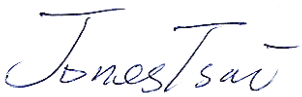
FCC RF Test Report

APPLICANT	:	**TCT Mobile Limited**
EQUIPMENT	:	**Tablet PC**
BRAND NAME	:	**ALCATEL** **one touch**
MODEL NAME	:	**ONE TOUCH EVO 7HD / ONE TOUCH E710** **(Module: one touch M800O)**
FCC ID	:	**RAD456**
STANDARD	:	**FCC Part 15 Subpart C §15.247**
CLASSIFICATION	:	**(DSS) Spread Spectrum Transmitter**

The product was integrated the WWAN Module (Brand Name: ALCATEL/one touch / Model Name: one touch M800O, FCC ID: RAD382) during the test.
The product was received on Jun. 13, 2013 and testing was completed on Oct. 29, 2013. We, SPORTON INTERNATIONAL (SHENZHEN) INC., would like to declare that the tested sample has been evaluated in accordance with the procedures and shown to be compliant with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL (SHENZHEN) INC., the test report shall not be reproduced except in full.

Reviewed by: Joseph Lin / Supervisor



Approved by: Jones Tsai / Manager

SPORTON INTERNATIONAL (SHENZHEN) INC.
No. 3 Building, the third floor of south, Shahe River west, Fengzeyuan warehouse, Nanshan District, Shenzhen, Guangdong, P.R.C.

TABLE OF CONTENTS

REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR361311-01A	Rev. 01	This is report for ONE TOUCH EVO 7HD / ONE TOUCH E710 (Module: one touch M800O). The product equality declaration could be referred to Appendix B. All test cases were performed on original report which can be referred to SPORTON Report Number FR342211A (FCC ID: RAD381). Based on the original test report, only the worst case of Radiated Spurious Emission was verified.	Dec. 02, 2013

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.247(d)	Radiated Band Edges and Radiated Spurious Emission	15.209(a) & 15.247(d)	Pass	Under limit 12.65 dB at 31.940 MHz

1 General Description

1.1 Applicant

TCT Mobile Limited

5F, C building, No. 232, Liang Jing Road, ZhangJiang High-Tech Park, Pudong Area Shanghai, P.R. China. 201203

1.2 Manufacturer

TCL COMMUNICATION TECHNOLOGY HOLDINGS LIMITED

70 Huifeng 4rd., ZhongKai Hi-tech Development District, Huizhou, Guangdong 516006 P.R.China (TCL Mobile Communication Co., LTD. Huizhou)

1.3 Feature of Equipment Under Test

Product Feature	
Equipment	Tablet PC
Brand Name	ALCATEL one touch
Model Name	ONE TOUCH EVO 7HD / ONE TOUCH E710 (Module: one touch M800O)
FCC ID	RAD456
EUT supports Radios application	GPRS/EGPRS/WCDMA/HSPA/HSPA+/DC-HSDPA/LTE/ WLAN2.4GHz 802.11bgn Bluetooth v3.0+EDR
HW Version	JUPITER_MAIN_V6.0
SW Version	UPDATA_111_104
EUT Stage	Production Unit

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.4 Product Specification of Equipment Under Test

Product Specification subjective to this standard	
Tx/Rx Frequency Range	2402 MHz ~ 2480 MHz
Number of Channels	79
Carrier Frequency of Each Channel	2402+n*1 MHz; n=0~78
Antenna Type	PIFA Antenna type
Type of Modulation	Bluetooth BR (1Mbps) : GFSK Bluetooth EDR (2Mbps) : π/4-DQPSK Bluetooth EDR (3Mbps) : 8-DPSK

1.5 Modification of EUT

No modifications are made to the EUT during all test items.

1.6 Testing Site

Test Site	SPORTON INTERNATIONAL (SHENZHEN) INC.	
Test Site Location	No. 3 Building, the third floor of south, Shahe River west, Fengzeyuan warehouse, Nanshan District, Shenzhen, Guangdong, P.R.C. TEL: +86-755- 3320-2398	
Test Site No.	**Sporton Site No.**	**FCC Registration No.**
	03CH01-SZ	831040

Note: The test site complies with ANSI C63.4 2003 requirement.

1.7 Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- FCC Part 15 Subpart C §15.247
- FCC Public Notice DA 00-705
- ANSI C63.4-2003

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

2 Test Configuration of Equipment Under Test

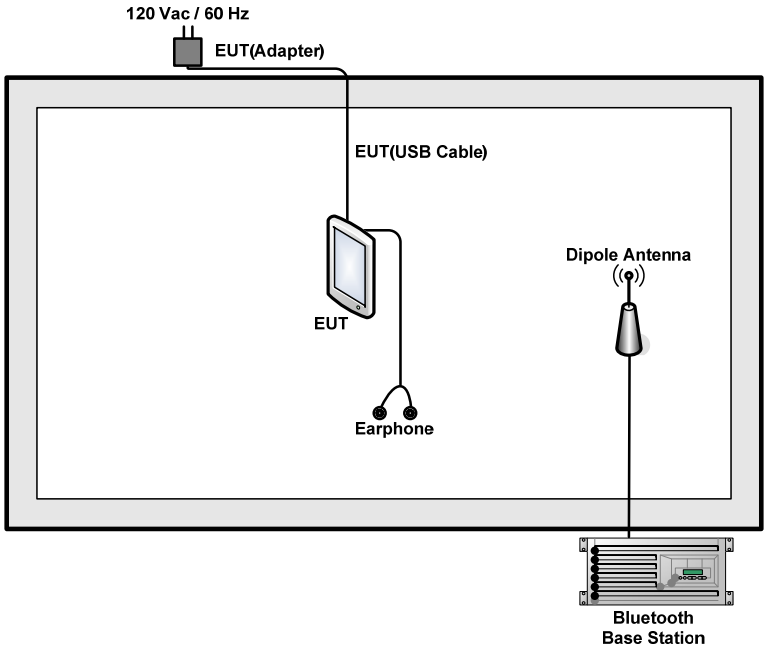
2.1 Test Mode

The following summary table is showing all test modes to demonstrate in compliance with the standard.

Summary table of Test Cases			
Test Item	Data Rate / Modulation		
	Bluetooth BR 1Mbps GFSK	Bluetooth EDR 2Mbps π/4-DQPSK	Bluetooth EDR 3Mbps 8-DPSK
Radiated Test Cases	Bluetooth BR 1Mbps GFSK		
	Mode 1: CH78_2480 MHz		
Remark: For Radiated Test Cases, The tests were performance with Adapter.			

2.2 Connection Diagram of Test System

<Bluetooth Tx Mode>



2.3 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Bluetooth Base Station	R&S	CBT	N/A	N/A	Unshielded, 1.8 m
2.	Earphone	Lenovo	SH100	N/A	N/A	N/A

2.4 EUT Operation Test Setup

For Bluetooth function, the engineering test program was provided and enabled to make EUT connect with Bluetooth base station to continuous transmit/receive.

3 Test Result

3.1 Radiated Band Edges and Spurious Emission Measurement

3.1.1 Limit of Radiated Band Edges and Spurious Emission

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. In addition, radiated emissions which fall in the restricted bands must also comply with the FCC section 15.209 limits as below.

Frequency (MHz)	Field Strength (microvolts/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

3.1.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

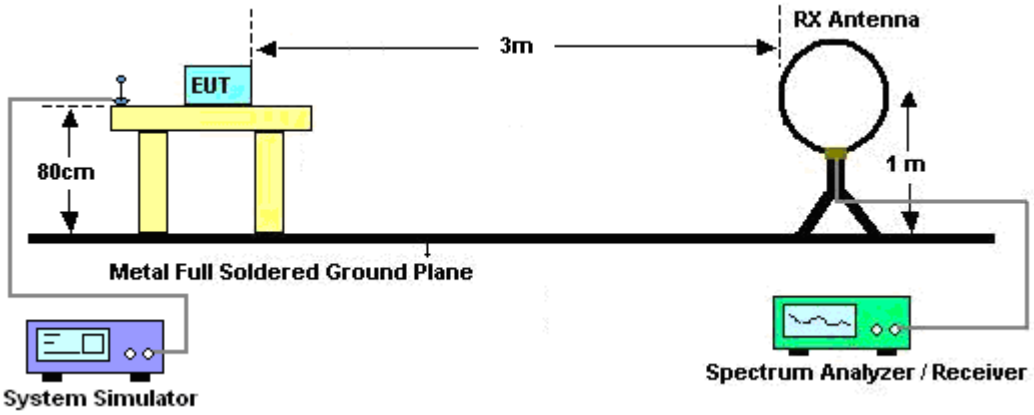
3.1.3 Test Procedures

1. The testing follows the guidelines in Spurious Radiated Emissions of FCC Public Notice DA 00-705 Measurement Guidelines.
1. The EUT was placed on a turntable with 0.8 meter above ground.
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.
4. Set to the maximum power setting and enable the EUT transmit continuously.
5. Use the following spectrum analyzer settings:
   (1) Span shall wide enough to fully capture the emission being measured;
   (2) Set RBW=100 kHz for f < 1 GHz, RBW=1MHz for f>1GHz ; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold for peak
   (3) For average measurement: use duty cycle correction factor method per 15.35(c).
   Duty cycle = On time/100 milliseconds
   On time = $N_1*L_1+N_2*L_2+...+N_{n-1}*LN_{n-1}+N_n*L_n$
   Where N_1 is number of type 1 pulses, L_1 is length of type 1 pulses, etc.
   Average Emission Level = Peak Emission Level + 20*log(Duty cycle)
6. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level

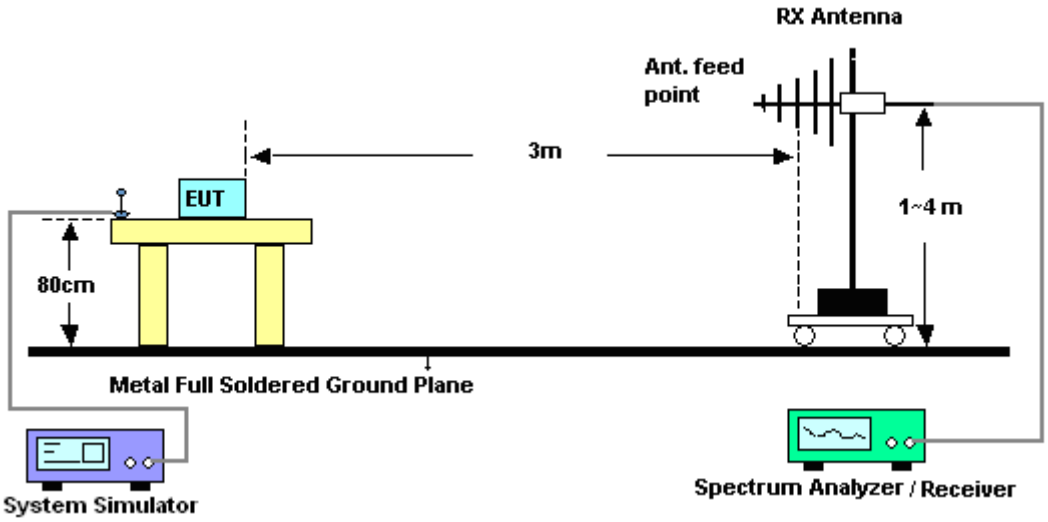
Note: The average levels were calculated from the peak level corrected with duty cycle correction factor (-24.82dB) derived from 20log (dwell time/100ms). This correction is only for signals that hop with the fundamental signal, such as band-edge and harmonic. Other spurious signals that are independent of the hopping signal would not use this correction.

3.1.4 Test Setup

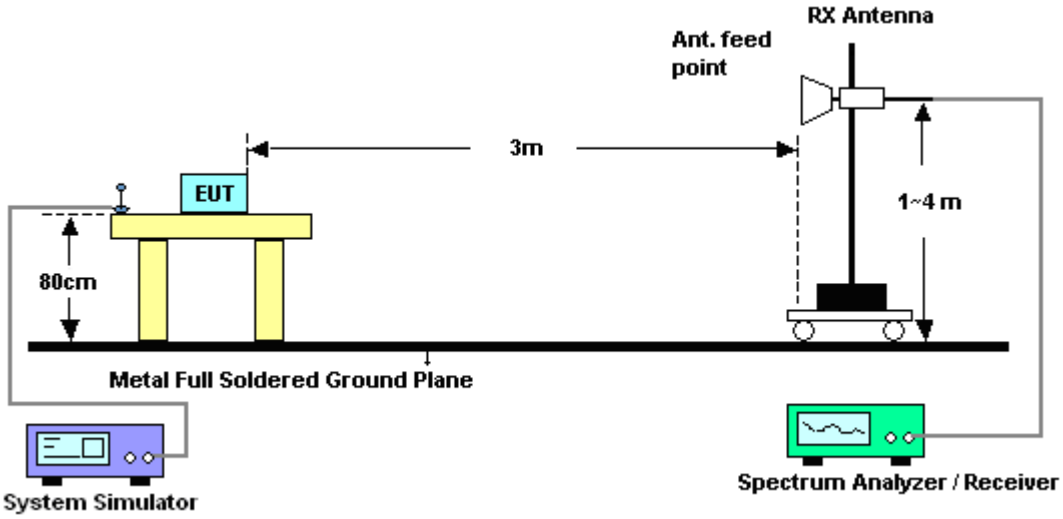
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz

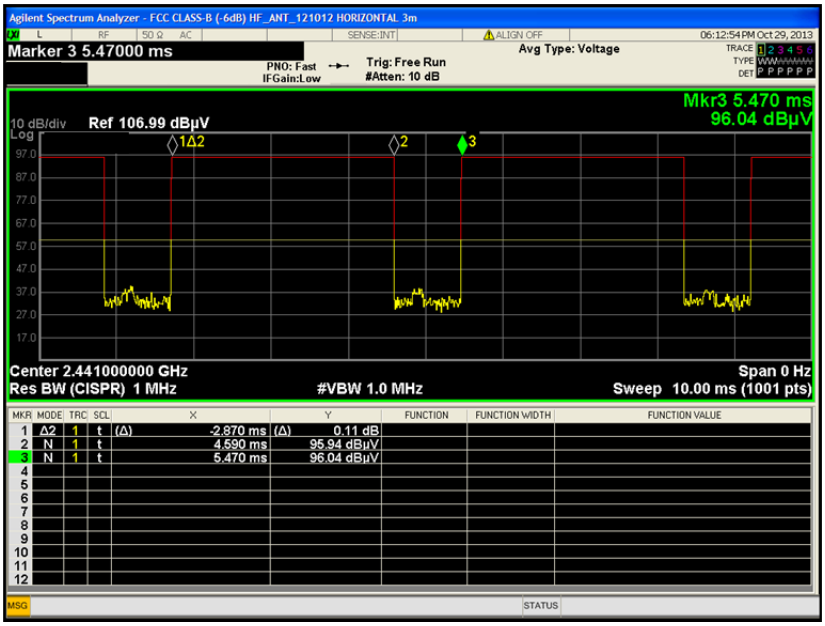


3.1.5 Test Results of Radiated Spurious Emissions (9 kHz ~ 30 MHz)

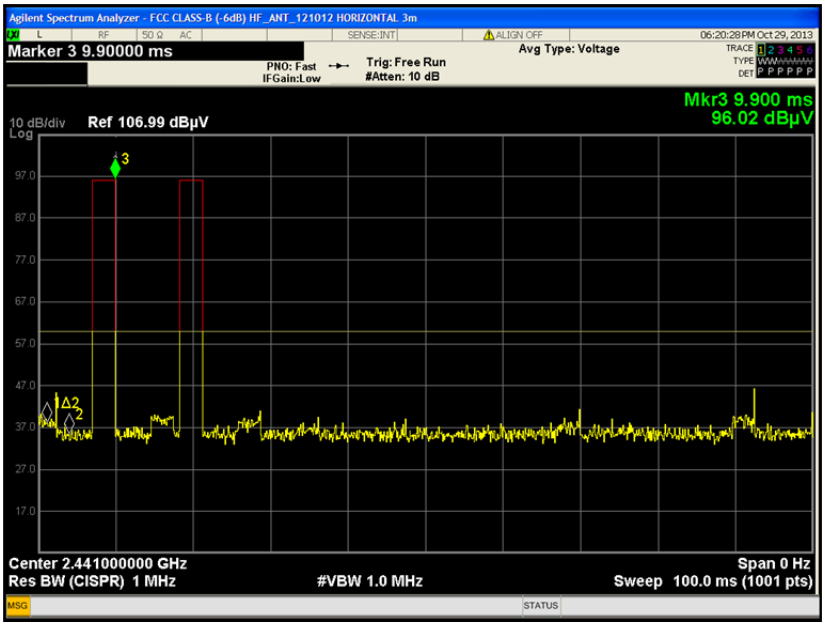
The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

3.1.6 Duty cycle correction factor for average measurement

DH5 on time (One Pulse) Plot on Channel 39



DH5 on time (Count Pulses) Plot on Channel 39



Note:

1. Worst case Duty cycle = on time/100 milliseconds = 2 * 2.87 / 100 = 5.74 %
2. Worst case Duty cycle correction factor = 20*log(Duty cycle) = -24.82 dB
3. DH5 has the highest duty cycle worst case and is reported.

Duty Cycle Correction Factor Consideration for AFH mode:

Bluetooth normal hopping rate is 1600Hz and reduced to 800Hz in AFH mode; due to the reduced number of hopping frequencies, with the same packet configuration the dwell time in each channel frequency within 100msec period is longer in AFH mode than normal mode.

In AFH mode, the minimum hopping frequencies are 20, to get the longest dwell time DH5 packet is observed; the period to have DH5 packet completing one hopping sequence is

2.87 ms x 20 channels = 57.4 ms

There cannot be 2 complete hopping sequences within 100ms period, considering the random hopping behavior, maximum 2 hops can be possibly observed within the period. [100ms / 57.6ms] = 2 hops

Thus, the maximum possible ON time:

2.87 ms x 2 = 5.74 ms

Worst case Duty Cycle Correction factor, which is derived from the maximum possible ON time,

20 x log(5.74 ms/100ms) = -24.82 dB

3.1.7 Test Result of Radiated Spurious at Band Edges

Test Mode :	1Mbps	Temperature :	25~26°C
Test Channel :	78	Relative Humidity :	54~58%
		Test Engineer :	Robin Luo

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.52	56.82	-17.18	74	48.6	32.27	5.71	29.76	127	24	Peak
2483.52	32.00	-22.00	54	-	-	-	-	127	24	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2484.4	52.5	-21.5	74	44.28	32.27	5.71	29.76	100	320	Peak
2484.4	27.68	-26.32	54	-	-	-	-	100	320	Average

3.1.8 Test Result of Radiated Spurious Emission (30MHz ~ 10th Harmonic)

Note: Pre-scanned all test modes and only choose the worst case mode recorded in the test report for radiated spurious emission below 1GHz.

Test Mode :	1Mbps	**Temperature :**	25~26°C
Test Channel :	78	**Relative Humidity :**	54~58%
Test Engineer :	Robin Luo	**Polarization :**	Horizontal
Remark :	2480 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30.97	26.54	-13.46	40	42.25	14.1	0.77	30.58	100	320	Peak
85.29	23.75	-16.25	40	44.7	8.5	1.17	30.62	-	-	Peak
192.96	22.42	-21.08	43.5	41.69	9.43	1.66	30.36	-	-	Peak
276.38	28.24	-17.76	46	43.51	12.87	1.94	30.08	-	-	Peak
365.62	25.16	-20.84	46	37.36	15.38	2.2	29.78	-	-	Peak
825.4	27	-19	46	31.29	21.36	3.25	28.9	-	-	Peak
2480	104.47	-	-	96.25	32.27	5.71	29.76	126	23	Peak
2480	79.65	-	-	-	-	-	-	126	23	Average
4960	39.32	-34.68	74	53.84	34.01	8.49	57.02	118	289	Peak
4960	14.5	-39.5	54	-	-	-	-	118	289	Average
7440	40.49	-33.51	74	52.07	35.37	10.04	56.99	158	273	Peak
7440	15.67	-38.33	54	-	-	-	-	158	273	Average

Note: Other harmonics are lower than background noise.

Test Mode :	1Mbps	Temperature :	25~26°C
Test Channel :	78	Relative Humidity :	54~58%
Test Engineer :	Robin Luo	Polarization :	Vertical
Remark :	2480 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
31.94	27.35	-12.65	40	43.64	13.5	0.78	30.57	178	302	Peak
191.02	24.9	-18.6	43.5	43.94	9.67	1.65	30.36	-	-	Peak
268.62	23.27	-22.73	46	38.49	12.97	1.91	30.1	-	-	Peak
613.94	25.63	-20.37	46	32.89	19.12	2.8	29.18	-	-	Peak
835.1	26.31	-19.69	46	30.84	21.1	3.26	28.89	-	-	Peak
956.35	27.26	-18.74	46	30.64	21.92	3.43	28.73	-	-	Peak
2480	99.46	-	-	91.24	32.27	5.71	29.76	100	320	Peak
2480	74.64	-	-	-	-	-	-	100	320	Average
4960	38.6	-35.4	74	53.12	34.01	8.49	57.02	118	289	Peak
4960	13.78	-40.22	54	-	-	-	-	118	289	Average
7440	40.82	-33.18	74	52.4	35.37	10.04	56.99	158	273	Peak
7440	16	-38	54	-	-	-	-	158	273	Average

Note: Other harmonics are lower than background noise.

4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	Agilent Technologies	N9038A	MY52260185	20Hz~26.5GHz	Apr. 04, 2013	Oct. 29, 2013	Apr. 03, 2014	Radiation (03CH01-SZ)
Double Ridge Horn Antenna	ETS Lindgren	3117	00119436	1GHz~18GHz	Oct. 12, 2013	Oct. 29, 2013	Oct. 11, 2014	Radiation (03CH01-SZ)
Bilog Antenna	SCHAFFNER	CBL6112B	2614	30MHz~2GHz	Nov. 03, 2012	Oct. 29, 2013	Nov. 02, 2013	Radiation (03CH01-SZ)
Amplifier	ADVANTEST	BB525C	E9007003	9kHz-3000MHz GAIN 30db	Mar. 28, 2013	Oct. 29, 2013	Mar. 27, 2014	Radiation (03CH01-SZ)
Amplifier	Yiai	AV3860B	04030	2GHz~26.5GHz	Mar. 28, 2013	Oct. 29, 2013	Mar. 27, 2014	Radiation (03CH01-SZ)
SHF-EHF-Horn	Schwarzbeck	BBHA9170	BBHA9170249	14GHz~40GHz	Nov. 23, 2012	Oct. 29, 2013	Nov. 22, 2013	Radiation (03CH01-SZ)
Loop Antenna	R&S	HFH2-Z2	100354	9kHz-30MHz	May 29, 2013	Oct. 29, 2013	May 28, 2014	Radiation (03CH01-SZ)
Turn Table	EM Electronics	EM 1000	N/A	0 ~ 360 degree	N/A	Oct. 29, 2013	N/A	Radiation (03CH01-SZ)
Antenna Mast	EM Electronics	EM 1000	N/A	1 m - 4 m	N/A	Oct. 29, 2013	N/A	Radiation (03CH01-SZ)

5 Uncertainty of Evaluation

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**3.90**

Appendix B. Product Equality Declaration

TCT Mobile Limited

5F, C building, No. 232, Liang Jing Road, Zhangjiang High-Tech Park, Pudong, Shanghai, China
Tel: +86(0)2161460890 ; Fax: +86(0)2161460600

Federal Communications Commission
Authorization and Evaluation Division
1435 Oakland Mills Road
Columbia, MD 21046

To whom it may concern:

FCC IDs RAD456 and RAD381 are tablet PCs that share the same enclosure, main logic board, display, battery and I/O design. Both FCC IDs use the same Wi-Fi / Bluetooth chipset, and operate using the same transmit power levels. Also, both FCC IDs run the same software.

The Wi-Fi and Bluetooth test reports from [FCC ID: RAD381] (WLAN/BT only) will represent the RF and EMC performance of FCC ID: [FCC ID: RAD456] (WWAN+WiFi).

FCC ID: RAD381 is identical to FCC ID: RAD456, except that FCC ID: RAD381 does not have WWAN radio capability.

FCC ID	RF function
RAD381	WLAN/BT
RAD456	WLAN/BT + WWAN

Pursuant to KDB 996369, we would use Wi-Fi and Bluetooth test reports from [FCC ID: RAD381] (WLAN/BT only) in our application for [FCC ID: RAD456] (WLAN/BT + WWAN).

Should you have any comments or questions, please feel free to contact me.
Sincerely,

Contact Person: Zhizhou Gong
E-mail: zhizhou.gong@jrdcom.com