

FCC RF Test Report

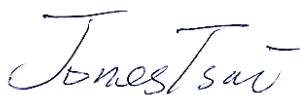
APPLICANT : TCT Mobile Limited
EQUIPMENT : Tablet PC
BRAND NAME : ALCATEL
MODEL NAME : ONE TOUCH P321
MARKETING NAME : ALCATEL ONE TOUCH POP8
FCC ID : RAD467
STANDARD : FCC Part 15 Subpart C §15.247
CLASSIFICATION : (DSS) Spread Spectrum Transmitter

The product was received on Jan. 06, 2014 and testing was completed on Apr. 23, 2014. We, SPORTON INTERNATIONAL (KUNSHAN) 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 (KUNSHAN) INC., the test report shall not be reproduced except in full.



Reviewed by: Joseph Lin / Supervisor



Approved by: Jones Tsai / Manager



SPORTON INTERNATIONAL (KUNSHAN) INC.
No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P.R.C.

TABLE OF CONTENTS

REVISION HISTORY	3
SUMMARY OF TEST RESULT	4
1 GENERAL DESCRIPTION	5
1.1 Applicant	5
1.2 Manufacturer	5
1.3 Feature of Equipment Under Test	5
1.4 Product Specification of Equipment Under Test	5
1.5 Modification of EUT	6
1.6 Testing Site	6
1.7 Applied Standards	6
2 TEST CONFIGURATION OF EQUIPMENT UNDER TEST	7
2.1 Test Mode	7
2.2 Connection Diagram of Test System	8
2.3 Support Unit used in test configuration and system	8
2.4 EUT Operation Test Setup	8
3 TEST RESULT	9
3.1 Radiated Band Edges and Spurious Emission Measurement	9
3.2 Antenna Requirements	18
4 LIST OF MEASURING EQUIPMENT	19
5 UNCERTAINTY OF EVALUATION	20
APPENDIX A. SETUP PHOTOGRAPHS	
APPENDIX B. PRODUCT EQUALITY DECLARATION	

REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR410304-01A	Rev. 01	This is report for ONE TOUCH P321. 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 FR410304A (FCC ID: RAD466). Based on the original test report, only the worst case of Radiated Spurious Emission was verified for the difference.	May 20, 2014

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 7.69 dB at 2483.500 MHz
3.2	15.203 & 15.247(b)	Antenna Requirement	N/A	Pass	-

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

TCT Mobile Limited

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

1.3 Feature of Equipment Under Test

Product Feature	
Equipment	Tablet PC
Brand Name	ALCATEL
Model Name	ONE TOUCH P321
Marketing Name	ALCATEL ONE TOUCH POP8
FCC ID	RAD467
EUT supports Radios application	WLAN 2.4GHz 802.11b/g/n HT20/HT40/ Bluetooth v3.0 + EDR/Bluetooth v4.0 LE
HW Version	V5.0
SW Version	BAQ
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	Monopole Antenna with gain 2.00 dBi
Type of Modulation	Bluetooth BR (1Mbps) : GFSK Bluetooth EDR (2Mbps) : $\pi/4$ -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 (KUNSHAN) INC.	
Test Site Location	No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P.R.C. TEL: +86-0512-5790-0158 FAX: +86-0512-5790-0958	
Test Site No.	Sporton Site No.	FCC Registration No.
	03CH01-KS	149928

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

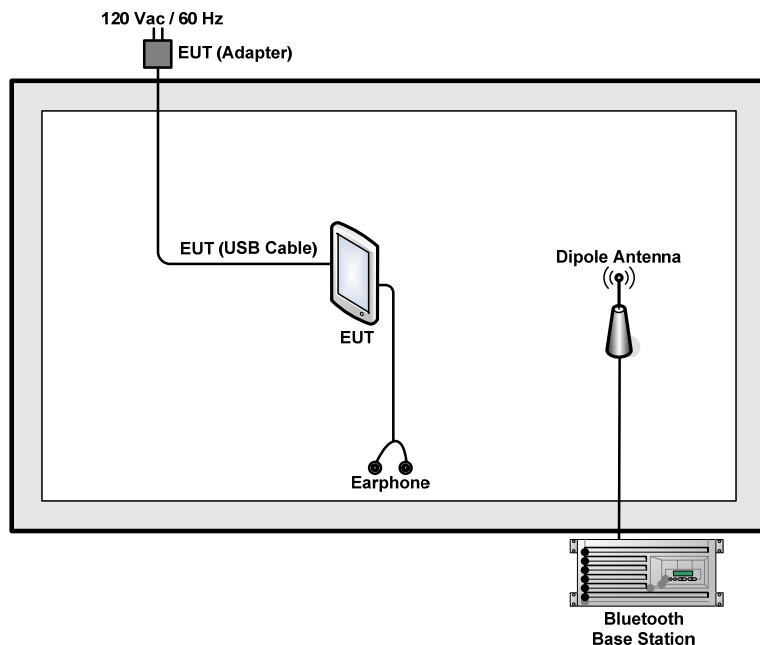
2.1 Test Mode

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
Radiated Test Cases	Mode 1: CH78_2480 MHz
Remark: All the radiated test cases were performed with adapter, earphone, USB cable and battery 1.	

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	FCC DoC	Unshielded, 1.2 m	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.

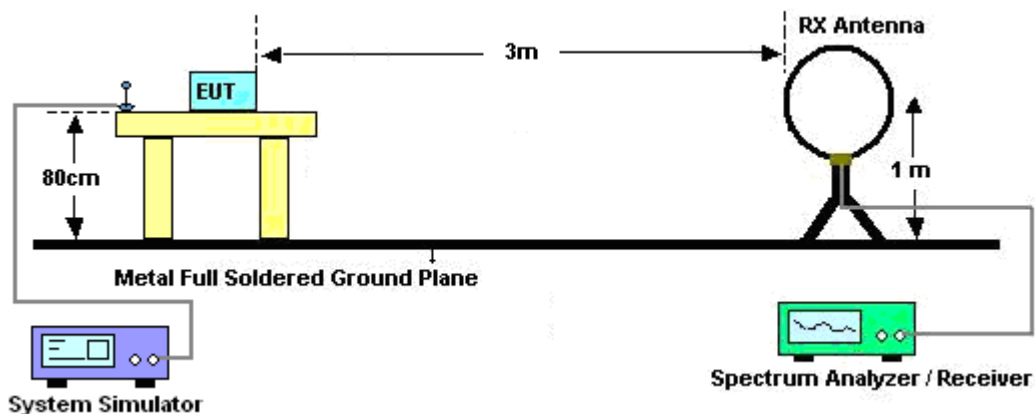
3.1.3 Test Procedures

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 $f > 1$ GHz ; VBW $\geq$ 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 = $N_1 * L_1 + N_2 * L_2 + \dots + N_{n-1} * L_{n-1} + N_n * L_n$
Where N_1 is number of type 1 pulses, L_1 is length of type 1 pulses, etc.
Average Emission Level = Peak Emission Level + $20 * \log(\text{Duty cycle})$
6. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level

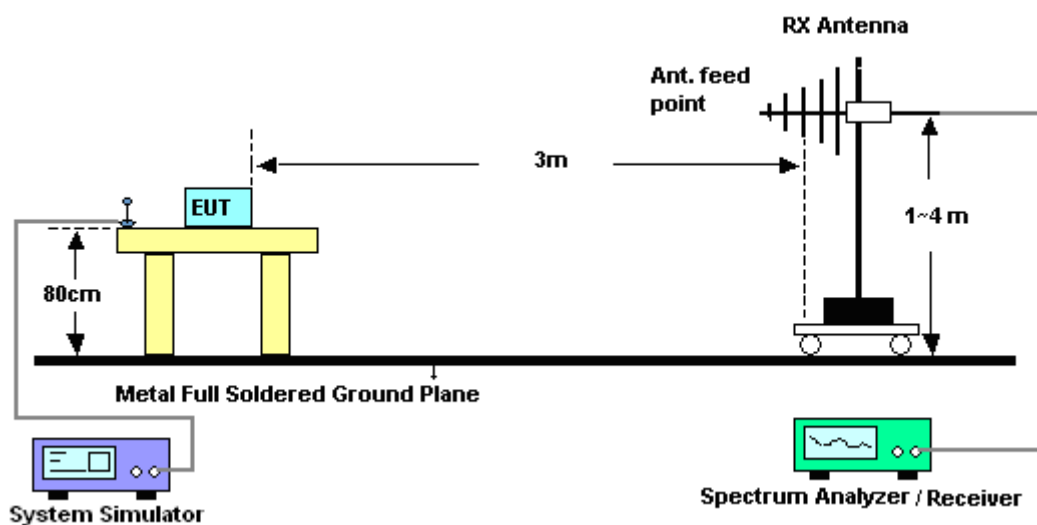
Note: The average levels were calculated from the peak level corrected with duty cycle correction factor (-24.79dB) derived from $20 \log(\text{dwell time}/100\text{ms})$. This correction is only for signals that hop with the fundamental signal, such as band-edge and harmonic. Other spurious signals that are independent of the hopping signal would not use this correction.

3.1.4 Test Setup

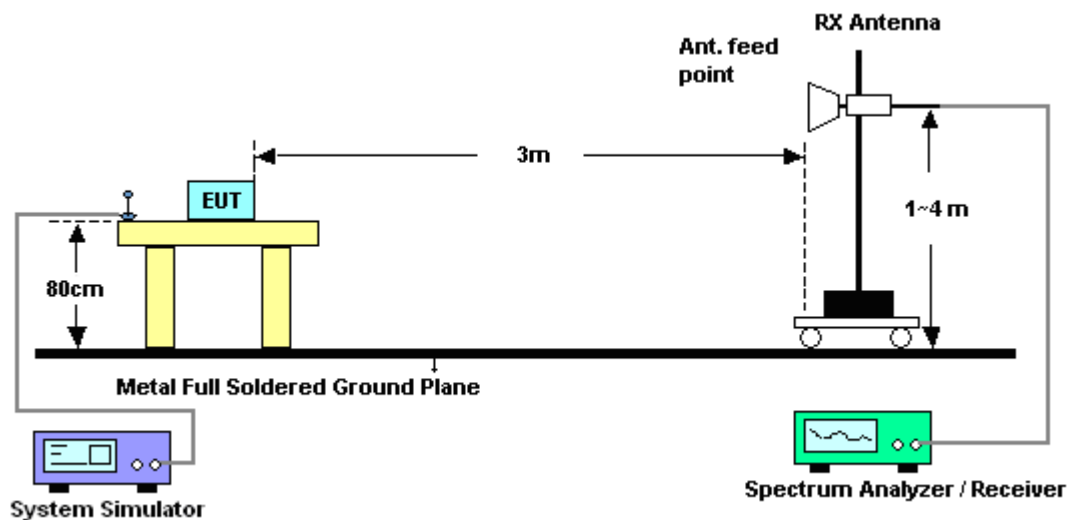
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



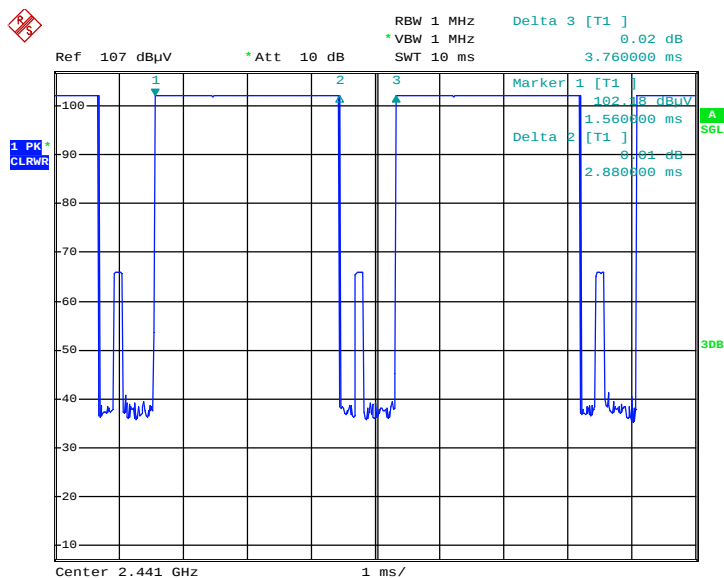
For radiated emissions above 1GHz



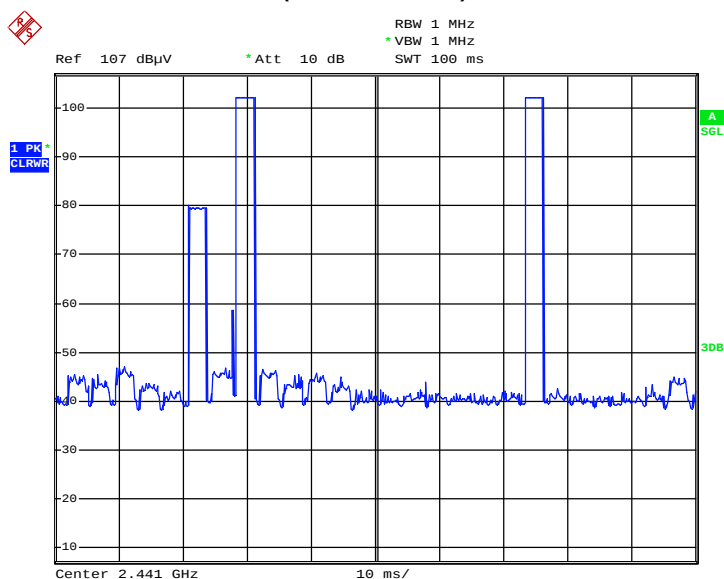
3.1.5 Test Results of Radiated Spurious Emissions (9 kHz ~ 30 MHz)

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


Date: 24.APR.2014 01:08:49

DH5 on time (Count Pulses) Plot on Channel 39


Date: 24.APR.2014 01:11:44

Note:

1. Worst case Duty cycle = on time/100 milliseconds = $2 * 2.88 / 100 = 5.76 \%$
2. Worst case Duty cycle correction factor = $20 * \log(\text{Duty cycle}) = -24.79 \text{ dB}$
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

$$2.88 \text{ ms} \times 20 \text{ channels} = 57.6 \text{ ms}$$

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. $[100\text{ms} / 57.6\text{ms}] = 2 \text{ hops}$

Thus, the maximum possible ON time:

$$2.88 \text{ ms} \times 2 = 5.76 \text{ ms}$$

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

$$20 \times \log(5.76 \text{ ms}/100\text{ms}) = -24.79 \text{ dB}$$

3.1.7 Test Result of Radiated Spurious at Band Edges

Test Mode :	Mode 1	Temperature :	23~24°C
Test Channel :	78	Relative Humidity :	43~44%
		Test Engineer :	Stone Gu

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
2483.5	66.31	-7.69	74	62.94	33.01	3.65	33.29	117	148	Peak
2483.5	41.52	-12.48	54	-	-	-	-	-	-	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
2483.5	62.82	-11.18	74	59.45	33.01	3.65	33.29	100	100	Peak
2483.5	38.03	-15.97	54	-	-	-	-	-	-	Average

Note: Average Emission Level = Peak Emission Level + duty cycle correction factor(-24.79dB)

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 :	Mode 1	Temperature :	23~24°C
Test Channel :	78	Relative Humidity :	43~44%
Test Engineer :	Stone Gu	Polarization :	Horizontal
Remark :	1. 2480 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

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	21.69	-18.31	40	36.78	18	0.48	33.57	-	-	Peak
112.45	22.3	-21.2	43.5	43.12	11.8	0.99	33.61	-	-	Peak
128.94	22.54	-20.96	43.5	43.38	11.71	1.04	33.59	-	-	Peak
224.97	25.32	-20.68	46	46.94	10.5	1.38	33.5	-	-	Peak
246.31	23.01	-22.99	46	43.17	11.84	1.45	33.45	-	-	Peak
942.77	30.8	-15.2	46	39.73	20.7	2.81	32.44	100	178	Peak
2480	105.69	-	-	102.32	33.01	3.65	33.29	117	148	Peak
2480	80.9	-	-	-	-	-	-	117	148	Average
4960	45.31	-28.69	74	38.58	35.2	5.33	33.8	100	216	Peak
7440	48.71	-25.29	74	39.87	36.27	6.75	34.18	100	60	Peak

Note: 1. Other harmonics are lower than background noise.

2. Average Emission Level = Peak Emission Level + duty cycle correction factor(-24.79)

Test Mode :	Mode 1	Temperature :	23~24°C
Test Channel :	78	Relative Humidity :	43~44%
Test Engineer :	Stone Gu	Polarization :	Vertical
Remark :	1. 2480 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

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	30.31	-9.69	40	45.4	18	0.48	33.57	100	20	Peak
50.37	28.93	-11.07	40	54.45	7.4	0.66	33.58	-	-	Peak
162.89	27.97	-15.53	43.5	50.89	9.49	1.17	33.58	-	-	Peak
237.58	24.57	-21.43	46	45.2	11.4	1.43	33.46	-	-	Peak
288.02	21.89	-24.11	46	40.9	12.82	1.56	33.39	-	-	Peak
939.86	31.22	-14.78	46	40.16	20.69	2.81	32.44	-	-	Peak
2480	104.55	-	-	101.18	33.01	3.65	33.29	100	97	Peak
2480	79.76	-	-	-	-	-	-	100	97	Average
4960	46.23	-27.77	74	39.5	35.2	5.33	33.8	100	108	Peak
7440	49.63	-24.37	74	40.79	36.27	6.75	34.18	100	161	Peak

Note: 1. Other harmonics are lower than background noise.

2. Average Emission Level = Peak Emission Level + duty cycle correction factor(-24.79)

3.2 Antenna Requirements

3.2.1 Standard Applicable

If directional gain of transmitting antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the FCC rule.

3.2.2 Antenna Connected Construction

Non-standard connector used.

3.2.3 Antenna Gain

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.

4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
EMI Test Receiver	R&S	ESCI	100534	9kHz~3GHz	Nov. 05, 2013	Apr. 23, 2014	Nov. 04, 2014	Radiation (03CH01-KS)
Spectrum Analyzer	R&S	FSP30	101399	9kHz~30GHz	May 23, 2013	Apr. 23, 2014	May 22, 2014	Radiation (03CH01-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Oct. 09, 2013	Apr. 23, 2014	Oct. 08, 2014	Radiation (03CH01-KS)
Bilog Antenna	SCHAFFNER	CBL6112D	23182	25MHz~2GHz	Jan. 08, 2014	Apr. 23, 2014	Jan. 07, 2015	Radiation (03CH01-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	75959	1GHz~18GHz	Jan. 08, 2014	Apr. 23, 2014	Jan. 07, 2015	Radiation (03CH01-KS)
Active Horn Antenna	com-power	AHA-118	701030	1GHz~18GHz	Nov. 18, 2013	Apr. 23, 2014	Nov. 17, 2014	Radiation (03CH01-KS)
SHF-EHF Horn	Schwarzbeck	BBHA 9170	BBHA170249	15GHz~40GHz	Mar. 10, 2014	Apr. 23, 2014	Mar. 09, 2015	Radiation (03CH01-KS)
Amplifier	com-power	PA-103A	161073	1MHz~1GHz	May 04, 2014	Apr. 23, 2014	May 03, 2015	Radiation (03CH01-KS)
Amplifier	Agilent	8449B	3008A02371	1GHz~26.5GHz	Dec. 10, 2013	Apr. 23, 2014	Dec. 09, 2014	Radiation (03CH01-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Apr. 23, 2014	NCR	Radiation (03CH01-KS)
Turn Table	MF	MF7802	N/A	0~360 degree	NCR	Apr. 23, 2014	NCR	Radiation (03CH01-KS)
Antenna Mast	MF	MF7802	N/A	1 m~4 m	NCR	Apr. 23, 2014	NCR	Radiation (03CH01-KS)

5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	2.54
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Appendix B. Product Equality Declaration

TCT Mobile Limited

Date: May 7, 2014

Product Equality Declaration

We, TCT Mobile Limited, declare on our sole responsibility for the product of ONE TOUCH P321 as below:

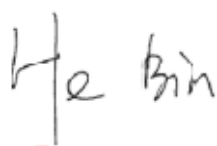
The differences between ONE TOUCH P321 and previous model, ONE TOUCH P320A are as below:

1. ONE TOUCH P320A has 2G/3G module on board, but ONE TOUCH P321 doesn't. All 2G/3G related components have removed from ONE TOUCH P321;
2. The CPU model number of ONE TOUCH P320A is MT8382V/W, and The CPU model number of ONE TOUCH P321 is MT8121V/B. The difference between these two CPUs is only that MT8382V/W has the modem, but MT8121V/B doesn't.
3. MCP has changed from KMK7X000VM-B314 to MT29PZZZ8D4WKFEW-18 W.
The only difference between these 2 MCPs : The eMMC flash in KMK7X000VM-B314 is 8GB and the other is 4GB.

Except listings above, the others are all the same as previous version.

Should you have any questions or comments regarding this matter, please have my best attention.

Sincerely yours,



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