



TEST REPORT

No. I23N01610-MPE

For

TCL Communication Ltd.

LINKHUB

Model Name: HH40L2

With

Hardware Version: TZ7.823.397

Software Version: HH40L2.1.01

FCC ID: 2ACCJB202

Issued Date: 2023-10-23

Designation Number: CN1210

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 SAICT.

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REPORT HISTORY

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1. Summary of Test Report

1.1. Test Items

Description:	LINKHUB
Model Name:	HH40L2
Applicant's Name:	TCL Communication Ltd.
Manufacturer's Name:	TCL Communication Ltd.

1.2. Test Standards

FCC Part 2.1091, KDB 447498 D04 Interim General RF Exposure Guidance v01

1.3. Test Result

Pass

1.4. Testing Location

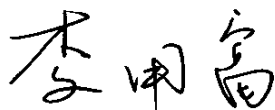
Address: Building G, Shenzhen International Innovation Center, No.1006 Shennan Road, Futian District, Shenzhen, Guangdong, P. R. China

1.5. Project Data

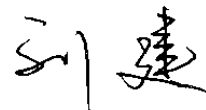
Testing Start Date: 2023-10-19

Testing End Date: 2023-10-19

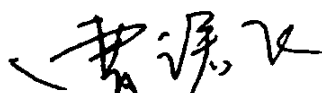
1.6. Signature



Li Yongfu
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2. Client Information

2.1. Applicant Information

Company Name:	TCL Communication Ltd.
Address:	5/F, Building 22E, 22 Science Park East Avenue, Hong Kong Science Park, Shatin, NT, Hong Kong, China
City:	Hong Kong
Country:	China
Telephone:	0086-755-3661 1621

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, China
City:	Hong Kong
Country:	China
Telephone:	0086-755-3661 1621

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

3.1. About EUT

Description:	LINKHUB
Model name:	HH40L2
Condition of EUT as received:	No obvious damage in appearance
Frequency Bands:	PCS 1900, LTE Band 5/41, WLAN 2.4GHz
Tx Frequency:	1850 – 1910MHz (PCS 1900)
	824 – 849MHz (LTE Band 5)
	2496 – 2690MHz (LTE Band 41)
	2412 – 2462MHz (WLAN 2.4GHz)

3.2. Device Classification

According to the user manual, the antenna of this device is at least 20cm away from the body of the user, this device is classified as a Mobile Device. So, the RF exposure evaluation requirements of § 2.1091 for mobile device exposure conditions subject to MPE limits.

4. Test Methodology

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

FCC Part 2.1091

KDB 447498 D04 Interim General RF Exposure Guidance v01

5. RF Exposure Evaluation

5.1. Limit

According to FCC §1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in §1.1307(b)

Limits For Maximum Permissible Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Average Time (Minutes)
(A) Limits for Occupational/ Control Exposures				
0.3-3.0	614	1.63	*(100)	≤6
3.0-30	1842/f	4.89/f	*(900/f ²)	<6
30-300	61.4	0.163	1.0	<6
300-1,500	--	--	f/300	<6
1,500-100,000	--	--	5	<6
(B) Limits for General Population/ Uncontrolled Exposures				
0.3-1.34	614	1.63	*(100)	<30
1.34-30	824/f	2.19/f	*(180/f ²)	<30
30-300	27.5	0.073	0.2	<30
300-1,500	--	--	f/1500	<30
1,500-100,000	--	--	1.0	<30

f = frequency in MHz. * = Plane-wave equivalent power density.

5.2. MPE Exemptions

For single RF sources (i.e., any single fixed RF source, mobile device, or portable device, as defined in paragraph §1.1307(b)(2) of this section): A single RF source is exempt if:

(Option A) The available maximum time-averaged power is no more than 1 mW, regardless of separation distance. This exemption may not be used in conjunction with other exemption criteria other than those in paragraph §1.1307(b)(3)(ii)(A) of this section.

Medical implant devices may only use this exemption and that in paragraph §1.1307(b)(3)(ii)(A);

(Option B) Or the available maximum time-averaged power or effective radiated power (ERP), whichever is greater, is less than or equal to the threshold P_{th} (mW) described in the following formula. This method shall only be used at separation distances (cm) from 0.5 centimeters to 40 centimeters and at frequencies from 0.3 GHz to 6 GHz (inclusive). P_{th} is given by:

$$P_{th} \text{ (mW)} = \begin{cases} ERP_{20 \text{ cm}} (d/20 \text{ cm})^x & d \leq 20 \text{ cm} \\ ERP_{20 \text{ cm}} & 20 \text{ cm} < d \leq 40 \text{ cm} \end{cases}$$

Where

$$x = -\log_{10} \left(\frac{60}{ERP_{20 \text{ cm}} \sqrt{f}} \right) \text{ and } f \text{ is in GHz;}$$

and

$$ERP_{20 \text{ cm}} \text{ (mW)} = \begin{cases} 2040f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz} \end{cases}$$

d = the separation distance (cm);

(Option C) Or using Table 1 and the minimum separation distance (R in meters) from the body of a nearby person for the frequency (f in MHz) at which the source operates, the ERP (watts) is no more than the calculated value prescribed for that frequency. For the exemption in Table 1 to apply, R must be at least $\lambda/2\pi$, where λ is the free-space operating wavelength in meters. If the ERP of a single RF source is not easily obtained, then the available maximum time-averaged power may be used in lieu of ERP if the physical dimensions of the radiating structure(s) do not exceed the electrical length of $\lambda/4$ or if the antenna gain is less than that of a half-wave dipole (1.64 linear value).

Table 1 to §1.1307(b)(3)(i)(C)-Single RF Sources Subject to Routine Environmental Evaluation

RF Source Frequency (MHz)	Threshold ERP (watts)
0.3-1.34	1920R ²
1.34-30	3450R ² /f ²
30-300	3.83R ²
300-1,500	0.0128R ² /f
1,500-100,000	19.2R ²

For multiple RF sources: Multiple RF sources are exempt if:

(A) The available maximum time-averaged power of each source is no more than 1 mW and there is a separation distance of two centimeters between any portion of a radiating structure operating and the nearest portion of any other radiating structure in the same device, except if the sum of multiple sources is less than 1 mW during the time-averaging period, in which case they may be treated as a single source (separation is not required). This exemption may not be used in conjunction with other exemption criteria other than those in paragraph §1.1307(b)(3)(i)(A) of this section. Medical implant devices may only use this exemption and that in paragraph §1.1307(b)(3)(i)(A).

(B) in the case of fixed RF sources operating in the same time-averaging period, or of multiple mobile or portable RF sources within a device operating in the same time averaging period, if the sum of the fractional contributions to the applicable thresholds is less than or equal to 1 as indicated in the following equation.

$$\sum_{i=1}^a \frac{P_i}{P_{th,i}} + \sum_{j=1}^b \frac{ERP_j}{ERP_{th,j}} + \sum_{k=1}^c \frac{Evaluated_k}{Exposure Limit_k} \leq 1$$

Where:

a = number of fixed, mobile, or portable RF sources claiming exemption using paragraph §1.1307(b)(3)(i)(B) of this section for P_{th} , including existing exempt transmitters and those being added.

b = number of fixed, mobile, or portable RF sources claiming exemption using paragraph §1.1307(b)(3)(i)(C) of this section for Threshold ERP, including existing exempt transmitters and those being added.

c = number of existing fixed, mobile, or portable RF sources with known evaluation for the specified minimum distance including existing evaluated transmitters.

P_i = the available maximum time-averaged power or the ERP, whichever is greater, for fixed, mobile, or portable RF source i at a distance between 0.5 cm and 40 cm (inclusive).

$P_{th,i}$ = the exemption threshold power (P_{th}) according to paragraph §1.1307(b)(3)(i)(B) of this section for fixed, mobile, or portable RF source i .

ERP_j = the ERP of fixed, mobile, or portable RF source j .

$ERP_{th,j}$ = exemption threshold ERP for fixed, mobile, or portable RF source j , at a distance of at least $\lambda/2\pi$ according to the applicable formula of paragraph §1.1307(b)(3)(i)(C) of this section.

$Evaluated_k$ = the maximum reported SAR or MPE of fixed, mobile, or portable RF source k either in the device or at the transmitter site from an existing evaluation at the location of exposure.

$Exposure Limit_k$ = either the general population/uncontrolled maximum permissible exposure (MPE) or specific absorption rate (SAR) limit for each fixed, mobile, or portable RF source k , as applicable from § 1.1310 of this chapter.

5.3. Assessment Result

Band	Tune-up Power (dBm)	Maximum Antenna Gain (dBi)	EIRP (dBm)
PCS 1900 (Build-in)	22.97	4.50	27.47
LTE Band 5 (Build-in)	23.50	2.50	26.00
LTE Band 41 (Build-in)	23.50	2.40	25.90
PCS 1900 (External)	22.97	2.31	25.28
LTE Band 5 (External)	23.50	1.49	24.99
LTE Band 41 (External)	23.50	4.05	27.55
WLAN 2.4GHz (Antenna 0)	20.00	3.74	23.74
WLAN 2.4GHz (Antenna 1)	20.00	3.88	23.88
WLAN 2.4GHz MIMO	16.00	3.81	19.81

Note 1: Tune-up Power/Antenna Gain is supplied by manufacturer.

Note 2: EIRP (dBm) = Tune-up Power (dBm) + Antenna Gain (dBi).

Note 3:

GPRS 1900 GMSK	Measured timeslot-Averaged output power (dBm)	Calculation	Source-based time-Averaged output power (dBm)
1Tx slot (Build-in)	32.0	-9.03	22.97
1Tx slot (External)	32.0	-9.03	22.97

For single RF source, Option B

Evaluation Mode	Distance (cm)	Tune-up Power (mW)	ERP (mW)	Threshold ERP (mW)	Conclusion
PCS 1900 (Build-in)	20	198.15	340.41	3060	Pass
LTE Band 5 (Build-in)	20	223.87	242.66	1681	Pass
LTE Band 41 (Build-in)	20	223.87	237.14	3060	Pass
PCS 1900 (External)	20	198.15	205.59	3060	Pass
LTE Band 5 (External)	20	223.87	192.31	1681	Pass
LTE Band 41 (External)	20	223.87	346.74	3060	Pass
WLAN 2.4GHz (Antenna 0)	20	100.00	144.21	3060	Pass
WLAN 2.4GHz (Antenna 1)	20	100.00	148.94	3060	Pass
WLAN 2.4GHz MIMO	20	39.81	58.34	3060	Pass

Note 1: Distance comes from the user's manual.

Note 2: Tune-up Power (mW) = $10^{[\text{Tune-up Power (dBm)}]/10}$

Note 3: ERP (mW) = $10^{[(\text{EIRP(dBm)}-2.15)/10]}$

For multiple RF sources

Co-transmitting Mode	Co-transmitting ERP / Threshold ERP	Limit	Conclusion
LTE Band 5 (Build-in) + WLAN 2.4GHz (Antenna 1)	0.193	1	Pass

Note: The Co-transmitting mode of above tables is for the worse case that has been evaluated.

Conclusion: the device qualifies for RF exposure test exemption.

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