



# FCC PART 15B TEST REPORT

No. I22Z60793-EMC01

for

**TCL Communication Ltd.**

**GSM/UMTS/LTE Mobile phone**

**Model name: T501L**

**FCC ID: 2ACCJH166**

with

**Hardware Version: 03**

**Software Version: FS38**

**Issued Date: 2022-07-05**

**Note:**

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**Test Laboratory:**

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## **REPORT HISTORY**

<b>Report Number</b>	<b>Revision</b>	<b>Description</b>	<b>Issue Date</b>
I22Z60793-EMC01	Rev.0	1 <sup>st</sup> edition	2022-07-05

Note: the latest revision of the test report supersedes all previous version.



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## **1. Test Laboratory**

### **1.1. Testing Location**

#### **CTTL (BDA)**

Address: No.18A, Kangding Street, Beijing Economic-Technology  
Development Area, Beijing, P. R. China 100176

### **1.2. Testing Environment**

Normal Temperature: 15-35°C

Relative Humidity: 20-75%

### **1.3. Project data**

Testing Start Date: 2022-06-30

Testing End Date: 2022-07-05

### **1.4. Signature**



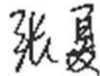
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## **2. Client Information**

### **2.1. Applicant Information**

Company Name: TCL Communication Ltd.  
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### **2.2. Manufacturer Information**

Company Name: TCL Communication Ltd.  
Address: 5/F, Building 22E, 22 Science Park East Avenue, Hong Kong Science Park, Shatin, NT, Hong Kong  
Contact: Peter yang  
Email: peter.yang@tcl.com  
Tel: +86 755 3664 5759

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

#### **3.1. About EUT**

Description	GSM/UMTS/LTE Mobile phone
Model Name	T501L
FCC ID:	2ACCJH166

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

#### **3.2. Internal Identification of EUT used during the test**

EUT ID*	SN or IMEI	HW Version	SW Version
EUT1	016256000010745	03	FS38

\*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	SN	Remarks
AE1	Battery1	/	/
AE2	Battery2	/	/
AE3	USB Cable1	/	/
AE4	Charger1	/	/
AE5	Charger2	/	/
AE6	USB Cable2	/	/
AE7	USB Cable3	/	/

##### AE1

Model	CAB2880012C7, TLi028C7
Manufacturer	VEKEN
Capacity	2880mAh
Nominal Voltage	3.85V

##### AE2

Model	CAB2880006C1, TLi028C1
Manufacturer	BYD
Capacity	2880mAh
Nominal Voltage	3.85V

##### AE3

Model	CDA0000131C1
Manufacturer	JUWEI
Length of cable	/

##### AE4

Model	CBA0058AGTC5
Manufacturer	PUAN
Length of cable	/

##### AE5

Model	CBA0058AGTC7
Manufacturer	CHENYANG



Length of cable /  
 AE6  
 Model CDA3122005C2  
 Manufacturer SHENGHUA  
 Length of cable /  
 AE7  
 Model CDA0000055C2  
 Manufacturer SHENGHUA  
 Length of cable /

**3.4. EUT set-ups**

EUT set-up No.	Combination of EUT and AE	Remarks
Set.1	EUT1 + AE1/2 + AE6/7	USB

Note:

Equipment Under Test (EUT) is a model of Smart Phone with integrated antenna.

It supports

GSM Band GSM850/GSM900/DCS1800/PCS1900

UMTS Band FDD Band II(W1900) /FDD Band IV(W1700)/FDD Band V(W850)

LTE Band FDD2/FDD4/FDD5/FDD12/FDD13/FDD14/FDD25/FDD26/TDD41/FDD66/FDD71

It has MP3, Camera, USB memory, OTG, Bluetooth 5.0, Wi-Fi (802.11b/g/n, 802.11n supports 20MHz and 40MHz bandwidth) ,GNSS functions.

The device contains receivers which tune and operate between 30MHz-960MHz in the following bands: GSM850, WCDMA850, LTE Band 5/12/13/26/71. All licensed band receivers that tune in the range of 30MHz-960MHz are investigated. Only the worst-case emissions are reported.

I22Z60793 is a variant model based on I22Z60839 for conformance test. According to the declaration of changes, the following test items and test modes were performed:

Test Item	Mode or Feature	EUT Set-up
Radiated Continuous Emission	USB	Set.1
Conducted Continuous Emission	USB	Set.1

Only the worst-case emissions are reported.

## **4. Reference Documents**

### **4.1. Reference Documents for testing**

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

<b>Reference</b>	<b>Title</b>	<b>Version</b>
FCC Part 15, Subpart B	Radio frequency devices - Unintentional Radiators	2019
ANSI C63.4	American National Standard for Methods of Measurement of Radio- Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz	2014

Note: The test methods have no deviation with standards.



## 5. LABORATORY ENVIRONMENT

**Semi-anechoic chamber SAC-1** (10 meters×6.7meters×6.1meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. = 15 %, Max. = 75 %
Shielding effectiveness	0.014MHz-1MHz, >60dB; 1MHz - 1000MHz, >90dB.
Electrical insulation	> 2 MΩ
Ground system resistance	< 4 Ω
Normalised site attenuation (NSA)	< ±4 dB, 3m distance
Site voltage standing-wave ratio ( $S_{VSWR}$ )	Between 0 and 6 dB, from 1GHz to 6GHz
Uniformity of field strength	Between 0 and 6 dB, from 80 to 6000 MHz

**Shielded room** did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. = 20 %, Max. = 75 %
Shielding effectiveness	0.014MHz-1MHz, >60dB; 1MHz—1000MHz, >90dB.
Electrical insulation	> 2 MΩ
Ground system resistance	< 4 Ω

## 6. SUMMARY OF TEST RESULTS

Abbreviations used in this clause:		
Verdict Column	P	Pass
	NA	Not applicable
	F	Fail

Items	Test Name	Clause in FCC rules	Section in this report	Verdict	Test Location
1	Radiated Emission	15.109(a)	B.1	P	CTTL(BDA)
2	Conducted Emission	15.107(a)	B.2	P	CTTL(BDA)

## 7. Test Equipments Utilized

NO.	Description	TYPE	SERIES NUMBER	MANUFACTURE	CAL DUE DATE	CALIBRATION INTERVAL
1	Test Receiver	ESU26	100376	R&S	2022-09-15	1 Year
2	LISN	ENV216	101459	R&S	2023-04-16	1 year
3	Universal Radio Communication Tester	CMW500	159408	R&S	2023-04-01	1 year
4	Test Receiver	ESCI 7	100766	R&S	2023-04-02	1 Year
5	EMI Antenna	VULB 9163	01176	SCHWARZBECK	2022-11-15	1 year
6	EMI Antenna	3115	00167252	ETS	2022-12-26	1 year

## **ANNEX A: MEASUREMENT RESULTS**

### **A.1 Radiated Emission**

#### **Reference**

FCC: CFR Part 15.109(a).

#### **A.1.1 Method of measurement**

The field strength of radiated emissions from the unintentional radiator (USB mode of MS and charging mode of MS) at distances of 3 meters is tested. Tested in accordance with the procedures of ANSI C63.4 – 2014, section 8.3.

The EUT was placed on a non-conductive table. The measurement antenna was placed at a distance of 3/10 meters from the EUT. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

#### **A.1.2 EUT Operating Mode**

The MS is operating in the USB mode and charging mode. During the test MS is connected to a PC via a USB cable in the case of USB mode and is connected to a charger in the case of charging mode.

The EUT was tested while operating in licensed band Rx mode. All licensed band receivers that tune in the range of 30MHz-960MHz, as listed in section 3.4, are investigated. Only the worst case emissions are reported.

All equipment is placed on the test table top and arranged in a typical configuration in accordance with ANSI C63.4-2014 and manipulated to obtain worst case emissions.

The model of the PC is M4000E-17, and the serial number of the PC is M706GWXD. The software is used to let the PC keep on copying data to MS, reading and erasing the data after copy action was finished.

Note : I/O information : Printer – USB, Mouse – PS/2, Keyboard – USB.

#### **A.1.3 Measurement Limit**

Frequency range (MHz)	Field strength limit ( $\mu\text{V/m}$ )		
	Quasi-peak	Average	Peak
30-88	100		
88-216	150		
216-960	200		
960-1000	500		
>1000		500	5000

Note: the above limit is for 3 meters test distance. 10 meters' limit is got by converting.

#### **A.1.4 Test Condition**

Frequency range (MHz)	RBW/VBW	Sweep Time (s)	Detector
30-1000	120kHz (IF Bandwidth)	5	Peak/Quasi-peak
Above 1000	1MHz/3MHz	15	Peak, Average

### A.1.5 Measurement Results

A "reference path loss" is established and the  $A_{Rpl}$  is the attenuation of "reference path loss". It includes the antenna factor of receive antenna and the path loss.

The measurement results are obtained as described below:

$$\text{Result} = P_{\text{Mea}} + A_{Rpl} = P_{\text{Mea}} + G_A + G_{PL}$$

Where

$G_A$ : Antenna factor of receive antenna

$G_{PL}$ : Path Loss

$P_{\text{Mea}}$ : Measurement result on receiver.

Measurement uncertainty (worst case):  $U = 4.74 \text{ dB}$ ,  $k=2$ .

#### Measurement results for Set.1:

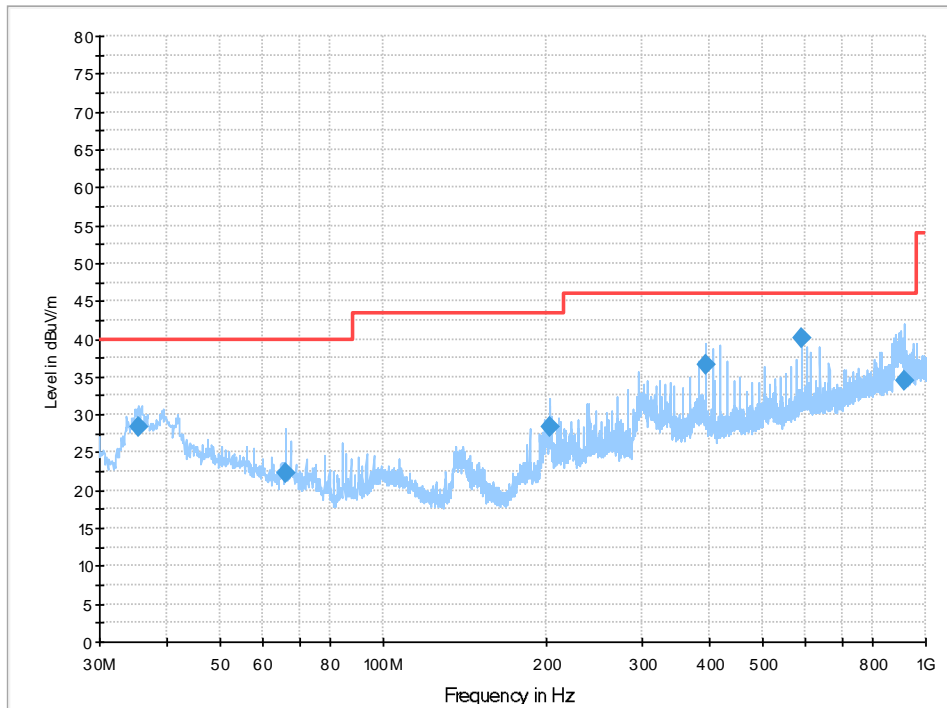
##### Charing Mode/Average detector

Frequency (MHz)	Measurement Result (dB $\mu$ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB $\mu$ V)	Limit (dB $\mu$ V/m)	Margin (dB)	Antenna Pol. (H/V)
17918.000	39.59	-26.2	41.2	24.54	54.0	14.4	V
17919.000	39.56	-26.2	41.2	24.51	54.0	14.4	V
17922.000	39.56	-26.2	41.2	24.50	54.0	14.4	V
17034.000	39.55	-27.0	41.6	24.94	54.0	14.4	V
17031.500	39.55	-27.0	41.6	24.94	54.0	14.4	V
17917.500	39.55	-26.2	41.2	24.50	54.0	14.5	V

##### Charging Mode/Peak detector

Frequency (MHz)	Measurement Result (dB $\mu$ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB $\mu$ V)	Limit (dB $\mu$ V/m)	Margin (dB)	Antenna Pol. (H/V)
11158.500	52.4	-32.1	37.9	46.63	74.0	21.6	H
17945.000	52.2	-26.1	41.3	37.02	74.0	21.8	V
17046.000	52.0	-27.0	41.6	37.38	74.0	22.0	H
17006.500	51.9	-27.1	41.7	37.25	74.0	22.1	V
17914.500	51.8	-26.2	41.2	36.78	74.0	22.2	V
17709.500	51.8	-26.6	41.1	37.31	74.0	22.2	H

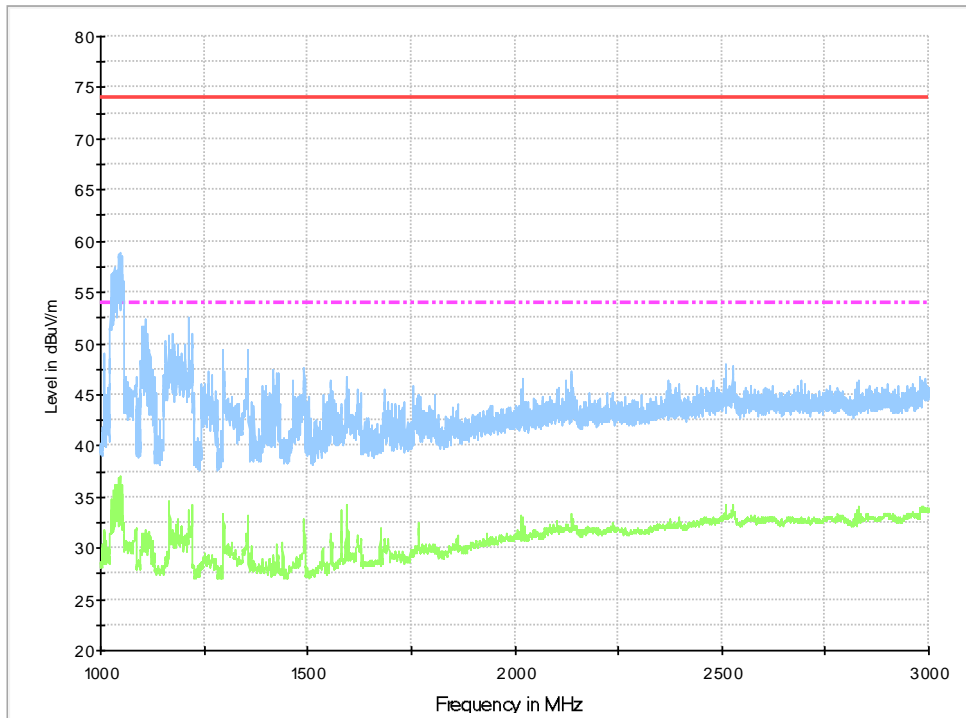
**Measurement results for Set.1:**



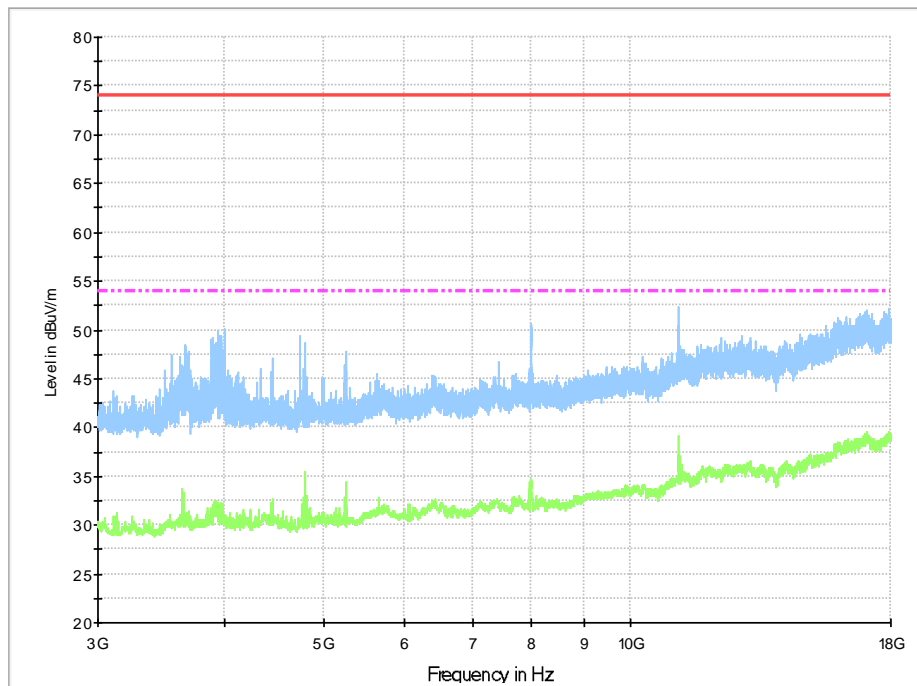
**Fig A.1 Radiated Emission from 30MHz to 1GHz**

**Final Result 1**

Frequency (MHz)	QuasiPeak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBuV/m)	Comment
35.335000	28.5	100.0	V	225.0	-2.2	11.5	40.0	
65.987000	22.3	125.0	H	288.0	-3.1	17.7	40.0	
203.145000	28.5	125.0	H	77.0	-0.9	15.0	43.5	
393.168000	36.5	100.0	H	102.0	4.7	9.5	46.0	
589.787000	40.1	125.0	H	270.0	8.6	5.9	46.0	
913.476000	34.4	100.0	V	0.0	12.3	11.6	46.0	



**Fig A.2 Radiated Emission from 1GHz to 3GHz**



**Fig A.3 Radiated Emission from 3GHz to 18GHz**

## A.2 Conducted Emission

### Reference

FCC: CFR Part 15.107(a).

### A.2.1 Method of measurement

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits. Tested in accordance with the procedures of ANSI C63.4 – 2014, section 7.3.

### A.2.2 EUT Operating Mode

The MS is operating in the USB mode and charging mode. During the test MS is connected to a PC via a USB cable in the case of USB mode and is connected to a charger in the case of charging mode. The model of the PC is DELL M4000E-17, and the serial number of the PC is M706GWXD. The software is used to let the PC keep on copying data to MS, reading and erasing the data after copy action was finished.

Note : I/O information : Printer – USB, Mouse – PS/2, Keyboard – USB.

### A.2.3 Measurement Limit

Frequency of emission (MHz)	Conducted limit (dB $\mu$ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

\*Decreases with the logarithm of the frequency

### A.2.4 Test Condition in charging mode

Voltage (V)	Frequency (Hz)
120	60

RBW/IF bandwidth	Sweep Time(s)
9kHz	1



### A.2.5 Measurement Results

Measurement uncertainty:  $U= 3.1 \text{ dB}$ ,  $k=2$ .

USB Mode, Set.1:

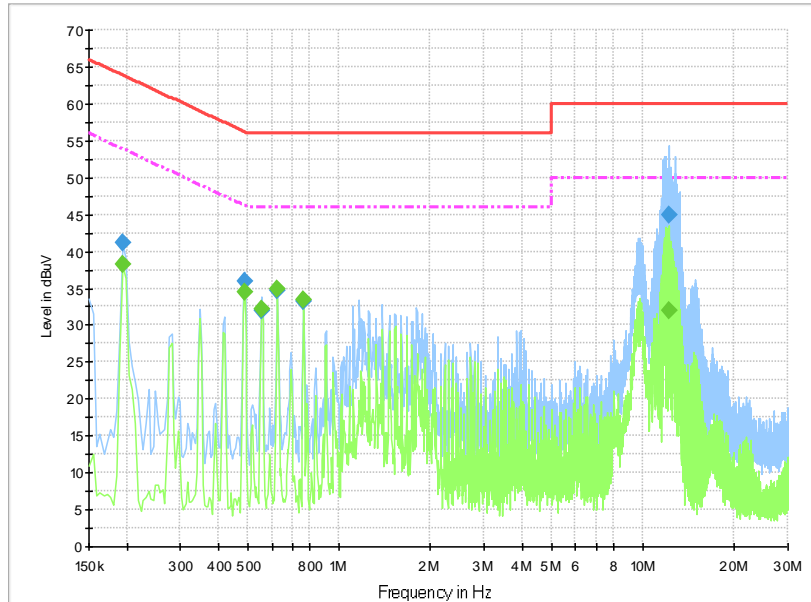


Fig A.4 Conducted Emission from 150kHz to 30MHz

#### Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.195000	41.1	3000.0	9.000	On	N	19.7	22.7	63.8	
0.487500	35.9	3000.0	9.000	On	N	19.8	20.3	56.2	
0.555000	31.9	3000.0	9.000	On	N	19.8	24.1	56.0	
0.627000	34.6	3000.0	9.000	On	N	19.7	21.4	56.0	
0.766500	33.3	3000.0	9.000	On	N	19.7	22.7	56.0	
12.165000	44.9	3000.0	9.000	On	L1	19.8	15.1	60.0	

#### Final Result 2

Frequency (MHz)	Average (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.195000	38.3	3000.0	9.000	On	L1	19.5	15.5	53.8	
0.487500	34.5	3000.0	9.000	On	L1	19.5	11.7	46.2	
0.555000	32.1	3000.0	9.000	On	N	19.8	13.9	46.0	
0.627000	34.8	3000.0	9.000	On	N	19.7	11.2	46.0	
0.766500	33.4	3000.0	9.000	On	N	19.7	12.6	46.0	
12.165000	32.0	3000.0	9.000	On	L1	19.8	18.0	50.0	

\*\*\*END OF REPORT\*\*\*