TEST REPORT

No. I19Z61861-EMC02

for

TCL Communication Ltd.

USB Connect 4G V2 (APAC)

Model Name: IK41CQ

FCC ID: 2ACCJB116

with

Hardware Version: V3.0

Software Version: IK41_ZZ_02.00_01

Issued Date: 2019-11-28

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.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S.Government.

Test Laboratory:

CTTL-Telecommunication Technology Labs, CAICT

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@caict.ac.cn, website: www.caict.ac.cn

REPORT HISTORY

Report Number	Revision	Description	Issue Date
I19Z61861-EMC02	Rev.0	1st edition	2019-11-28

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

CONTENTS

1. Test Laboratory

1.1. Introduction & Accreditation

Telecommunication Technology Labs, CAICT is an ISO/IEC 17025:2005 accredited test laboratory under NATIONAL VOLUNTARY LABORATORY ACCREDITATION PROGRAM (NVLAP) with lab code 600118-0, and is also an FCC accredited test laboratory (CN5017), and ISED accredited test laboratory (CN0066). The detail accreditation scope can be found on NVLAP website.

2. Test Laboratory

2.1. Testing Location

CTTL(huayuan North Road)

Address: No. 52, Huayuan North Road, Haidian District, Beijing, P. R. China100191

2.2. Testing Environment

Normal Temperature: 15-35℃

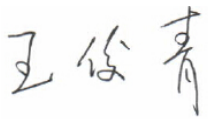
Relative Humidity: 20-75%

2.3. Project data

Testing Start Date: 2019-11-10

Testing End Date: 2019-11-28

2.4. Signature

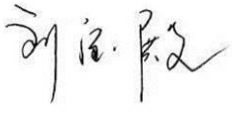


Wang Junqing

(Prepared this test report)

Zhang Ying

(Reviewed this test report)



Liu Baodian

Deputy Director of the laboratory

(Approved this test report)

3. Client Information

3.1. Applicant Information

Company Name:	TCL Communication Ltd.
Address /Post:	5/F, Building 22E, 22 Science Park East Avenue, Hong Kong Science Park, Shatin, NT, Hong Kong
Contact Person:	Gong Zhizhou
Contact Email	zhizhou.gong@tcl.com
Telephone:	0086-755-36611722
Fax:	0086-755-36612000-81722

3.2. Manufacturer Information

Company Name:	TCL Communication Ltd.
Address /Post:	5/F, Building 22E, 22 Science Park East Avenue, Hong Kong Science Park, Shatin, NT, Hong Kong
Contact Person:	Gong Zhizhou
Contact Email	zhizhou.gong@tcl.com
Telephone:	0086-755-36611722
Fax:	0086-755-36612000-81722

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

4.1. About EUT

Description	USB Connect 4G V2 (APAC)
Model Name	IK41CQ
FCC ID	2ACCJB116

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.

4.2. Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version
EUT1	352540110000360	V3.0	IK41_ZZ_02.00_01

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

4.3. Internal Identification of AE used during the test

AE ID*	Description	SN	Remarks
AE1	Test Computer	/	/
AE2	USB Cable	/	DC21a/22a

AE2

Model	/
Manufacturer	/
Length of cable	/

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

Note: The USB cables are shielded.

4.4. EUT set-ups

EUT set-up No.	Combination of EUT and AE	Remarks
Set.1	EUT1+ AE1	PC USB
Set.2	EUT1+ AE1 + AE2	OTG USB

Note: USB Connect 4G V2 (APAC) IK41CQ is a variant model based on IK41VE for conformance test. According to the declaration of changes, no tests is performed. All results are inherited from the initial model. The report number of initial model is I19Z61810-EMC02.

5. Reference Documents

5.1. 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	2016
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.

6. LABORATORY ENVIRONMENT

Semi-anechoic chamber SAC-1 (23 meters×17meters×10meters) 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, 10 m 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 3000 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

7. 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)**

8. Test Equipments Utilized

NO.	Description	TYPE	SERIES NUMBER	MANUFACTURE	CAL DUE DATE	CALIBRATION INTERVAL
1	Test Receiver	ESU26	100235	R&S	2020-03-01	1 Year
2	Test Receiver	ESCI3	100344	R&S	2020-02-14	1 Year
3	Universal Radio Communication Tester	CMW500	150344	R&S	2019-12-27	1 year
4	Universal Radio Communication Tester	CMW500	116588	R&S	2019-12-26	1 year
5	LISN	ENV216	101200	R&S	2020-03-14	1 year
6	EMI Antenna	VULB 9163	9163-1222	Schwarzbeck	2020-03-14	1 year
7	EMI Antenna	3115	6914	ETS-Lindgren	2020-01-03	1 year
8	PC	M4000E-17	M706GWXD	LENOVO	N/A	N/A
9	Printer	P1606dn	VNC3L52122	HP	N/A	N/A

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) at distances of 10 meters(for 30MHz-1GHz) and 3 meters (for above 1GHz) 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. During the test MS is connected to a PC via a USB cable in the case of USB mode. 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 (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/1MHz	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 = 5.44 dB, k=2.

Measurement results for Set.1:

USB Mode/Average detector

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Antenna Pol. (H/V)
17951.833	46.5	-5.4	33.8	18.1	H
17954.100	46.4	-5.4	33.8	18.0	H
17952.967	46.4	-5.4	33.8	18.0	V
17950.133	46.4	-5.4	33.8	18.0	H
17821.500	46.3	-5.7	33.8	18.2	H
17941.633	46.3	-5.4	33.8	17.9	H

USB Mode/ Peak detector

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Antenna Pol. (H/V)
17843.600	58.1	-5.7	33.8	30.0	H
17990.367	57.9	-5.4	33.8	29.5	H
17975.633	57.9	-5.4	33.8	29.5	V
17402.167	57.8	-5.9	33.8	29.9	H
17802.233	57.6	-5.7	33.8	29.5	H
17917.267	57.6	-5.4	33.8	29.2	H

Measurement results for Set.2:

USB Mode with OTG Cable/Average detector

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Antenna Pol. (H/V)
17958.633	46.8	-17.7	45.6	18.9	H
17826.033	46.7	-18.5	45.6	19.6	H
17823.767	46.7	-18.5	45.6	19.6	V
17955.800	46.6	-17.7	45.6	18.7	H
17960.333	46.5	-17.7	45.6	18.6	H
17911.033	46.5	-18.5	45.6	19.4	H

USB Mode with OTG Cable/ Peak detector

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Antenna Pol. (H/V)
17949.000	58.9	-17.7	45.6	31.0	H
17513.800	58.3	-19.2	45.6	31.9	H
17958.633	58.3	-17.7	45.6	30.4	V
17944.467	58.1	-17.7	45.6	30.2	H
17930.300	58.0	-17.7	45.6	30.1	H
17980.167	58.0	-17.7	45.6	30.1	H

USB Mode, Set.1

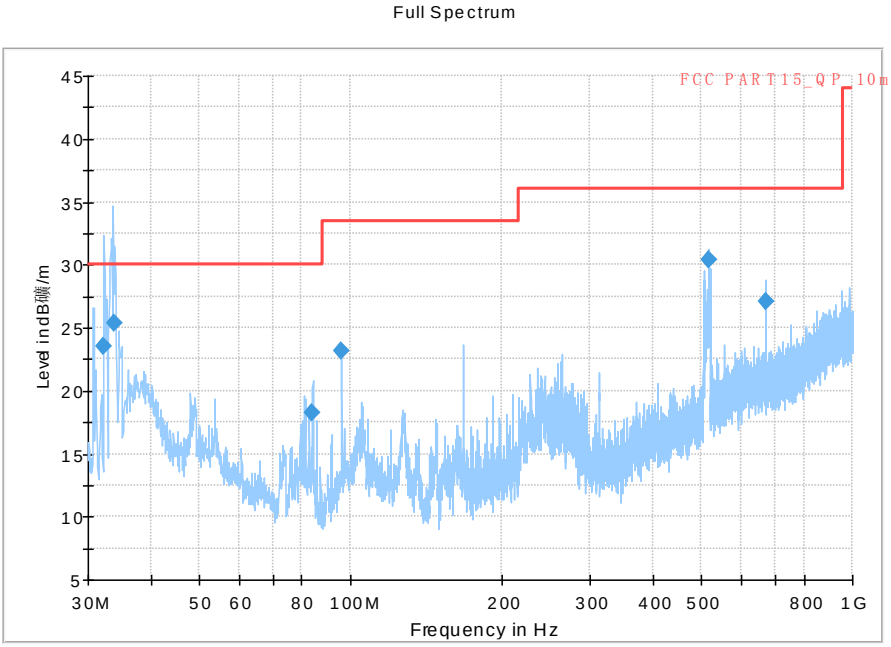


Fig A.1 Radiated Emission from 30MHz to 1GHz

Final_Result

Frequency (MHz)	QuasiPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
32.231000	23.58	30.00	6.42	1000.0	120.000	317.0	V	282.0
33.746000	25.41	30.00	4.59	1000.0	120.000	217.0	V	-30.0
84.066000	18.27	30.00	11.73	1000.0	120.000	307.0	V	79.0
96.080000	23.22	33.50	10.30	1000.0	120.000	100.0	V	73.0
518.880000	30.44	36.00	5.58	1000.0	120.000	225.0	V	-20.0
671.983000	27.14	36.00	8.88	1000.0	120.000	225.0	V	210.0

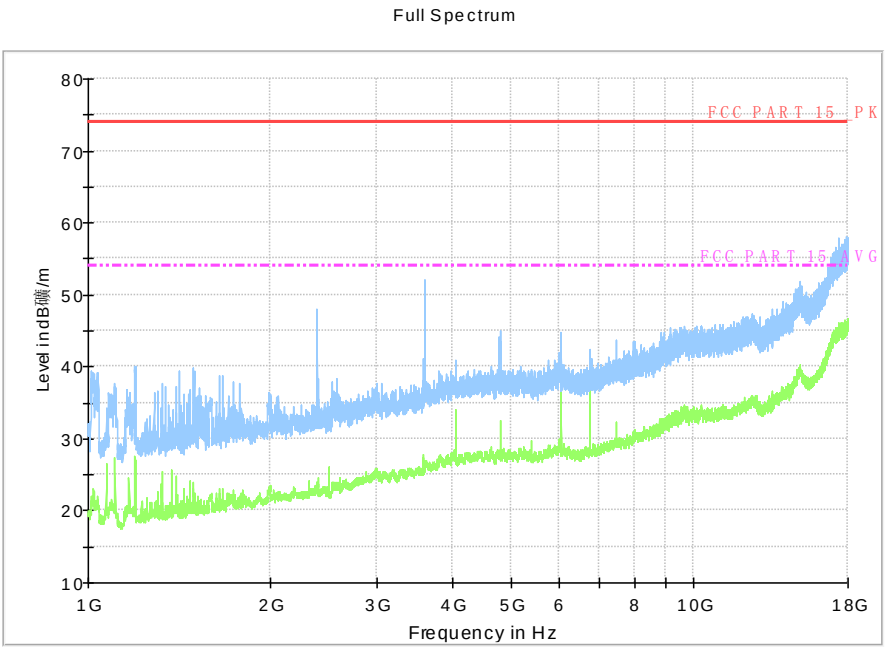


Fig A.2 Radiated Emission from 1GHz to 18GHz

USB Mode with OTG Cable, Set.2

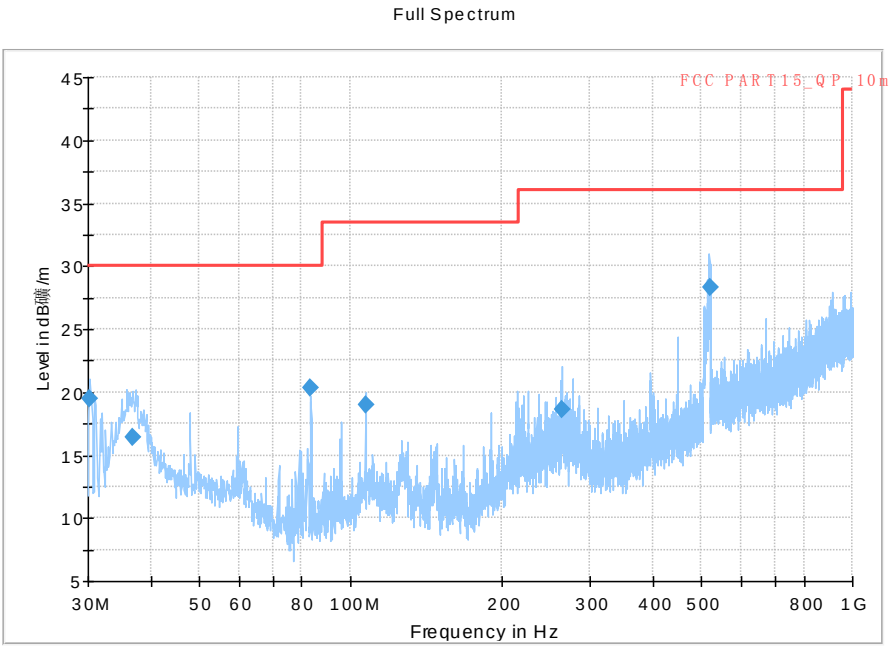


Fig A.3 Radiated Emission from 30MHz to 1GHz

Final_Result

Frequency (MHz)	QuasiPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
30.300000	19.51	30.00	10.49	1000.0	120.000	185.0	V	241.0
36.795000	16.35	30.00	13.65	1000.0	120.000	125.0	V	158.0
83.433000	20.35	30.00	9.65	1000.0	120.000	125.0	V	19.0
107.235000	18.99	33.50	14.53	1000.0	120.000	116.0	V	19.0
264.024000	18.63	36.00	17.39	1000.0	120.000	117.0	V	20.0
519.360000	28.28	36.00	7.74	1000.0	120.000	278.0	V	-12.0

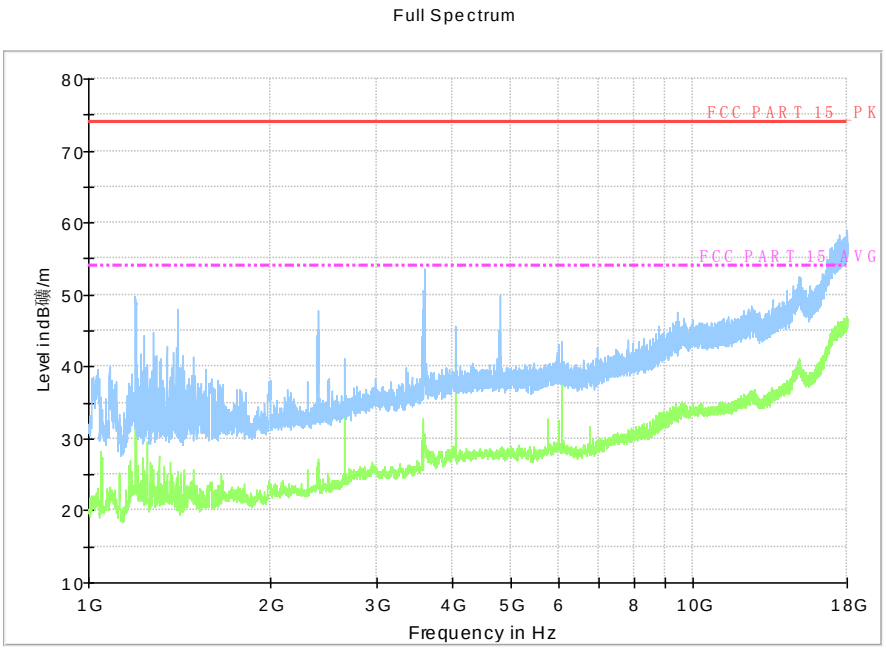


Fig A.4 Radiated Emission from 1GHz to 18GHz

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 USB mode. During the test MS is connected to a PC via a USB cable in the case of USB 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 (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*= 3.38 dB, *k*=2.

USB Mode, Set.1

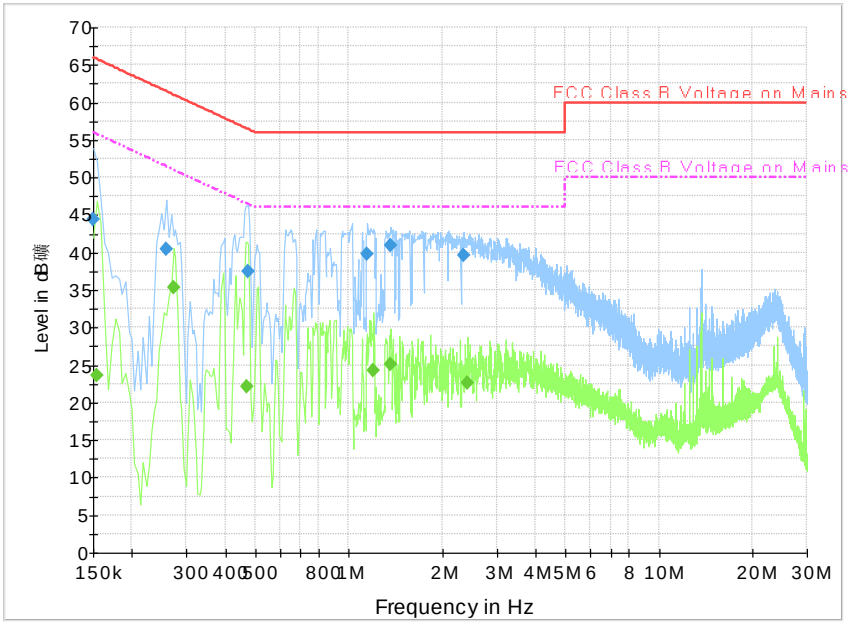


Fig A.5 Conducted Emission from 150kHz to 30MHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.150000	44.4	2000.0	9.000	On	N	30.6	21.6	66.0	
0.258000	40.4	2000.0	9.000	On	N	19.8	21.1	61.5	
0.474000	37.5	2000.0	9.000	On	L1	19.8	18.9	56.4	
1.149000	39.8	2000.0	9.000	On	N	19.7	16.2	56.0	
1.369500	40.9	2000.0	9.000	On	L1	19.6	15.1	56.0	
2.337000	39.6	2000.0	9.000	On	N	19.6	16.4	56.0	

Final Result 2

Frequency (MHz)	Average (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.154500	23.7	2000.0	9.000	On	L1	29.7	32.1	55.8	
0.271500	35.3	2000.0	9.000	On	L1	19.8	15.8	51.1	
0.469500	22.2	2000.0	9.000	On	L1	19.8	24.3	46.5	
1.203000	24.3	2000.0	9.000	On	L1	19.7	21.7	46.0	
1.369500	25.1	2000.0	9.000	On	L1	19.6	20.9	46.0	
2.409000	22.6	2000.0	9.000	On	L1	19.6	23.4	46.0	

USB Mode with OTG Cable, Set.2

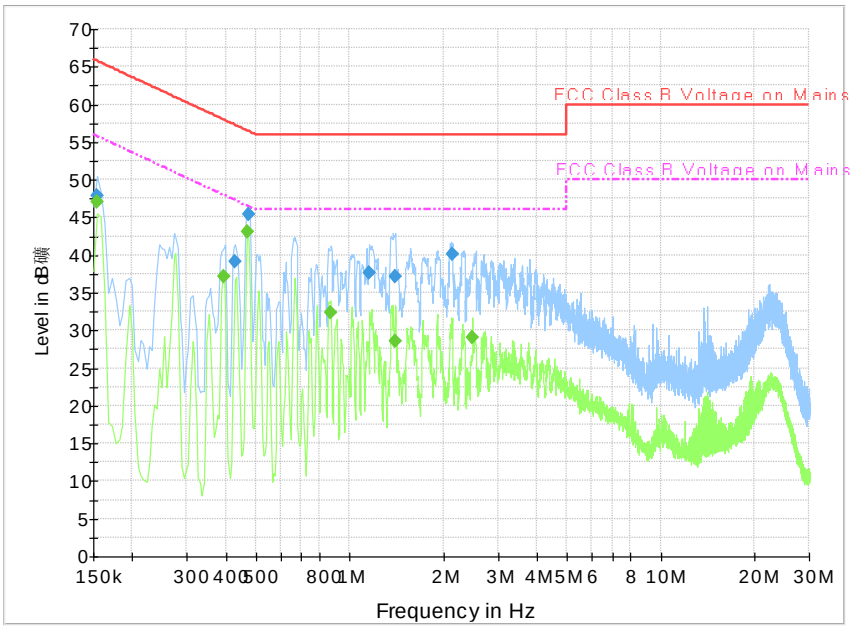


Fig A.6 Conducted Emission from 150kHz to 30MHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.154500	47.8	1000.0	9.000	On	L1	29.7	17.9	65.8	
0.429000	39.1	1000.0	9.000	On	N	19.8	18.2	57.3	
0.474000	45.4	1000.0	9.000	On	N	19.8	11.1	56.4	
1.153500	37.6	1000.0	9.000	On	L1	19.7	18.4	56.0	
1.405500	37.1	1000.0	9.000	On	N	19.6	18.9	56.0	
2.134500	40.1	1000.0	9.000	On	N	19.6	15.9	56.0	

Final Result 2

Frequency (MHz)	Average (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.154500	47.1	1000.0	9.000	On	L1	29.7	8.7	55.8	
0.393000	37.2	1000.0	9.000	On	L1	19.8	10.8	48.0	
0.469500	43.0	1000.0	9.000	On	L1	19.8	3.5	46.5	
0.865500	32.4	1000.0	9.000	On	N	19.7	13.6	46.0	
1.405500	28.5	1000.0	9.000	On	N	19.6	17.5	46.0	
2.485500	29.1	1000.0	9.000	On	N	19.6	16.9	46.0	

ANNEX B: PERSONS INVOLVED IN THIS TESTING

Test Item	Test Software and Version	Software Vendor	Test operator
Conducted Emission	EMC32 V8.5.2	R&S	Shi Suolan
Radiated Emission	EMC32 V9.01.00	R&S	Yan Hanchen Li Pengfei

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