15.77	10.36	41.65		26.13	57.10	47.10	-15.45	-20.97	P	
4	1.6019	23.93		11.59	10.35	34.28		21.94	56.00	46.00	-21.72	-24.06	P	
5	4.2500	21.06		10.29	10.32	31.38		20.61	56.00	46.00	-24.62	-25.39	P	
6	16.1100	22.49		10.36	10.11	32.60		20.47	60.00	50.00	-27.40	-29.53	P	

RESULT: PASS



## LINE CONDUCTED EMISSION TEST-N



Site: Conduction

Phase: **N**

Temperature: 26

Limit: FCC Class B Conduction(QP)

Power: AC 120V/60Hz

Humidity: 60 %

EUT: THUNDER PLUS

M/N: DP5108

Mode: USB

Note:

No.	Freq. (MHz)	Reading_Level (dBuV)			Correct Factor dB	Measurement (dBuV)			Limit (dBuV)		Margin (dB)		P/F	Comment
		Peak	QP	AVG		Peak	QP	AVG	QP	AVG	QP	AVG		
1	0.1539	43.62		24.95	10.16	53.78		35.11	65.78	55.78	-12.00	-20.67	P	
2	0.1900	38.70		21.51	10.20	48.90		31.71	64.03	54.03	-15.13	-22.32	P	
3	0.2340	34.95		18.96	10.25	45.20		29.21	62.30	52.30	-17.10	-23.09	P	
4	0.4140	32.10		20.23	10.34	42.44		30.57	57.57	47.57	-15.13	-17.00	P	
5	1.2820	24.31		12.74	10.38	34.69		23.12	56.00	46.00	-21.31	-22.88	P	
6	15.5020	21.35		8.45	10.11	31.46		18.56	60.00	50.00	-28.54	-31.44	P	

**RESULT: PASS**



## 8. FCC RADIATED EMISSION TEST

### 8.1. LIMITS OF RADIATED EMISSION TEST

#### LIMITS OF RADIATED EMISSION MEASUREMENT (Frequency Range 9kHz-1000MHz)

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

#### LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

FREQUENCY (MHz)	Class B (dBuV/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	74	54

#### Notes:

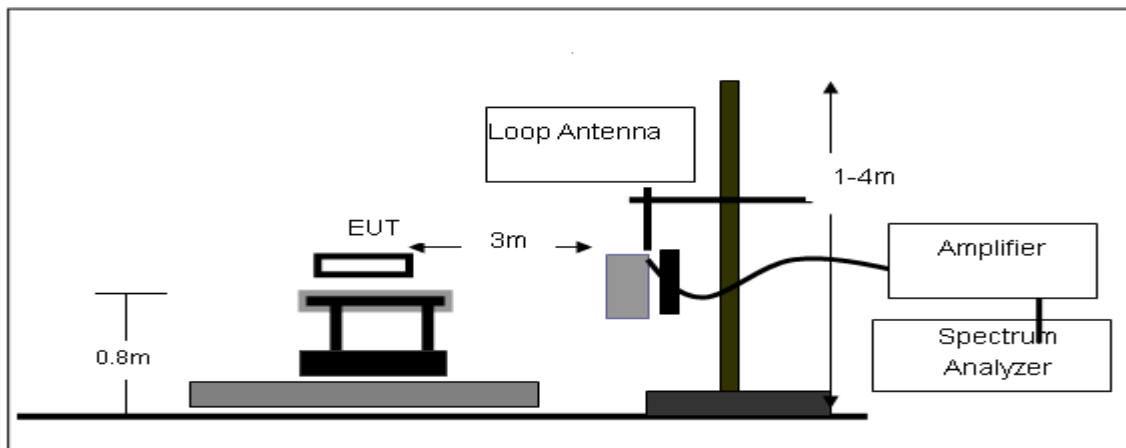
- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

Spectrum Parameter	Setting
Attenuation	Auto
Detector	Peak
Start Frequency	1000 MHz(Peak/AV)
Stop Frequency	10th carrier harmonic(Peak/AV)
RB / VB (emission in restricted band)	1 MHz / 1 MHz, AV=1 MHz / 10Hz

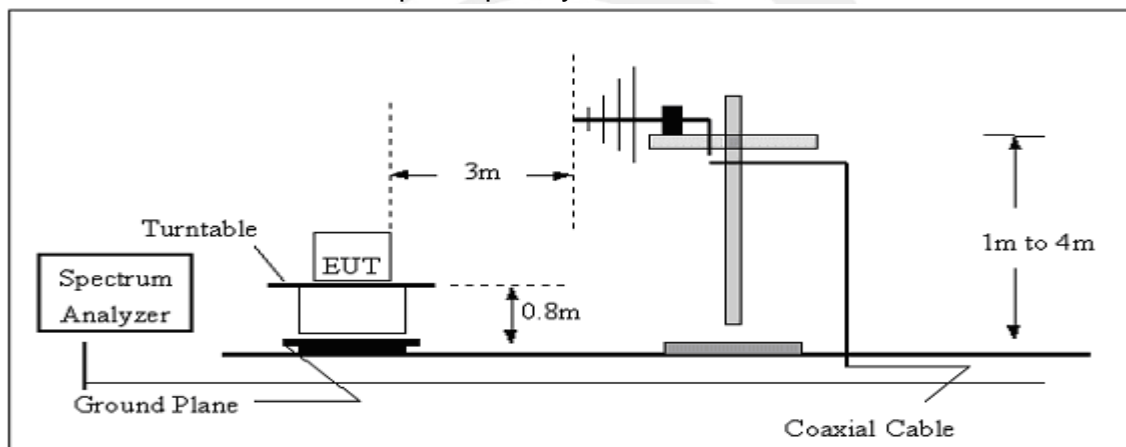
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

## 8.2. BLOCK DIAGRAM OF TEST SETUP

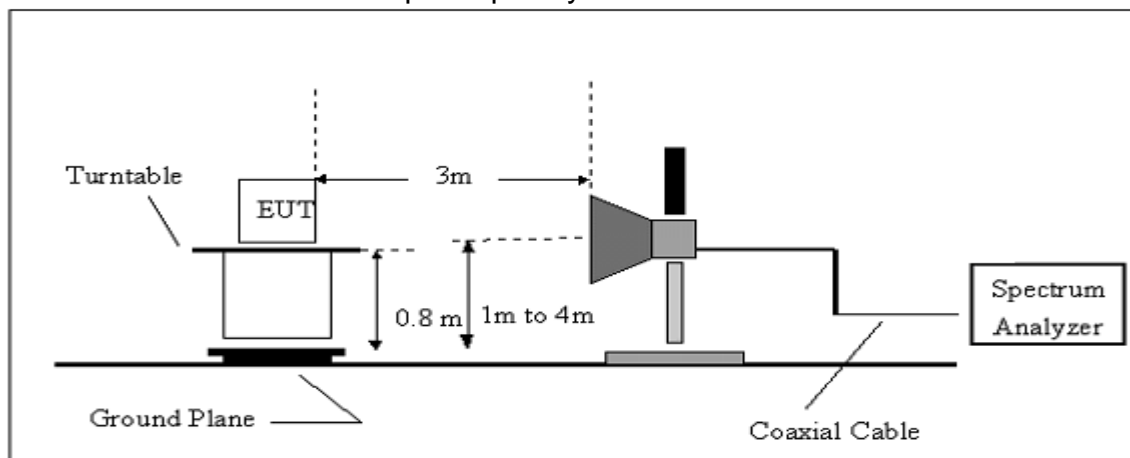
### (A) Radiated Emission Test-Up Frequency Below 30MHz



### (B) Radiated Emission Test-Up Frequency 30MHz~1GHz



### (C) Radiated Emission Test-Up Frequency Above 1GHz





Between 9KHz – 30 MHz)

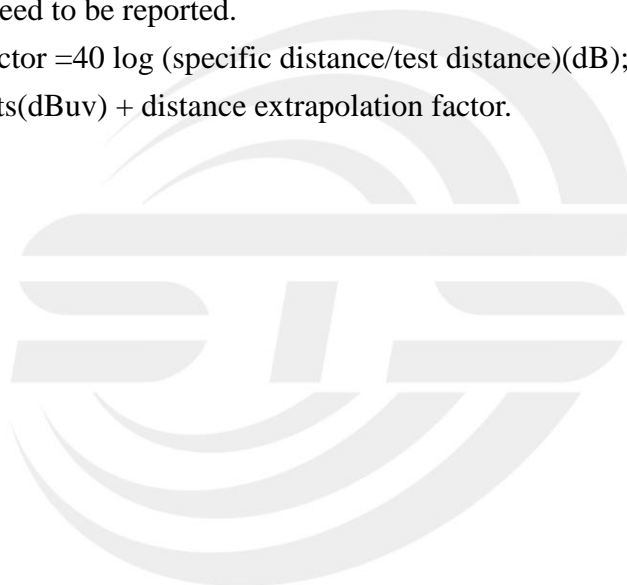
Freq.	Reading	Limit	Margin	State
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F
--	--	--	--	PASS
--	--	--	--	PASS

**Note:**

The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor =  $40 \log (\text{specific distance/test distance})$ (dB);

Limit line = specific limits(dBuV) + distance extrapolation factor.





### 8.3. PROCEDURE OF RADIATED EMISSION TEST

- (1) The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden turntable with a height of 0.8 meters is used which is placed on the ground plane as per ANSI C63.4 (see Test Facility for the dimensions of the ground plane used). When the EUT is floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
- (2) Support equipment, if needed, was placed as per ANSI C63.4.
- (3) All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.
- (4) The EUT received DC 5V power from PC with receive AC120V/60Hz power from socket under the turntable through a LISN.
- (5) The antenna was placed at 3 meter away from the EUT as stated in FCC Part 15. The antenna connected to the Analyzer via a cable and at times a pre-amplifier would be used.
- (6) The Analyzer / Receiver quickly scanned from 30MHz to 1000MHz. The EUT test program was started. Emissions were scanned and measured rotating the EUT to 360 degrees and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.
- (7) The test mode(s) were scanned during the test:
- (8) Recorded at least the six highest emissions. Emission frequency, amplitude, antenna position, polarization and turntable position were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit and Q.P./Peak reading is presented.

The test data of the worst case condition (mode 1) was reported on the Summary Data page.





#### 8.4. TEST RESULT OF RADIATED EMISSION TEST

##### Radiated Emission Test at 3m Distance-Horizontal



Site: site #1

Limit: FCC Class B 3M Radiation

EUT: THUNDER PLUS

M/N: DP5108

Mode: USB

Note:

Polarization: **Horizontal**

Power: AC 120V/60Hz

Distance: 3m

Temperature: 26

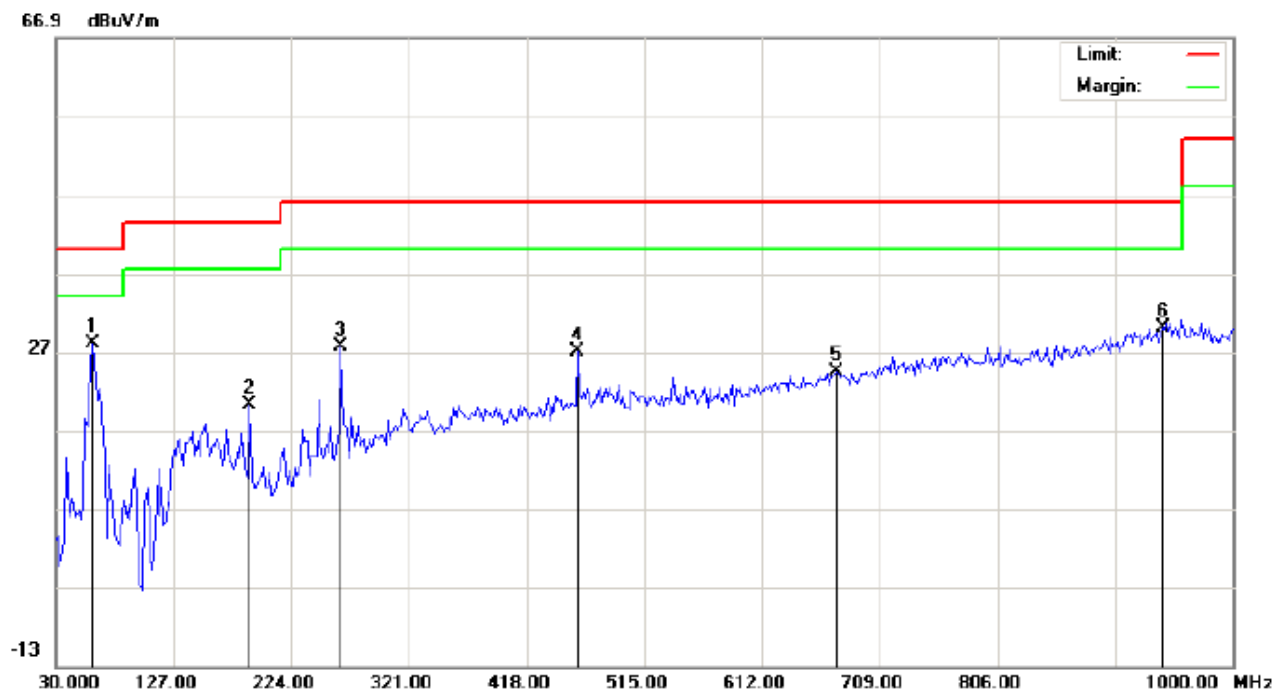
Humidity: 60 %

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1	*	59.1000	23.40	11.16	34.56	40.00	-5.44	peak			
2		96.2833	15.06	10.07	25.13	43.50	-18.37	peak			
3		232.0833	18.43	13.22	31.65	46.00	-14.35	peak			
4		333.9333	12.15	17.67	29.82	46.00	-16.18	peak			
5		460.0333	5.41	20.70	26.11	46.00	-19.89	peak			
6		736.4833	0.71	26.24	26.95	46.00	-19.05	peak			

**RESULT: PASS**



## Radiated Emission Test at 3m Distance-Vertical



Site: site #1  
Limit: FCC Class B 3M Radiation  
EUT: THUNDER PLUS  
M/N: DP5108  
Mode: USB  
Note:

Polarization: **Vertical**  
Power: AC 120V/60Hz  
Distance: 3m

Temperature: 26  
Humidity: 60 %

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1	*	60.7167	20.07	7.87	27.94	40.00	-12.06	peak			
2		190.0500	8.65	11.52	20.17	43.50	-23.33	peak			
3		264.4167	13.33	14.34	27.67	46.00	-18.33	peak			
4		460.0333	6.36	20.70	27.06	46.00	-18.94	peak			
5		673.4333	0.02	24.48	24.50	46.00	-21.50	peak			
6		941.8000	0.30	29.77	30.07	46.00	-15.93	peak			

**RESULT: PASS**

Note: All Other modes above 1GHz have more than 20db margin, no recording in the report

Measurement = Reading + Factor, Over = Measurement – Limit.



## Above 1GHz

The worst test data above 1 GHz was showed as thefollow:

Freq.	Ant. Pol	Peak	AV	Ant./CL	Actual Fs		Peak	AV	Peak	AV
(MHz)	H/V	Reading	Reading	CF			Limit	Limit	margin	margin
		(dBuV)	(dBuV)	(dB)	Peak	AV	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)
					(dBuV/m)	(dBuV/m)				
1097.22	H	57.33	41.32	5.15	62.48	46.47	74	54	-11.52	-7.53
2866.4	H	52.43	38.24	9.45	61.88	47.69	74	54	-12.12	-6.31
N/A										
1069.22	V	52.14	37.55	5.15	57.29	42.7	74	54	-16.71	-11.3
2896.40	V	49.32	32.14	9.45	58.77	41.59	74	54	-15.23	-12.41
N/A										

## Notes:

1. Measuring frequencies from 1 GHz to 6GHz.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode of the emission shown in Actual FS column.
3. The frequency that above 3GHz is mainly from the environment noise.

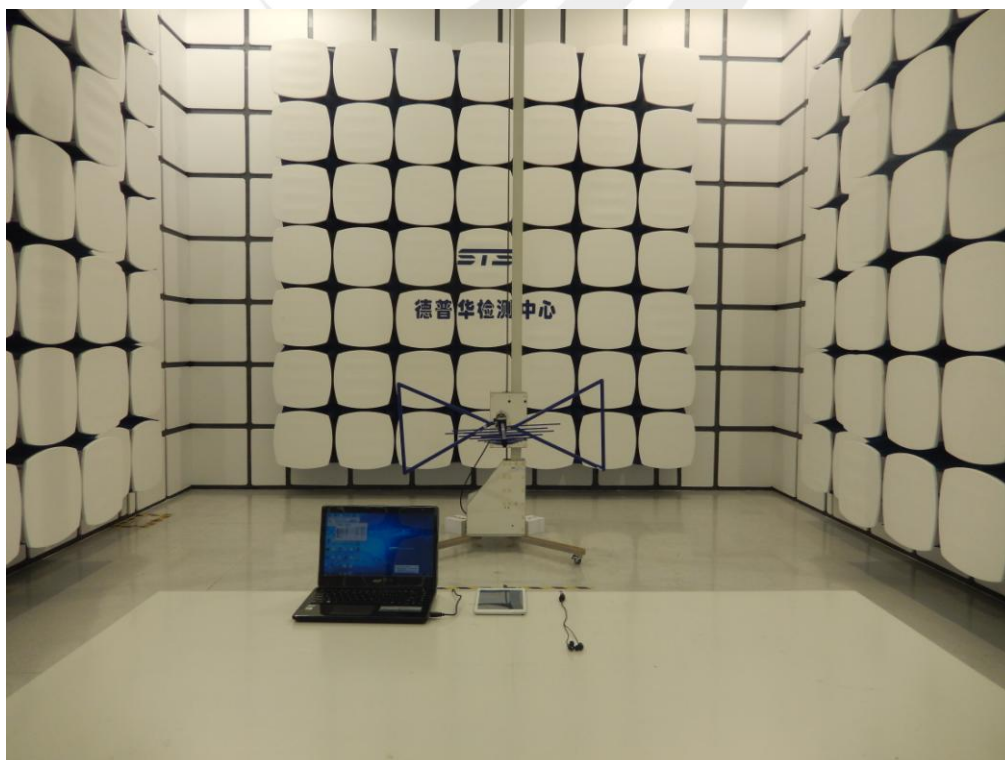
## APPENDIX A: PHOTOGRAPHS OF TEST SETUP

### FCC LINE CONDUCTED EMISSION TEST SETUP



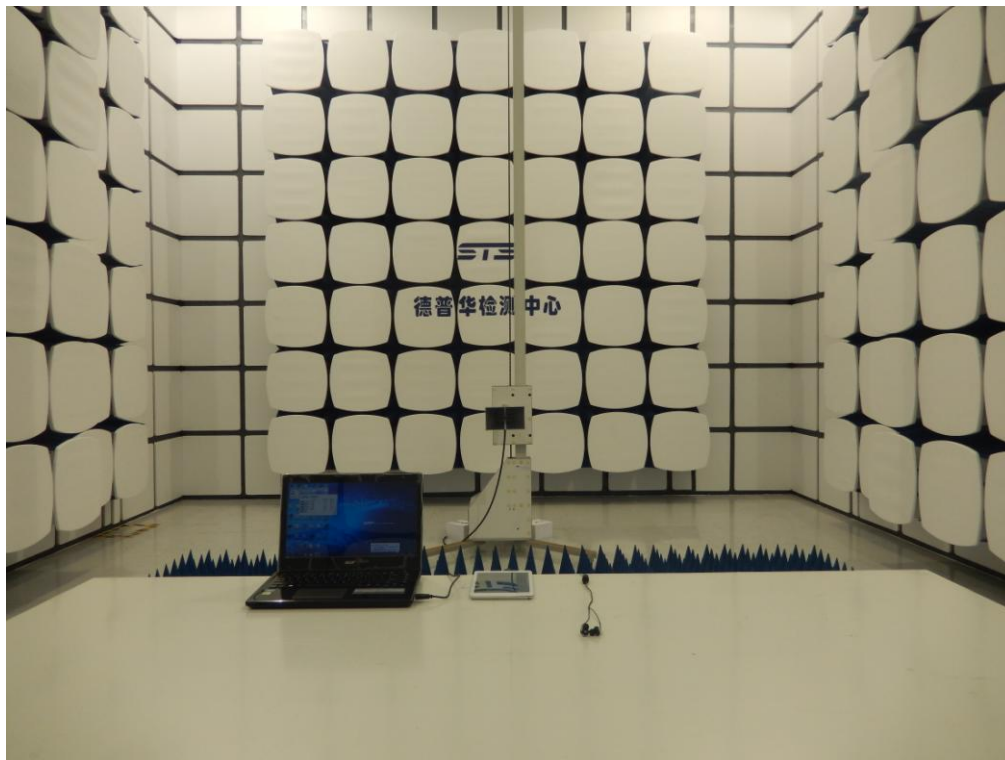
### FCC RADIATED EMISSION TEST SETUP

radiation L

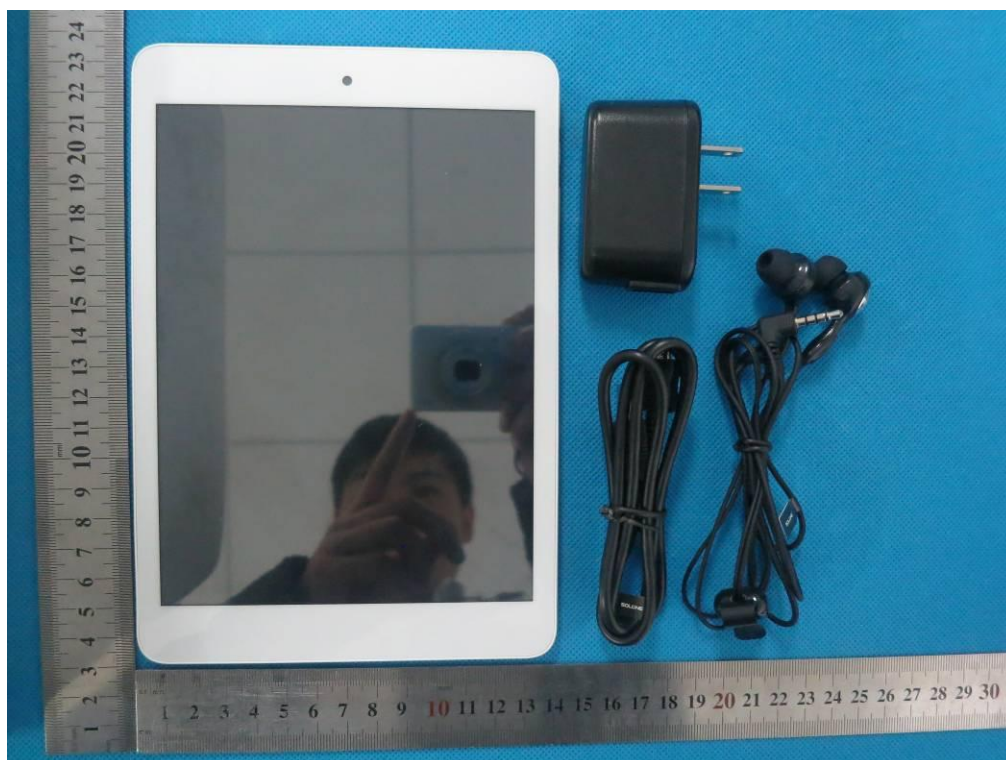




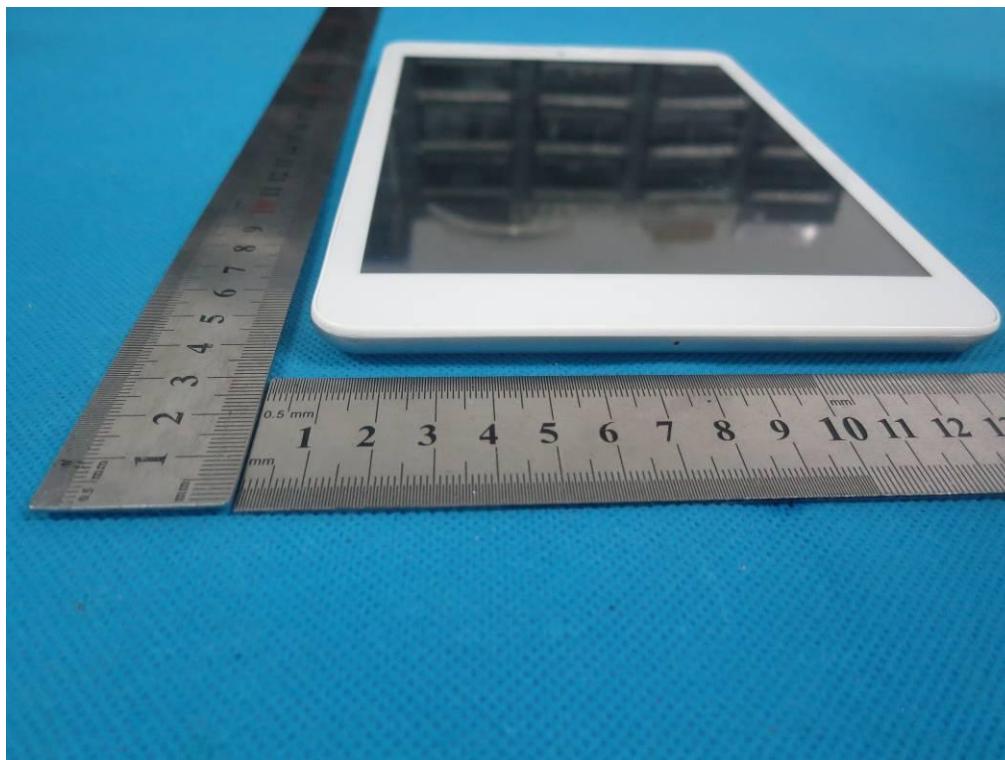
Adiation H





**APPENDIX B: PHOTOGRAPHS OF EUT****TOTAL VIEW OF EUT****TOP VIEW OF EUT**

BOTTOM VIEW OF EUT



FRONT VIEW OF EUT





BACK VIEW OF EUT

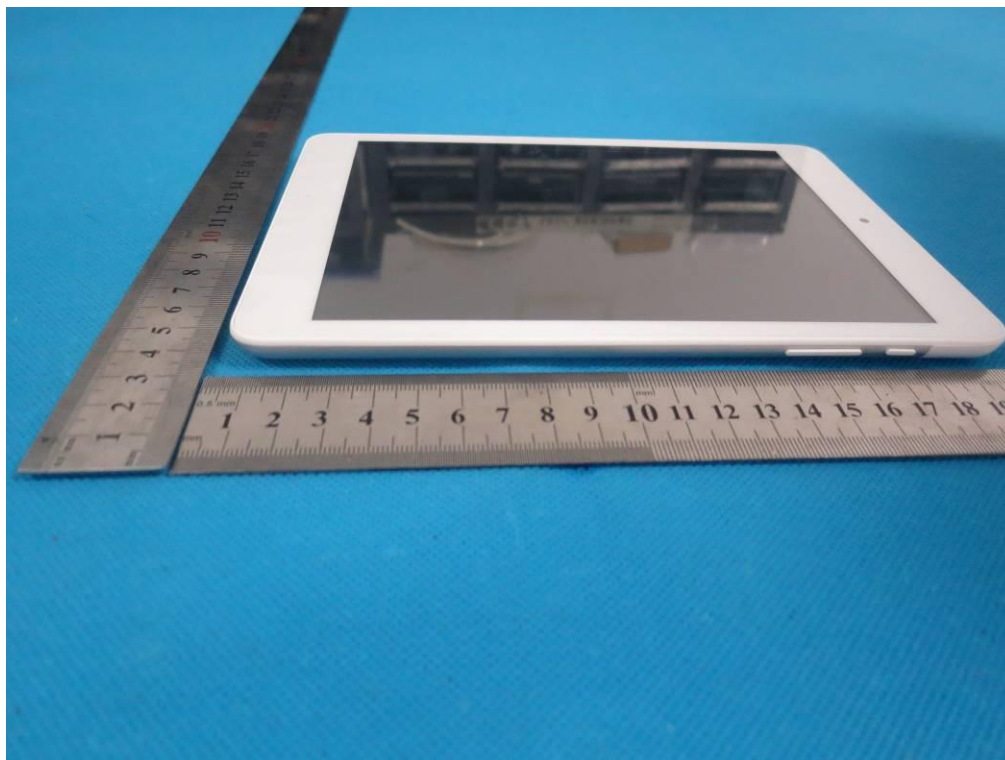


LEFT VIEW OF EUT



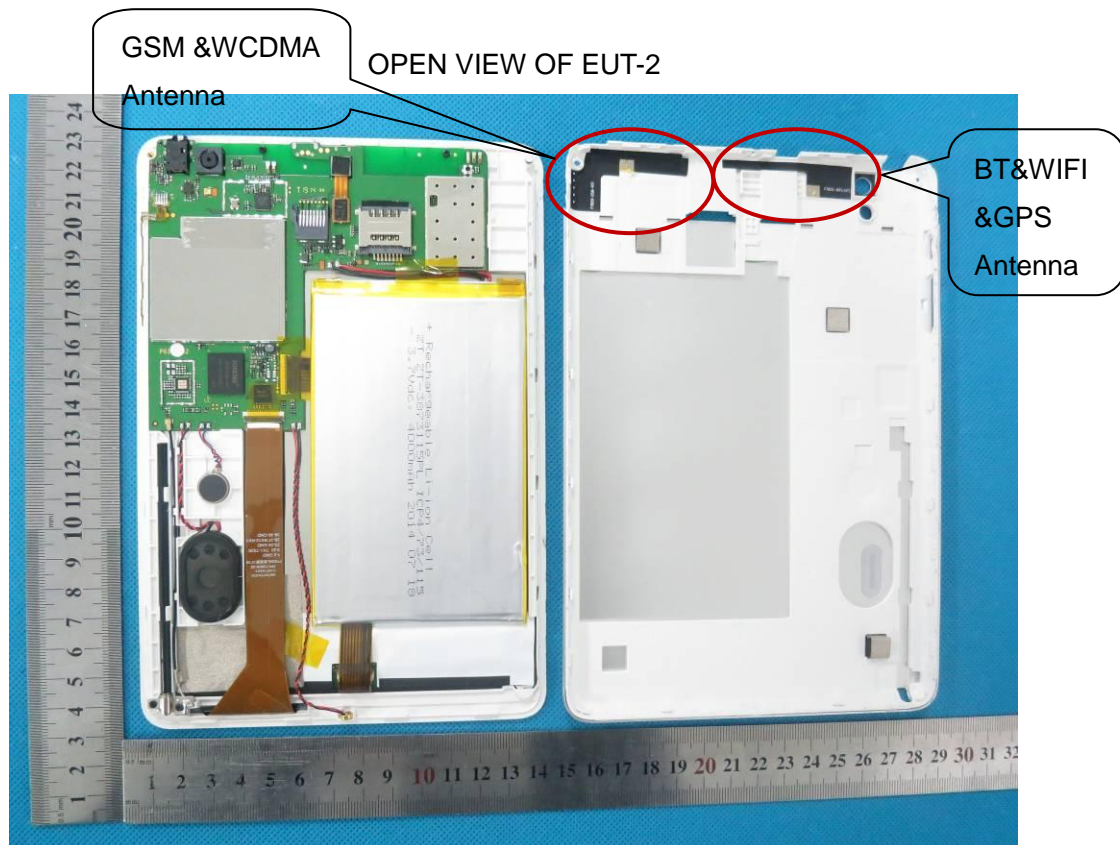


RIGHT VIEW OF EUT

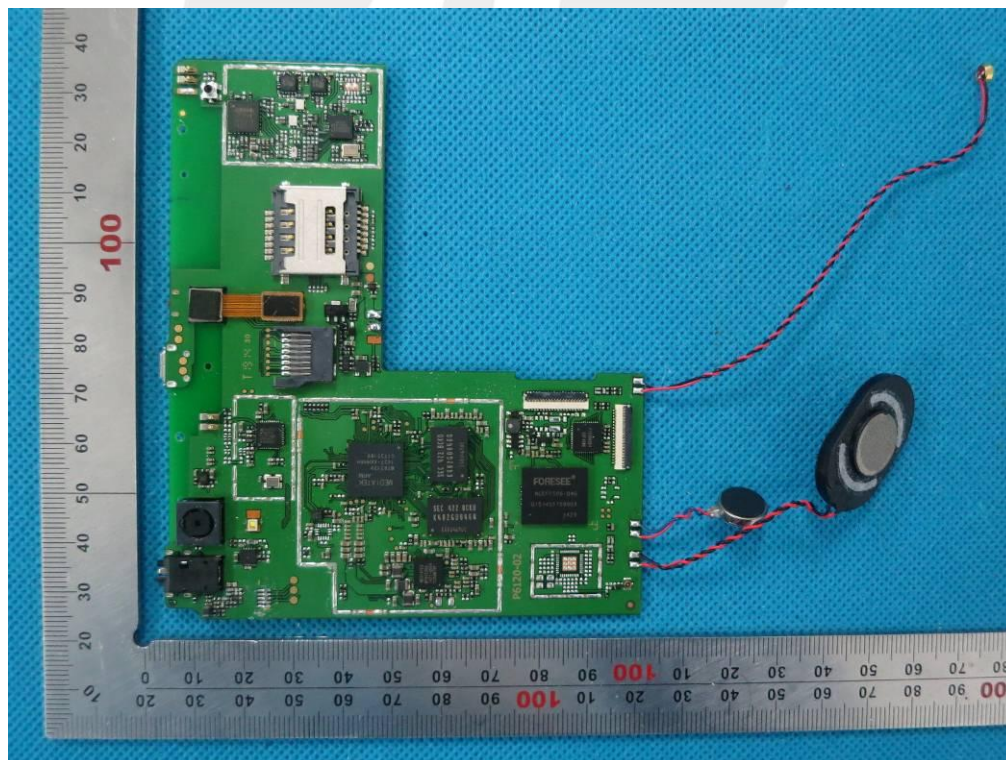


OPEN VIEW OF EUT-1



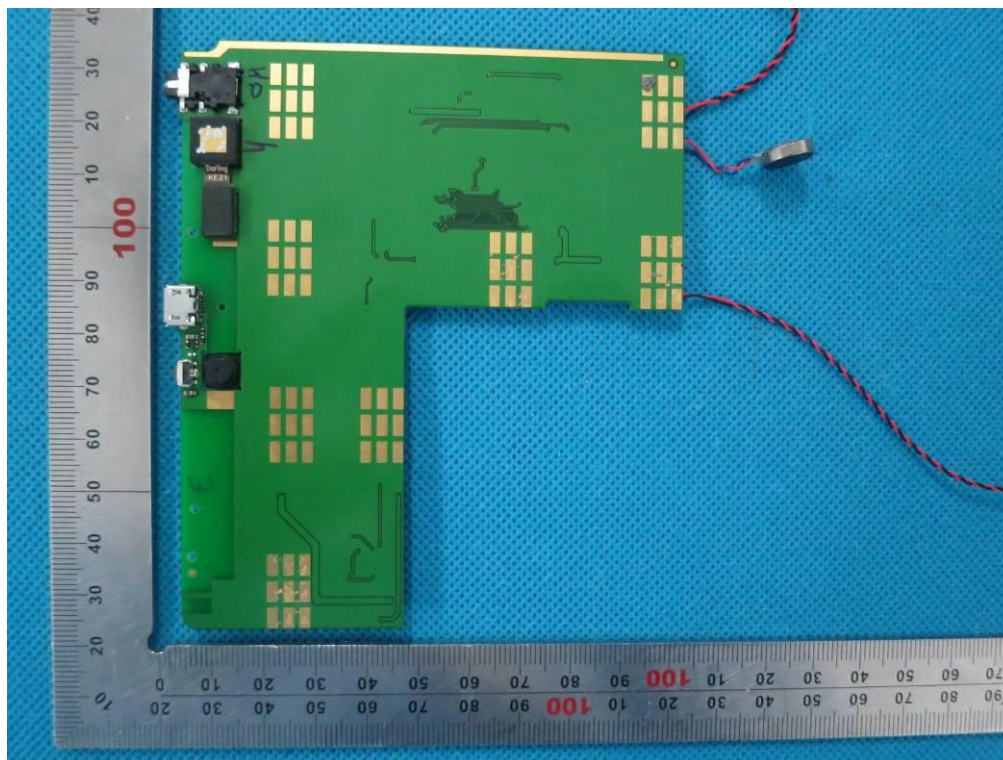


INTERNAL VIEW OF EUT-1





## INTERNAL VIEW OF EUT-2



-----END OF REPORT-----

