FCC PART 15B
TEST REPORT

No. I23Z61627-EMC01

for

TCL Communication Ltd.

TWS Headphone

Model name: TW241-TW18

FCC ID: 2ACCJB212 (right); 2ACCJB213 (left)

with

Hardware Version: V03

Software Version: V1.1.5.7

Issued Date: 2023-09-14

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:

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REPORT HISTORY

Report Number	Revision	Description	Issue Date
I23Z61627-EMC01	Rev.0	1st edition	2023-09-14

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

CONTENTS

1. Test Laboratory

1.1. Testing Location

CTTL (huayuan North Road)

Address: No. 52, Huayuan North Road, Haidian District, Beijing, P. R. China 100191

1.2. Testing Environment

Normal Temperature: 15-35°C

Relative Humidity: 20-75%

1.3. Project data

Testing Start Date: 2023-09-06

Testing End Date: 2023-09-13

1.4. Signature

Wang Xue

(Prepared this test report)

Zhang Ying

(Reviewed this test report)

Zhang Xia

(Approved this test report)

2. Client Information

2.1. Applicant Information

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2.2. Manufacturer Information

Company Name:	TCL Communication Ltd.
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Email	nianxiang.jiang@tcl.com
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3. Equipment Under Test (EUT) and Ancillary Equipment (AE)

3.1. About EUT

Description	TWS Headphone
Model Name	TW241-TW18
FCC ID:	2ACCJB212 (right); 2ACCJB213 (left)

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
UT11a(left)	\	V03	V1.1.5.7
UT12a(right)	\	V03	V1.1.5.7

*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	Model	Manufacture
AE1	Battery	531012PPE-42mAh	Zhongshan TianMao Battery Co.,Ltd.
AE2	Battery	742040PPV-760mAh	Zhongshan TianMao Battery Co.,Ltd.
AE3	Charing Box	TW241-TW18	TCL communication ltd

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

3.4. EUT set-ups

EUT set-up No.	Combination of EUT and AE	Remarks
Set.1	UT11a+UT12a+AE1+ AE2 + AE3	Charging mode

Note:

Equipment Under Test (EUT) is a model of TWS Headphone.

It has Bluetooth V5.2 EDR and BLE function.

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.

Reference	Title	Version
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. 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(huayuan North Road)**
2	Conducted Emission	15.107(a)	B.2	P	**CTTL(huayuan North Road)**

6. Test Equipments Utilized

NO.	Description	TYPE	SERIES NUMBER	MANUFACTURE	CAL DUE DATE	CALIBRATION INTERVAL
1	Test Receiver	ESW44	103144	R&S	2023-10-25	1 Year
2	LISN	ENV216	101200	R&S	2023-06-29	1 year
3	Test Receiver	ESCI 7	100344	R&S	2024-02-28	1 Year
4	EMI Antenna	VULB 9163	01222	SCHWARZBECK	2023-07-25	1 year
5	EMI Antenna	3115	6914	ETS-Lindgren	2024-04-25	1 year

Test software information		
Test Item	Software	Version
Radiated Emission	EMC32	V8.53.0
Conducted Emission	EMC32	V11.50.00

Semi-anechoic chamber utilized did not exceed following limits along the testing:

Temperature	Min. = 15 ℃, Max. = 35 ℃
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, 10 m distance
Site voltage standing-wave ratio (S_{VSWR})	Between 0 and 6 dB, from 1GHz to 6GHz

Shielded room utilized did not exceed following limits along the testing:

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

7. Measurement Uncertainty

Where relevant, the following measurement uncertainty(worse case) levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Location 1: CTTL(huayuan North Road)

Test item	Frequency ranges	Measurement uncertainty
Radiated Emission	30MHz-1GHz	4.72dB(*k*=2)
	1GHz-18GHz	4.84dB(*k*=2)
Conducted Emission	150kHz-30MHz	AC Power Line: 3.08dB(*k*=2)

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 (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 charging mode. During the test MS placed in its charging box which connected to a charger in the case of charging mode.

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.

A.1.3 Measurement Limit

Frequency range (MHz)	Field strength limit (μV/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:

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

Where

G_A: Antenna factor of receive antenna

G_{PL}: Path Loss

P_{Mea}: Measurement result on receiver.

Measurement uncertainty (worst case): U = 4.84 dB, k=2.

Measurement results for Set.1:

Charing Mode/Average detector

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
17987.760	47.20	-29.06	46.66	29.60	54.00	6.80	V
17971.440	47.10	-29.06	46.66	29.50	54.00	6.90	V
17968.040	47.00	-29.06	46.66	29.40	54.00	7.00	H
17993.540	46.90	-29.06	46.66	29.30	54.00	7.10	V
17986.060	46.80	-29.06	46.66	29.20	54.00	7.20	H
17953.080	46.70	-28.94	46.66	28.98	54.00	7.30	H

Charging Mode/Peak detector

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
17995.920	58.50	-29.06	46.66	40.90	74.00	15.50	H
17981.980	58.00	-29.06	46.66	40.40	74.00	16.00	V
17953.760	57.10	-28.94	46.66	39.38	74.00	16.90	H
17971.100	57.10	-29.06	46.66	39.50	74.00	16.90	V
17966.340	56.90	-29.06	46.66	39.30	74.00	17.10	V
17997.960	56.90	-29.06	46.66	39.30	74.00	17.10	H

Measurement results for Set.1:

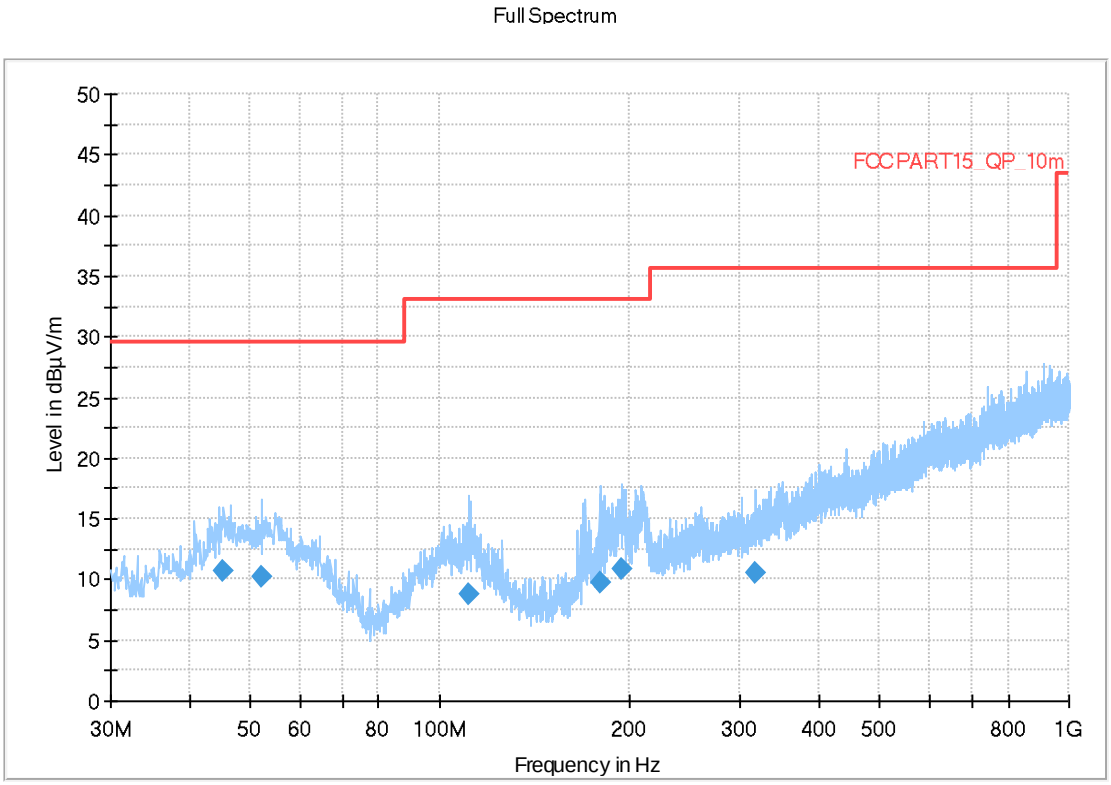

Fig A.1 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
45.326000	10.63	29.54	18.91	120.000	202.0	V	45.0
52.213000	10.25	29.54	19.29	120.000	275.0	V	-4.0
110.995000	8.84	33.06	24.22	120.000	108.0	V	149.0
179.477000	9.76	33.06	23.30	120.000	108.0	V	239.0
195.288000	10.81	33.06	22.25	120.000	100.0	V	239.0
316.926000	10.47	35.56	25.09	120.000	202.0	V	111.0

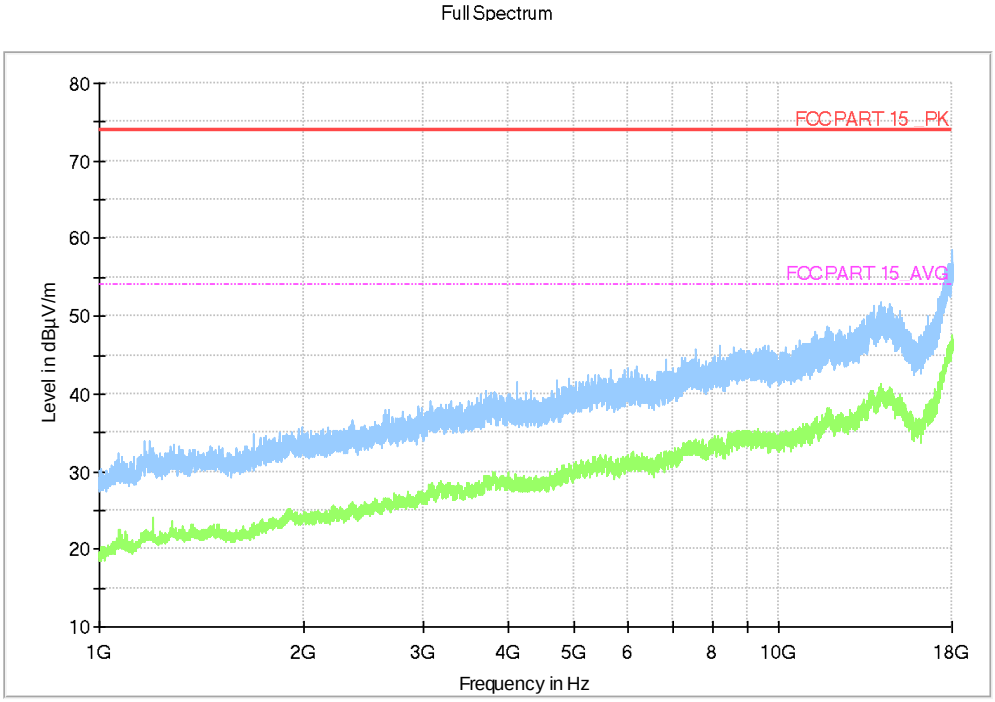

Fig A.2 Radiated Emission from 1GHz to 18GHz

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 charging mode. During the test MS is connected to a charger in the case of charging mode.

A.2.3 Measurement Limit

Frequency of emission (MHz)	Conducted limit (dBμV)	
	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*= 3.08 dB, *k*=2.

Charging Mode, Set.1:

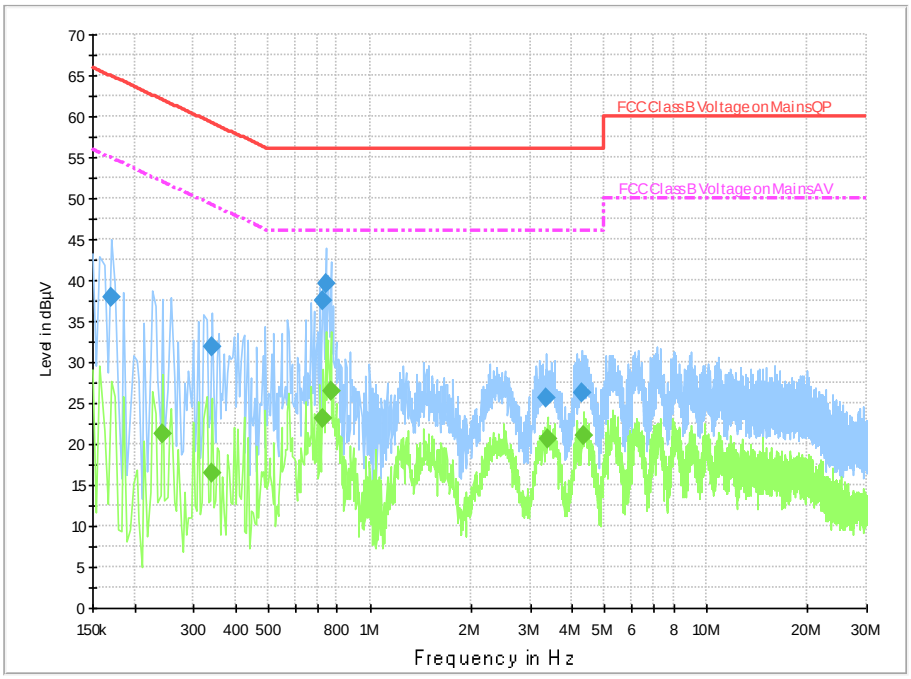

Fig A.3 Conducted Emission from 150kHz to 30MHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.170000	37.8	2000.0	9.000	On	L1	19.7	27.1	65.0	
0.338000	31.8	2000.0	9.000	On	N	19.7	27.4	59.3	
0.722000	37.5	2000.0	9.000	On	L1	19.7	18.5	56.0	
0.738000	39.7	2000.0	9.000	On	L1	19.7	16.3	56.0	
3.338000	25.6	2000.0	9.000	On	L1	19.6	30.4	56.0	
4.282000	26.2	2000.0	9.000	On	N	19.6	29.8	56.0	

Final Result 2

Frequency (MHz)	Average (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.242000	21.2	2000.0	9.000	On	N	19.7	30.8	52.0	
0.338000	16.4	2000.0	9.000	On	L1	19.7	32.8	49.3	
0.726000	23.2	2000.0	9.000	On	N	19.7	22.8	46.0	
0.766000	26.5	2000.0	9.000	On	N	19.7	19.5	46.0	
3.366000	20.7	2000.0	9.000	On	N	19.6	25.3	46.0	
4.306000	21.0	2000.0	9.000	On	L1	19.6	25.0	46.0	

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