



TEST REPORT

No. I16Z40420-GTE01

for

TCL Communication Ltd.

HSUPA/HSDPA/UMTS quad band /GSM quad band mobile phone

Model Name: 5010E

FCC ID: 2ACCJH048

with

Hardware Version: PIO

Software Version: v5E53

Issued Date: 2016-03-28

Note:

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of CTTL.

Test Laboratory:

FCC 2.948 Listed: No.525429

CTTL, Telecommunication Technology Labs, Academy of Telecommunication Research, MIIT
No. 52, Huayuan North Road, Haidian District, Beijing, P. R. China 100191.
Tel: +86(0)10-62304633-2512, Fax: +86(0)10-62304633-2504
Email: cttl_terminals@catr.cn, website: www.chinattl.com

REPORT HISTORY

Report Number	Revision	Description	Issue Date
I16Z40420-GTE01	Rev.0	1st edition	2016-03-28

CONTENTS

1. TEST LABORATORY	4
1.1. TESTING LOCATION.....	4
1.2. TESTING ENVIRONMENT.....	4
1.3. PROJECT DATA	4
1.4. SIGNATURE.....	4
2. CLIENT INFORMATION.....	5
2.1. APPLICANT INFORMATION.....	5
2.2. MANUFACTURER INFORMATION.....	5
3. EQUIPMENT UNDER TEST (EUT) AND ANCILLARY EQUIPMENT (AE)	6
3.1. ABOUT EUT	6
3.2. INTERNAL IDENTIFICATION OF EUT USED DURING THE TEST	6
3.3. INTERNAL IDENTIFICATION OF AE USED DURING THE TEST	6
3.4. NORMAL ACCESSORY SETTING.....	8
3.5. GENERAL DESCRIPTION	8
4. REFERENCE DOCUMENTS.....	9
4.1. REFERENCE DOCUMENTS FOR TESTING	9
5. LABORATORY ENVIRONMENT.....	10
6. SUMMARY OF TEST RESULTS	11
7. TEST EQUIPMENTS UTILIZED	12
ANNEX A: MEASUREMENT RESULTS.....	13
A.1 OUTPUT POWER.....	13
A.2 EMISSION LIMIT.....	19
A.3 FREQUENCY STABILITY.....	25
A.4 OCCUPIED BANDWIDTH	27
A.5 EMISSION BANDWIDTH.....	40
A.6 BAND EDGE COMPLIANCE	52
A.7 CONDUCTED SPURIOUS EMISSION.....	59

1. Test Laboratory

1.1. Testing Location

Company Name: CTTL, Telecommunication Technology Labs, Academy of Telecommunication Research, MIIT
Address: No. 52, Huayuan North Road, Haidian District, Beijing, P. R. China 100191
Telephone: 00861062304633
Fax: 00861062304793

1.2. Testing Environment

Normal Temperature: 15-35°C
Relative Humidity: 20-75%

1.3. Project data

Testing Start Date: 2016-03-08
Testing End Date: 2016-03-09

1.4. Signature



Shen Yi

(Prepared this test report)



Zhong Nan

(Reviewed this test report)



Sun Xiang Qian

Deputy Director of the laboratory
(Approved this test report)

2. Client Information

2.1. Applicant Information

Company Name: TCL Communication Ltd.
Address /Post: 5F, C building, No. 232, Liang Jing Road ZhangJiang High-Tech Park,
Pudong Area Shanghai, P.R. China. 201203
Contact Person: Gong Zhizhou
Contact Email: zhizhou.gong@tcl.com
Telephone: 0086-21-31363544
Fax: 0086-21-61460602

2.2. Manufacturer Information

Company Name: TCL Communication Ltd.
Address /Post: 5F, C building, No. 232, Liang Jing Road ZhangJiang High-Tech Park,
Pudong Area Shanghai, P.R. China. 201203
Contact Person: Gong Zhizhou
Contact Email: zhizhou.gong@tcl.com
Telephone: 0086-21-31363544
Fax: 0086-21-61460602

3. Equipment Under Test (EUT) and Ancillary Equipment (AE)

3.1. About EUT

Description	HSUPA/HSDPA/UMTS quad band /GSM quad band mobile phone
Model Name	5010E
FCC ID	2ACCJH048
Antenna	Integrated
Output power	31.06dBm maximum ERP measured for GSM850
Extreme vol. Limits	3.5VDC to 4.2VDC (nominal: 3.8VDC)
Extremetemp. Tolerance	-30°C to +50°C

Note: Components list, please refer to documents of the manufacturer; it is also included in the original test record of CTTL, Telecommunication Technology Labs, Academy of Telecommunication Research, MIIT

The EUT is a variant model of 5010G. All the result is coming from the initial model.

3.2. Internal Identification of EUT used during the test

EUT ID*	IMEI	HW Version	SW Version
\	\	\	\

*EUT ID: is used to identify the test sample in the lab internally.

3.3. Internal Identification of AE used during the test

AE ID*	Description
AE1	Battery
AE2	Battery
AE3	Charger
AE4	Charger
AE5	Charger
AE6	Charger
AE7	Charger

AE1

Model	CAB2000041C7 (711700096011)
Manufacturer	Veken
Capacitance	2000mAh
Nominal voltage	3.8V

AE2

Model	CAB2000010C1
Manufacturer	BYD
Capacitance	2000mAh
Nominal voltage	3.8V

AE3

Model CBA3068AG0C4 (711813100141)
Manufacturer AOHAI
Length of cable /

AE4

Model CBA3068AG0C3 (711813100161)
Manufacturer YINGJU
Length of cable /

AE5

Model CBA0057AG0C3 (711813200121)
Manufacturer Yingju
Length of cable /

AE6

Model CBA0067AG0C4 (711813100151)
Manufacturer AOHAI
Length of cable /

AE7

Model CBA0067AG0C3 (711813100181)
Manufacturer Yingju
Length of cable /

*AE ID: is used to identify the test sample in the lab internally.

3.4. Normal Accessory setting

Fully charged battery was used during the test.

3.5. General Description

The Equipment Under Test (EUT) is a model of HSUPA/HSDPA/UMTS quad band /GSM quad band mobile phone with integrated antenna. Manual and specifications of the EUT were provided to fulfil the test.

4. Reference Documents

4.1. Reference Documents for testing

The following documents listed in this section are referred for testing.

Reference	Title	Version
FCC Part 24	PERSONAL COMMUNICATIONS SERVICES	10-1-15 Edition
FCC Part 22	PUBLIC MOBILE SERVICES	10-1-15 Edition
ANSI/TIA-603-D	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards	2015
ANSI C63.4	Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz	2014
KDB 971168 D01	Measurement Guidance for Certification of Licensed Digital Transmitters	v02r02

5. LABORATORY ENVIRONMENT

Control room / conducted chamber did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. = 20 %, Max. = 80 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 2 MΩ
Ground system resistance	< 0.5 Ω

Fully-anechoic chamber 2 (8.6 meters × 6.1 meters × 3.85 meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 30 °C
Relative humidity	Min. = 35 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 2 MΩ
Ground system resistance	< 1 Ω
Site voltage standing-wave ratio (S_{VSWR})	Between 0 and 6 dB, from 1GHz to 18GHz
Uniformity of field strength	Between 0 and 6 dB, from 80 to 4000 MHz

Semi-anechoic chamber 2 / Fully-anechoic chamber 3 (10 meters × 6.7 meters × 6.15 meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 30 °C
Relative humidity	Min. = 35 %, Max. = 60 %
Shielding effectiveness	> 100 dB
Electrical insulation	> 2 MΩ
Ground system resistance	< 0.5 Ω
Normalised site attenuation (NSA)	< ±3.5 dB, 3 m distance
Site voltage standing-wave ratio (S_{VSWR})	Between 0 and 6 dB, from 1GHz to 18GHz
Uniformity of field strength	Between 0 and 6 dB, from 80 to 3000 MHz

6. SUMMARY OF TEST RESULTS

Items	List	Clause in FCC rules	Verdict
1	Output Power	22.913(a)/24.232(c)	P
2	Emission Limit	2.1051/22.917/24.238	P
3	Frequency Stability	2.1055/24.235	P
4	Occupied Bandwidth	2.1049(h)(i)	P
5	Emission Bandwidth	22.917(b)/24.238(b)	P
6	Band Edge Compliance	22.917(b)/24.238(b)	P
7	Conducted Spurious Emission	2.1057/22.917/24.238	P

7. Test Equipments Utilized

NO.	DESCRIPTION	TYPE	series number	MANUFACTURE	CAL DUE DATE	Calibration interval
1	Test Receiver	ESU26	100235	R&S	2017-03-02	1 year
2	Test Receiver	ESU26	100376	R&S	2016-10-29	1 year
3	EMI Antenna	VULB 9163	302	Schwarzbeck	2017-01-03	3 year
4	EMI Antenna	3117	00119024	ETS-Lindgren	2017-01-20	3 year
5	LISN	ENV216	101200	R&S	2016-07-07	1 year
6	Universal Radio Communication Tester	CMU200	108646	R&S	2016-10-27	1 year
7	Universal Radio Communication Tester	E5515C	MY48361083	Agilent	2016-07-06	1 year
8	Spectrum Analyzer	E4440A	MY48250642	Agilent	2017-03-02	1 year
9	EMI Antenna	9117	167	Schwarzbeck	2016-04-01	3 year
10	EMI Antenna	VULB9163	9163-234	Schwarzbeck	2016-09-15	3 year
11	Signal Generator	N5183A	MY49060052	Agilent	2017-03-07	1 year
12	Climate chamber	SH-241	92007454	ESPEC	2017-12-14	2 year
13	Loop Antenna	HFH2-Z2	829324/007	R&S	2017-12-10	3 year

ANNEX A: MEASUREMENT RESULTS

A.1 OUTPUT POWER

A.1.1 Summary

During the process of testing, the EUT was controlled via Rhode & Schwarz Digital Radio Communication tester (CMU-200) to ensure max power transmission and proper modulation. In all cases, output power is within the specified limits.

A.1.2 Conducted

A.1.2.1 Method of Measurements

The EUT was set up for the max output power with pseudo random data modulation.

These measurements were done at 3 frequencies, 1850.2 MHz, 1880.0MHz and 1909.8MHz for PCS1900 band; 824.4MHz, 836.6MHz and 848.8MHz for GSM850 band. (bottom, middle and top of operational frequency range).

GSM850

	Power step	Nominal Peak output power (dBm)
GSM	5	33dBm(2W)
GPRS	3	33dBm(2W)
EGPRS	3	33dBm(2W)

Measurement result

GSM(GMSK)

Frequency(MHz)	Power Step	Output power(dBm)
824.2	5	32.70
836.6	5	32.70
848.8	5	32.65

GPRS(GMSK,1Slot)

Frequency(MHz)	Power Step	Output power(dBm)
824.2	3	32.79
836.6	3	32.77
848.8	3	32.73

EGPRS(GMSK,1Slot)

Frequency(MHz)	Power Step	Output power(dBm)
824.2	3	32.05
836.6	3	32.06
848.8	3	32.10

PCS1900

	Power step	Nominal Peak output power (dBm)
GSM	0	30dBm(1W)
GPRS	3	30dBm(1W)
EGPRS	3	30dBm(1W)

Measurement result
GSM(GMSK)

Frequency(MHz)	Power Step	Output power(dBm)
1850.2	0	29.64
1880.0	0	29.54
1909.8	0	29.51

GPRS(GMSK,1Slot)

Frequency(MHz)	Power Step	Output power(dBm)
1850.2	3	29.64
1880.0	3	29.55
1909.8	3	29.54

EGPRS(GMSK,1Slot)

Frequency(MHz)	Power Step	Output power(dBm)
1850.2	3	29.66
1880.0	3	29.64
1909.8	3	29.62

A.1.3 Radiated

A.1.3.1 Description

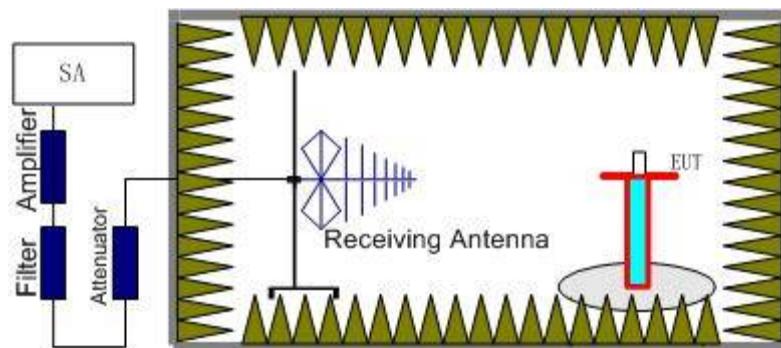
This is the test for the maximum radiated power from the EUT.

Rule Part 24.232(c) specifies, "Mobile/portable stations are limited to 2 watts e.i.r.p. Peak power" and 24.232(c) specifies that "Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage." Rule Part 22.913(a) specifies " The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts."

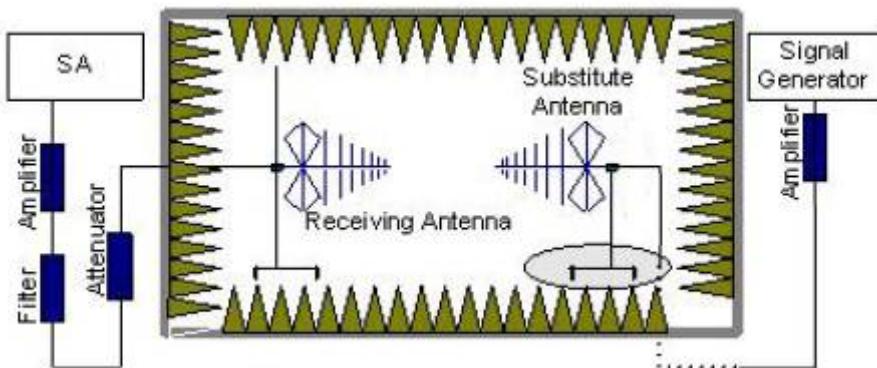
A.1.3.2 Method of Measurement

The measurements procedures in TIA-603D-2015 are used.

1. EUT was placed on a 1.5 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.5m. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all transmit frequencies in three channels (High, Middle, Low) were measured with peak detector.



2. The EUT is then put into continuously transmitting mode at its maximum power level during the test. And the maximum value of the receiver should be recorded as (Pr).
3. The EUT shall be replaced by a substitution antenna. The test setup refers to figure below.



In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere

with the radiation pattern of the antenna. A power (P_{Mea}) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (P_r). The power of signal source (P_{Mea}) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.

4. A amplifier should be connected to the Signal Source output port. And the cable should be connect between the Amplifier and the Substitution Antenna.

The cable loss (P_{cl}), the Substitution Antenna Gain (G_a) and the Amplifier Gain (P_{Ag}) should be recorded after test.

The measurement results are obtained as described below:

$$\text{Power(EIRP)} = P_{Mea} - P_{Ag} - P_{cl} - G_a$$

5. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.
6. ERP can be calculated from EIRP by subtracting the gain of the dipole, $ERP = EIRP - 2.15\text{dBi}$.

GSM 850-ERP
Limits

		Power Step	Burst Peak ERP (dBm)
GSM		5	≤38.45dBm (7W)
GPRS		3	≤38.45dBm (7W)
EGPRS		3	≤38.45dBm (7W)

Measurement result
GSM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dB)	Correction (dB)	ERP(dBm)	Limit(dBm)	Margin(dB)	Polarization
824.20	-12.92	2.26	-45.79	-0.96	2.15	29.42	38.45	9.03	V
836.60	-11.50	2.26	-45.66	-0.82	2.15	30.57	38.45	7.88	V
848.80	-10.85	2.28	-45.54	-0.79	2.15	31.05	38.45	7.40	V

GPRS

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dB)	Correction (dB)	ERP(dBm)	Limit(dBm)	Margin(dB)	Polarization
824.20	-12.91	2.26	-45.79	-0.96	2.15	29.43	38.45	9.02	V
836.60	-11.51	2.26	-45.66	-0.82	2.15	30.56	38.45	7.89	V
848.80	-10.84	2.28	-45.54	-0.79	2.15	31.06	38.45	7.39	V

EGPRS-GMSK

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dB)	Correction (dB)	ERP(dBm)	Limit(dBm)	Margin(dB)	Polarization
824.20	-12.57	2.26	-45.79	-0.96	2.15	29.77	38.45	8.68	V
836.60	-11.46	2.26	-45.66	-0.82	2.15	30.61	38.45	7.84	V
848.80	-10.98	2.28	-45.54	-0.79	2.15	30.92	38.45	7.53	V

Frequency: 848.80MHz

 Peak ERP(dBm)=P_{Mea}(-10.84dBm)-P_{cl}(2.28dB)-P_{Ag}(-45.54dB)-G_a (-0.79dB)-2.15dB=31.06dBm

ANALYZER SETTINGS: RBW = VBW = 3MHz

PCS1900-EIRP
Limits

		Power Step	Burst Peak EIRP (dBm)
GSM		0	≤33dBm (2W)
GPRS		3	≤33dBm (2W)
EGPRS		3	≤33dBm (2W)

Measurement result
GSM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dB)	EIRP(dBm)	Limit(dBm)	Margin(dB)	Polarization
1850.20	-16.61	2.93	-43.75	-4.87	29.08	33.00	3.92	H
1880.00	-15.52	2.85	-43.75	-4.82	30.20	33.00	2.80	H
1909.80	-16.89	2.89	-43.77	-4.76	28.75	33.00	4.25	H

GPRS

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dB)	EIRP(dBm)	Limit(dBm)	Margin(dB)	Polarization
1850.20	-16.63	2.93	-43.75	-4.87	29.06	33.00	3.94	H
1880.00	-15.53	2.85	-43.75	-4.82	30.19	33.00	2.81	H
1909.80	-16.80	2.89	-43.77	-4.76	28.84	33.00	4.16	H

EGPRS-GMSK

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dB)	EIRP(dBm)	Limit(dBm)	Margin(dB)	Polarization
1850.20	-15.87	2.93	-43.75	-4.87	29.82	33.00	3.18	H
1880.00	-15.94	2.85	-43.75	-4.82	29.78	33.00	3.22	H
1909.80	-16.17	2.89	-43.77	-4.76	29.47	33.00	3.53	H

Frequency: 1880.00MHz

 Peak EIRP(dBm) = P_{Mea}(-15.52dBm) - P_{cl}(2.85dB) - P_{Ag}(-43.75dB) - G_a (-4.82dB) = 30.20dBm

ANALYZER SETTINGS: RBW = VBW = 3MHz