



TEST REPORT

No. I19Z62156-EMC01

for

TCL Communication Ltd.

HSUPA/HSDPA/UMTS 5 Bands/GSM Quad Bands/LTE 17 bands

mobile phone

Model Name: T799B

FCC ID: 2ACCJN034

with

Hardware Version: 04

Software Version: 4D2Y

Issued Date: 2019-12-26

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

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REPORT HISTORY

Report Number	Revision	Description	Issue Date
I19Z62156-EMC01	Rev.0	1 st edition	2019-12-26

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

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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. China 100191

2.2. Testing Environment

Normal Temperature: 15-35° C

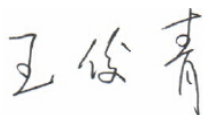
Relative Humidity: 20-75%

2.3. Project data

Testing Start Date: 2019-12-10

Testing End Date: 2019-12-20

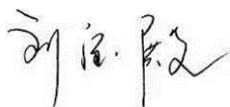
2.4. Signature



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.
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Telephone: 0086-755-36611722
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3.2. 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 Person Gong Zhizhou
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Telephone: 0086-755-36611722
Fax: 0086-755-36612000-81722

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

4.1. About EUT

Description	HSUPA/HSDPA/UMTS 5 Bands/GSM Quad Bands/LTE 17 bands mobile phone
Model Name	T799B
FCC ID	2ACCJN034
Extreme vol. Limits	3.5VDC to 4.4VDC (nominal: 3.85VDC)

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	015626000009394	04	4D2Y

*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	Battery	/	/
AE2	Battery	/	/
AE3	Charger	/	CH009/010
AE5	USB Cable	/	DC005
AE6	USB Cable	/	DC015
AE7	Headset	/	/

AE1

Model	Tlp043D7
Manufacturer	VEKEN
Capacitance	4360mAh
Nominal voltage	3.85 V

AE2

Model	TLp043D1
Manufacturer	BYD
Capacitance	4360mAh
Nominal voltage	3.85 V

AE3

Model	QC13US
Manufacturer	BYD
Length of cable	/

AE5

Model	CDA0000139C1
Manufacturer	Juwei
Length of cable	/



AE6

Model	CDA0000139C2
Manufacturer	Shenghua
Length of cable	/

AE7

Model	MTRO100
Manufacturer	TES
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/AE2+ AE3+ AE5/AE6+AE7	Charger +FM
Set.2	EUT1+ AE1/AE2+ AE5/AE6	USB

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	CALIBRATI ON INTERVAL
1	Test Receiver	ESU26	100235	R&S	2020-03-01	1 Year
2	Test Receiver	ESC13	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
10	Signal Power	SMBV100A	260613	R&S	2019-12-27	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 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 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 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:

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

Where

G_A : Antenna factor of receive antenna

G_{PL} : Path Loss

P_{Mea} : Measurement result on receiver.

Measurement uncertainty (worst case): $U = 5.44 \text{ dB}$, $k=2$.

Measurement results for Set.1:

Charging Mode/Average detector

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Antenna Pol. (H/V)
17822.633	47.0	-18.5	45.6	19.900	H
17820.933	46.9	-18.5	45.6	19.800	H
17941.067	46.8	-17.7	45.6	18.900	V
17611.267	46.8	-18.9	45.6	20.100	H
17616.933	46.7	-18.9	45.6	20.000	H
17949.000	46.7	-17.7	45.6	18.800	H

Charging Mode/Peak detector

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Antenna Pol. (H/V)
17715.533	59.2	-18.9	45.6	32.500	H
17489.433	58.3	-19.2	41.5	36.000	H
17929.167	58.2	-17.7	45.6	30.300	V
17837.933	58.2	-18.5	45.6	31.100	H
17743.867	58.1	-18.5	45.6	31.000	H
17281.467	58.0	-19.5	41.5	36.000	H

Measurement results for Set.2:
USB Mode/Average detector

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Antenna Pol. (H/V)
17956.933	47.0	-17.7	45.6	19.100	H
17937.667	46.6	-17.7	45.6	18.700	H
17938.233	46.6	-17.7	45.6	18.700	V
17954.100	46.4	-17.7	45.6	18.500	H
17937.100	46.4	-17.7	45.6	18.500	H
17943.333	46.4	-17.7	45.6	18.500	H

USB Mode/ Peak detector

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Antenna Pol. (H/V)
17611.833	57.9	-18.9	45.6	31.200	H
17959.200	57.8	-17.7	45.6	29.900	H
17973.933	57.8	-17.7	45.6	29.900	V
17938.233	57.8	-17.7	45.6	29.900	H
17949.567	57.7	-17.7	45.6	29.800	H
17820.933	57.7	-18.5	45.6	30.600	H

Charging Mode, Set.1

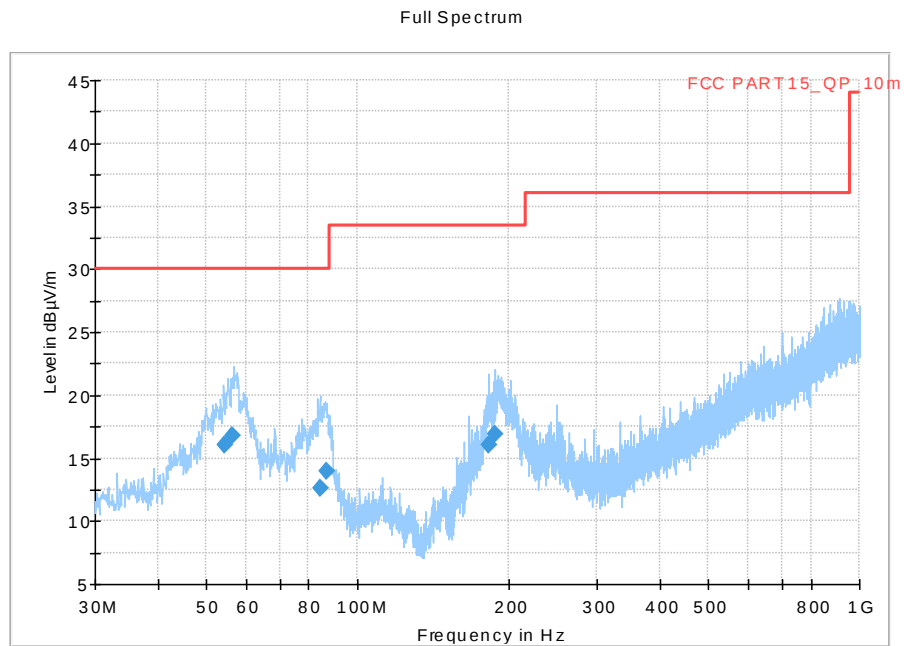


Fig A.1 Radiated Emission from 30MHz to 1GHz

Final_Result

Frequency (MHz)	QuasiPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
54.513000	15.99	30.00	14.01	1000.0	120.000	325.0	V	240.0
56.495000	16.73	30.00	13.27	1000.0	120.000	106.0	V	183.0
84.426000	12.55	30.00	17.45	1000.0	120.000	176.0	V	96.0
87.119000	13.93	30.00	16.07	1000.0	120.000	125.0	V	97.0
182.447000	15.99	33.50	17.53	1000.0	120.000	125.0	V	187.0
187.953000	16.85	33.50	16.67	1000.0	120.000	119.0	V	100.0

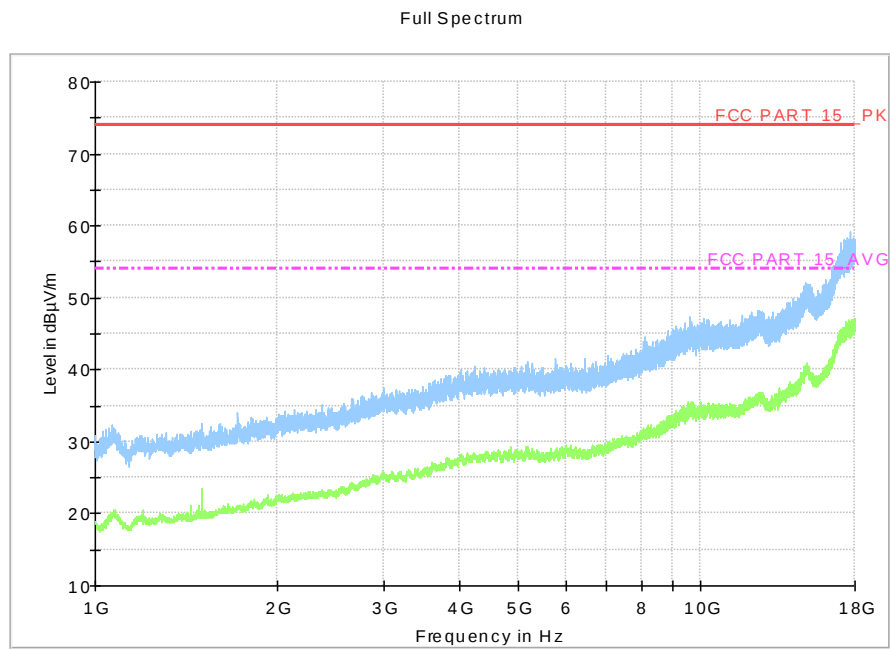


Fig A.2 Radiated Emission from 1GHz to 18GHz

USB Mode, Set.2

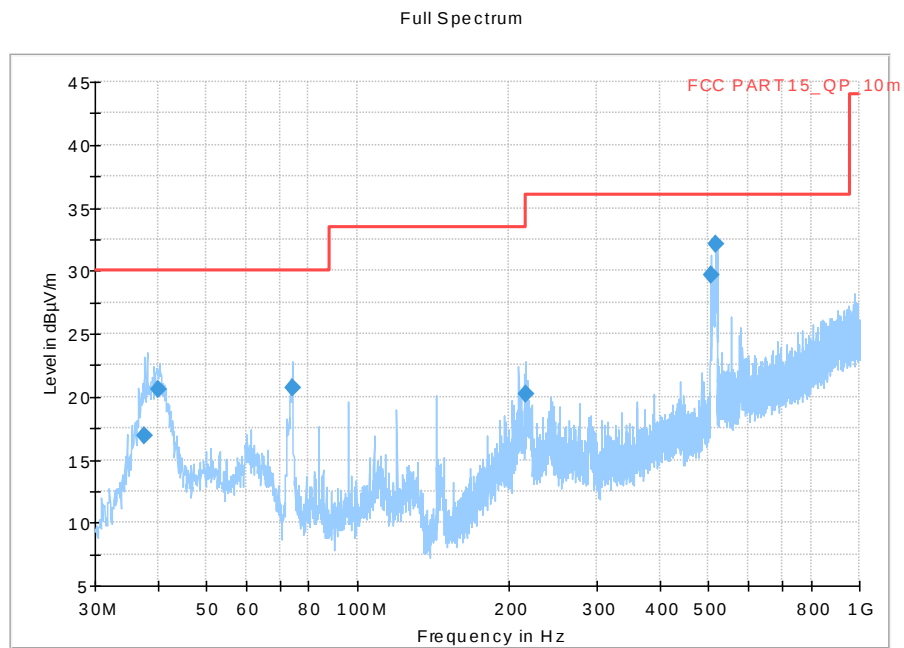


Fig A.3 Radiated Emission from 30MHz to 1GHz

Final_Result

Frequency (MHz)	QuasiPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
37.543000	16.86	30.00	13.14	1000.0	120.000	205.0	V	254.0
39.982000	20.55	30.00	9.45	1000.0	120.000	180.0	V	4.0
74.195000	20.71	30.00	9.29	1000.0	120.000	193.0	V	199.0
216.633000	20.18	36.00	15.84	1000.0	120.000	125.0	V	-14.0
506.464000	29.67	36.00	6.35	1000.0	120.000	281.0	V	-13.0
519.240000	32.13	36.00	3.89	1000.0	120.000	225.0	V	-18.0

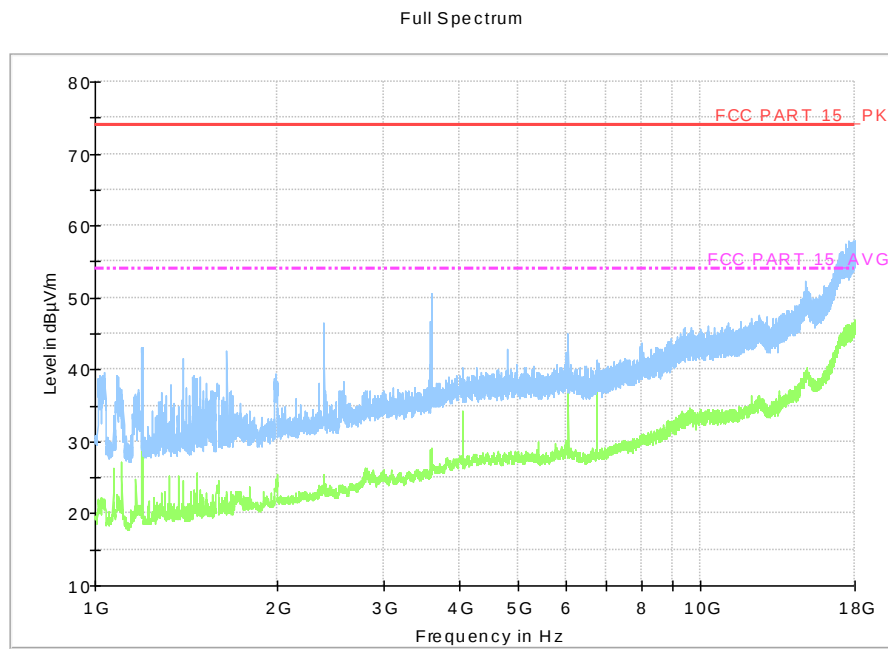


Fig A.4 Radiated Emission from 1GHz to 18GHz

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 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 (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: $U = 3.38 \text{ dB}$, $k=2$.

Charging Mode, Set.1

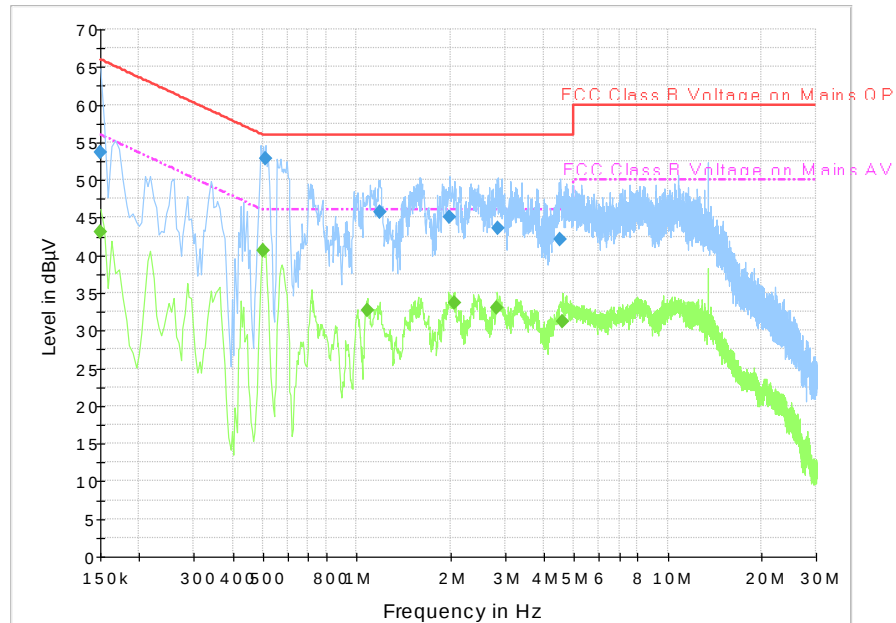


Fig A.5 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.150000	53.6	1000.0	9.000	On	N	30.6	12.4	66.0	
0.510000	52.8	1000.0	9.000	On	L1	19.8	3.2	56.0	
1.185000	45.7	1000.0	9.000	On	L1	19.7	10.3	56.0	
1.995000	45.1	1000.0	9.000	On	L1	19.6	10.9	56.0	
2.859000	43.5	1000.0	9.000	On	L1	19.6	12.5	56.0	
4.528500	42.2	1000.0	9.000	On	L1	19.6	13.8	56.0	

Final Result 2

Frequency (MHz)	Average (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.150000	43.1	1000.0	9.000	On	L1	30.7	12.9	56.0	
0.501000	40.6	1000.0	9.000	On	L1	19.8	5.4	46.0	
1.081500	32.6	1000.0	9.000	On	L1	19.7	13.4	46.0	
2.058000	33.7	1000.0	9.000	On	L1	19.6	12.3	46.0	
2.832000	33.0	1000.0	9.000	On	L1	19.6	13.0	46.0	
4.596000	31.2	1000.0	9.000	On	L1	19.6	14.8	46.0	

USB Mode, Set.2

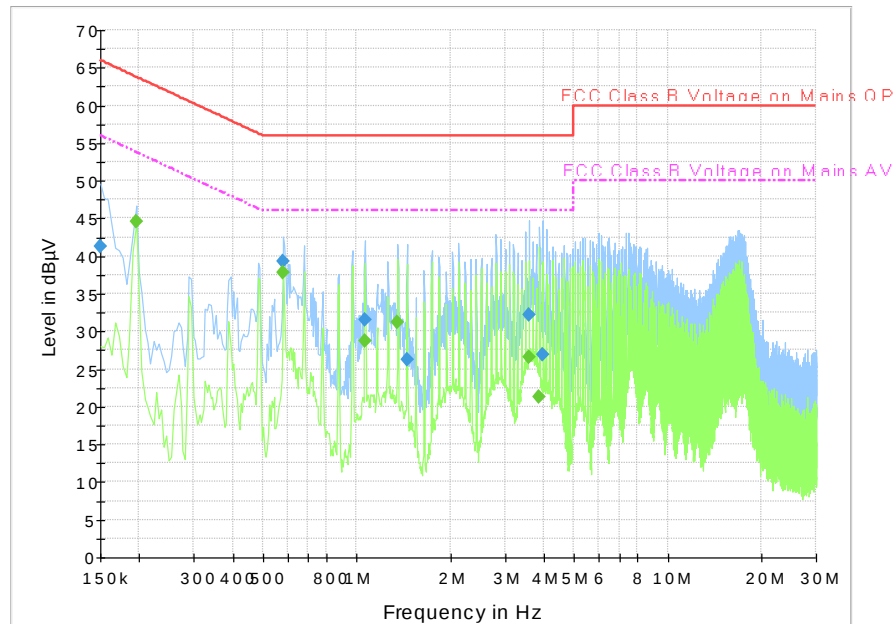


Fig A.6 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.150000	41.3	1000.0	9.000	On	L1	30.7	24.7	66.0	
0.582000	39.3	1000.0	9.000	On	L1	19.8	16.7	56.0	
1.063500	31.6	1000.0	9.000	On	L1	19.7	24.4	56.0	
1.450500	26.2	1000.0	9.000	On	L1	19.6	29.8	56.0	
3.579000	32.2	1000.0	9.000	On	L1	19.6	23.8	56.0	
3.966000	26.9	1000.0	9.000	On	L1	19.6	29.1	56.0	

Final Result 2

Frequency (MHz)	Average (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.195000	44.5	1000.0	9.000	On	N	20.9	9.3	53.8	
0.582000	37.9	1000.0	9.000	On	N	19.8	8.1	46.0	
1.063500	28.6	1000.0	9.000	On	L1	19.7	17.4	46.0	
1.356000	31.2	1000.0	9.000	On	L1	19.6	14.8	46.0	
3.579000	26.5	1000.0	9.000	On	L1	19.6	19.5	46.0	
3.871500	21.2	1000.0	9.000	On	L1	19.6	24.8	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*****