



TEST REPORT

No. I14Z49048-EMC01

for

TCT Mobile Limited

HSDPA/HSUPA/HSPA+/UMTS dual band / GSM quad band/LTE 4

band Mobile phone

Model Name: Alto-4 NA

Marketing Name: A521L

FCC ID: RAD534

with

Hardware Version: PIO

Software Version: 5MTF

Issued Date: 2015-01-04

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:

FCC 2.948 Listed: No. 525429

CTTL, Telecommunication Technology Labs, Academy of Telecommunication Research, MIIT

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

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REPORT HISTORY

Report Number	Revision	Description	Issue Date
I14Z49048-EMC01	Rev.0	1st edition	2015-01-04



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1. Test Laboratory

1.1. Testing Location

Location 1: 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: 2014-12-20

Testing End Date: 2014-12-27

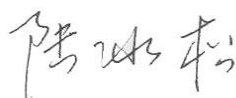
1.4. Signature



Qu Pengfei
(Prepared this test report)



Sun Xiangqian
(Reviewed this test report)



Lu Bingsong
Director of the laboratory
(Approved this test report)



2. Client Information

2.1. Applicant Information

Company Name: TCT Mobile Limited
Address /Post: 5F, C building, No. 232, Liang Jing Road ZhangJiang High-Tech Park,
Pudong Area Shanghai, P.R. China.
City: Shanghai
Postal Code: 201203
Country: China
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Telephone: 0086-21-61460890
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2.2. Manufacturer Information

Company Name: TCT Mobile Limited
Address /Post: 5F, C building, No. 232, Liang Jing Road ZhangJiang High-Tech Park,
Pudong Area Shanghai, P.R. China.
City: Shanghai
Postal Code: 201203
Country: China
Telephone: 0086-21-61460890
Fax: 0086-21-61460602



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

3.1. About EUT

Description	HSDPA/HSUPA/HSPA+/UMTS dual band / GSM quad band/LTE 4 band Mobile phone
Model Name	Alto-4 NA
Marketing Name	A521L
FCC ID	RAD534
Extreme vol. Limits	3.55VDC to 4.35VDC (nominal: 3.8VDC)

Note: Components list, please refer to documents of the manufacturer; it is also included in the original test record of Telecommunication Metrology Center of MIIT of People's Republic of China.

3.2. Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version
EUT1	014262000003046	PIO	5MTF

*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	Battery	B2000013C2Y107TK	14TCT-BA-2153
AE2	Battery	B2000013C2Y0S9OT	14TCT-BA-2148
AE3	Battery	B2000013C2Y0S9OY	14TCT-BA-2159
AE11	Travel charger	/	14TCT-CH-1766
AE12	Travel charger	/	14TCT-CH-1800
AE17	USB cable	/	14TCT-DC-0050
AE18	USB cable	/	14TCT-DC-0775
AE19	USB cable	/	/
AE20	USB cable	/	/

AE1、AE2、AE3

Model	CAB2000013C2
Manufacturer	SCUD
Capacitance	2000mAh
Nominal voltage	3.8V

AE11、AE12

Model	CBA3000AG0C2
Manufacturer	BYD
Length of cable	/

AE17

Model	CDA3122005C1
Manufacturer	JUWEI
Length of cable	99cm



AE18
Model CDA3122005C2
Manufacturer SHENGHUA
Length of cable 100cm

AE19
Model CDA3122002C1
Manufacturer /
Length of cable /

AE20
Model CDA3122002C2
Manufacturer /
Length of cable /

*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	EUT1+ AE1/AE2/AE3 + AE11/AE12 + AE17/AE18	Charger
Set.2	EUT1+ AE1/AE2/AE3 + AE17/AE18	USB

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	10-1-13 Edition
ANSI C63.4	Methods of Measurement of Radio-Noise Emissions from Low - Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz	2009

5. 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



6. SUMMARY OF TEST RESULTS

Abbreviations used in this clause:		
Verdict Column	P	Pass
	NA	Not applicable
	F	Fail
Location Column	1/2/3/4	The test is performed in test location 1, 2, 3 or 4 which are described in section 1.1 of this report

Clause	List	Clause in FCC rules	Verdict	Location
1	Radiated Emission	15.109(a)	P	1
2	Conducted Emission	15.107(a)	P	1



7. Test Equipments Utilized

NO.	NAME	TYPE	SERIES NUMBER	PRODUCER	CAL. DUE DATE	CAL. INTERVAL
1.	EMI Antenna	VULB 9163	9163-234	Schwarzbeck	2016-09-15	3 Years
2.	Test Receiver	ESCI 7	100948	R&S	2015-07-16	1 Year
3.	Test Receiver	FSV	101047	R&S	2015-07-03	1 Year
4.	EMI Antenna	3115	6914	ETS-Lindgren	2016-12-15	3 Years
5.	Test Receiver	ESCI	100344	R&S	2015-03-03	1 Year
6.	LISN	ENV216	101200	R&S	2015-07-07	1 Year
7.	Universal Radio Communication Tester	CMU200	109914	R&S	2015-04-13	1 Year
8.	PC	OPTIPLEX 380	2X1YV2X	DELL	/	/
9.	Monitor	E1709Wc	CN-OJ672H-6 4180-9BF-1CR L	DELL	/	/
10.	Printer	P1606dn	VNC3L52122	HP	/	/
11.	Keyboard	L100	CN-ORH656-6 5890-03S-041 Y	DELL	/	/
12.	Mouse	M-UAR	LZ013HC1YLV	DELL	/	/

ANNEX A: MEASUREMENT RESULTS

A.1 Radiated Emission (§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 - 2009, 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 DELL OPTIPLEX 380, and the serial number of the PC is 2X1YV2X. The software is used to let the PC keep on copying data to MS, reading and erasing the data after copy action was finished.

A.1.3 Measurement Limit

Frequency range (MHz)	Field strength limit ($\mu\text{V}/\text{m}$)		
	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): $U = 4.3 \text{ dB}$, $k=2$.

Measurement results for Set.1:

Charging Mode/Average detector

Frequency(MHz)	Result(dB $\mu\text{V}/\text{m}$)	GPL (dB)	GA (dB/m)	PMea(dB μV)	Polarity
5264.063	30.6	-34.5	34.6	30.500	H
5265.625	30.5	-34.5	34.6	30.400	H
5262.500	30.4	-34.5	34.6	30.300	V
5261.875	30.4	-34.5	34.6	30.300	H
5267.813	30.3	-34.5	34.6	30.200	H
5262.813	30.3	-34.5	34.6	30.200	H

Charging Mode/Peak detector

Frequency(MHz)	Result(dB $\mu\text{V}/\text{m}$)	GPL (dB)	GA (dB/m)	PMea(dB μV)	Polarity
5267.188	42.8	-34.5	34.6	42.700	H
5271.875	42.4	-34.4	34.6	42.200	H
5253.438	42.3	-34.5	34.6	42.200	V
5266.563	42.2	-34.5	34.6	42.100	H
5023.125	42.1	-34.6	34.6	42.100	H
5329.063	42.1	-34.8	34.6	42.300	H

Note: The measurement results showed here are worst cases of the combinations of different USB cables.

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

Frequency(MHz)	Result(dB μ V/m)	G _{PL} (dB)	G _A (dB/m)	P _{Mea} (dB μ V)	Polarity
1498.750	33.4	-40.3	24.1	49.600	V
1895.000	33.4	-35.0	25.3	43.100	V
1499.063	33.2	-40.3	24.1	49.400	V
1498.438	33.2	-40.3	24.1	49.400	V
1449.688	32.7	-40.2	24.1	48.800	H
1645.625	32.7	-39.5	25.3	46.900	H

USB Mode/Peak detector

Frequency(MHz)	Result(dB μ V/m)	G _{PL} (dB)	G _A (dB/m)	P _{Mea} (dB μ V)	Polarity
1464.688	51.6	-40.0	24.1	67.500	H
1464.375	51.5	-40.0	24.1	67.400	H
1453.125	51.0	-40.2	24.1	67.100	V
1463.750	50.9	-40.0	24.1	66.800	V
1465.000	50.7	-40.0	24.1	66.600	H
1465.313	50.5	-40.0	24.1	66.400	H

Note: The measurement results showed here are worst cases of the combinations of different USB cables.

Charging Mode, Set.1

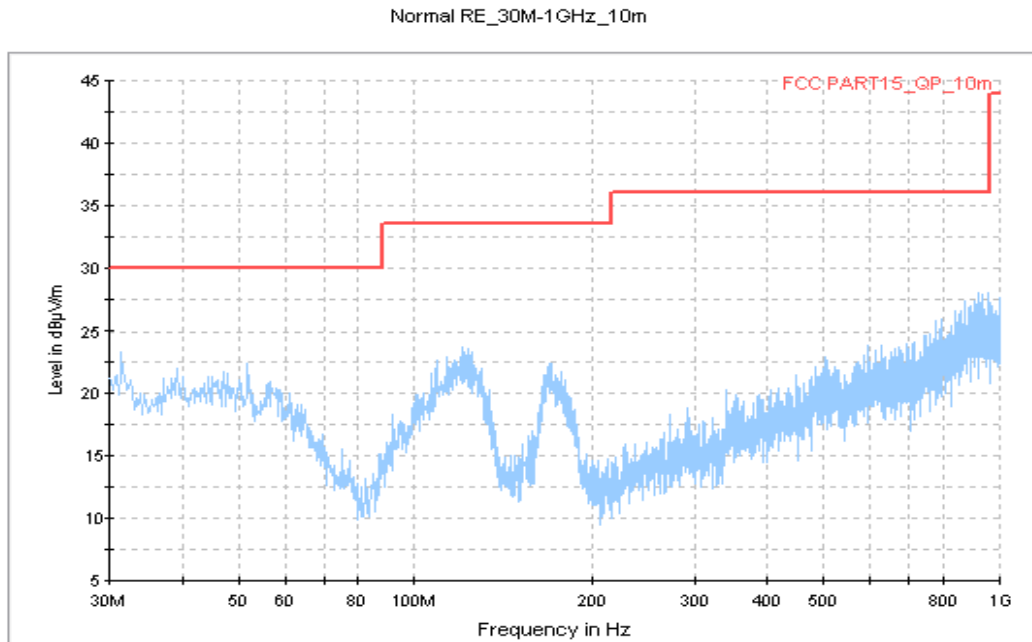


Fig.1 Radiated Emission from 30MHz to 1GHz

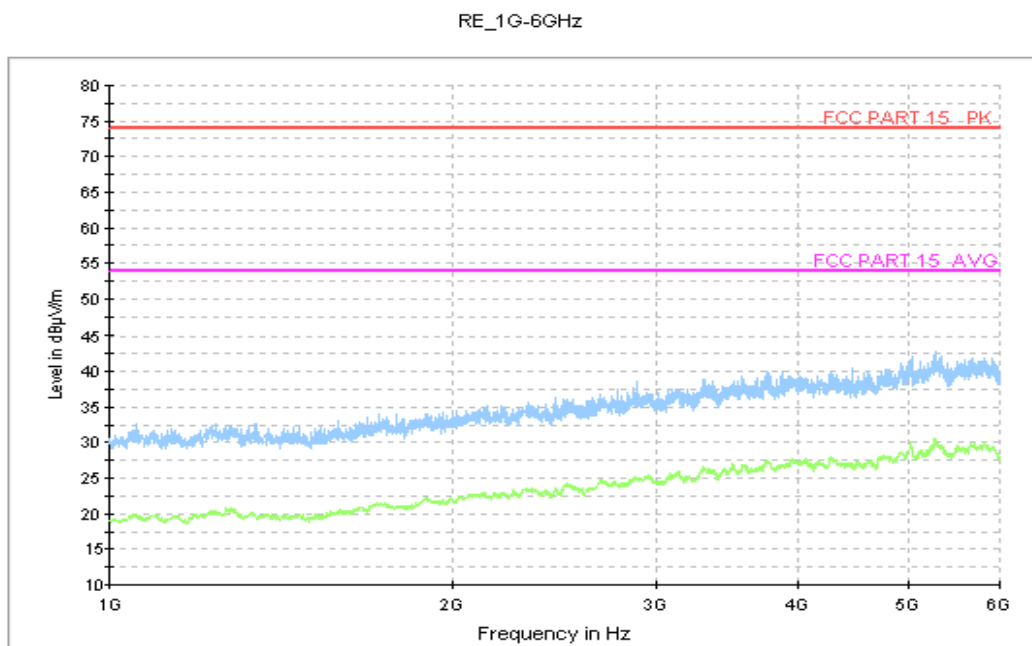


Fig.2 Radiated Emission from 1GHz to 6GHz

USB Mode, Set.2

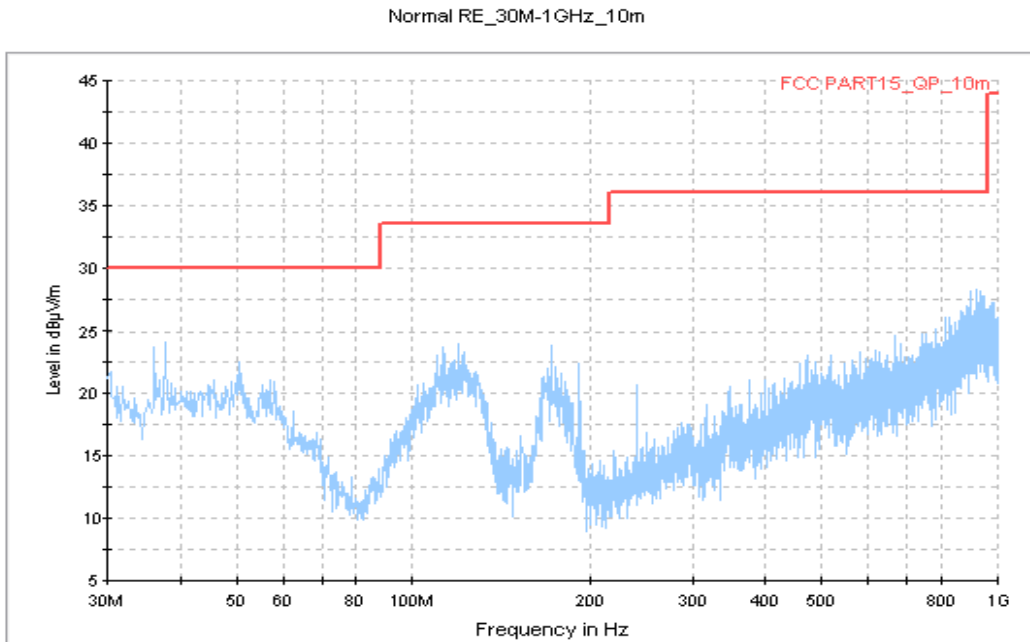


Fig.3 Radiated Emission from 30MHz to 1GHz

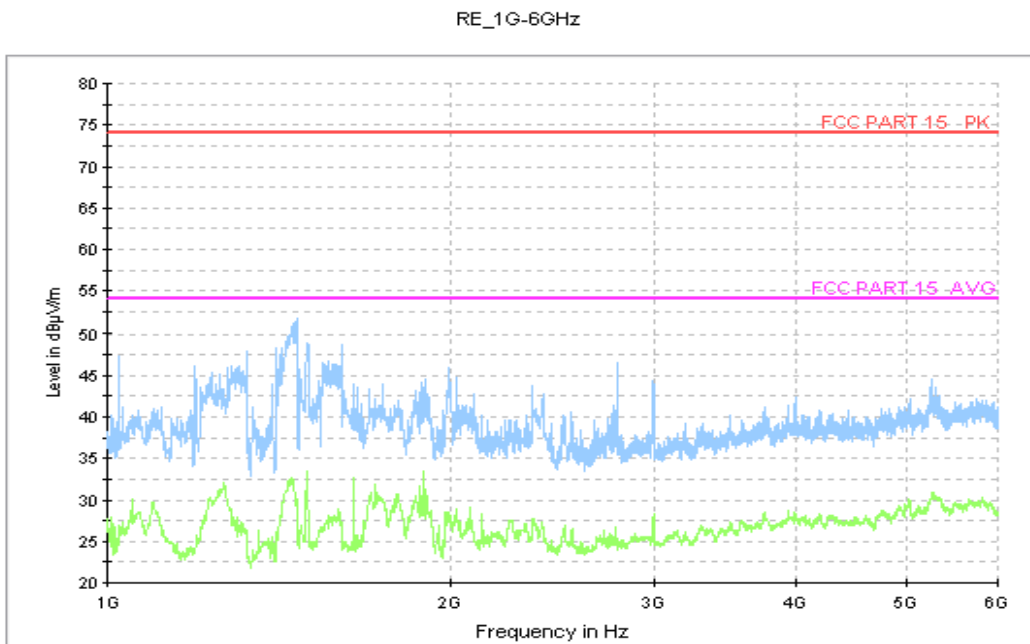


Fig.4 Radiated Emission from 1GHz to 6GHz

A.2 Conducted Emission (§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 - 2009, section 7.2.

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 OPTIPLEX 380, and the serial number of the PC is 2X1YV2X. The software is used to let the PC keep on copying data to MS, reading and erasing the data after copy action was finished.

A.2.3 Measurement Limit

Frequency of emission (MHz)	Conducted limit (dB μ 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: $U= 2.9$ dB, $k=2$.

Charging Mode, Set.1

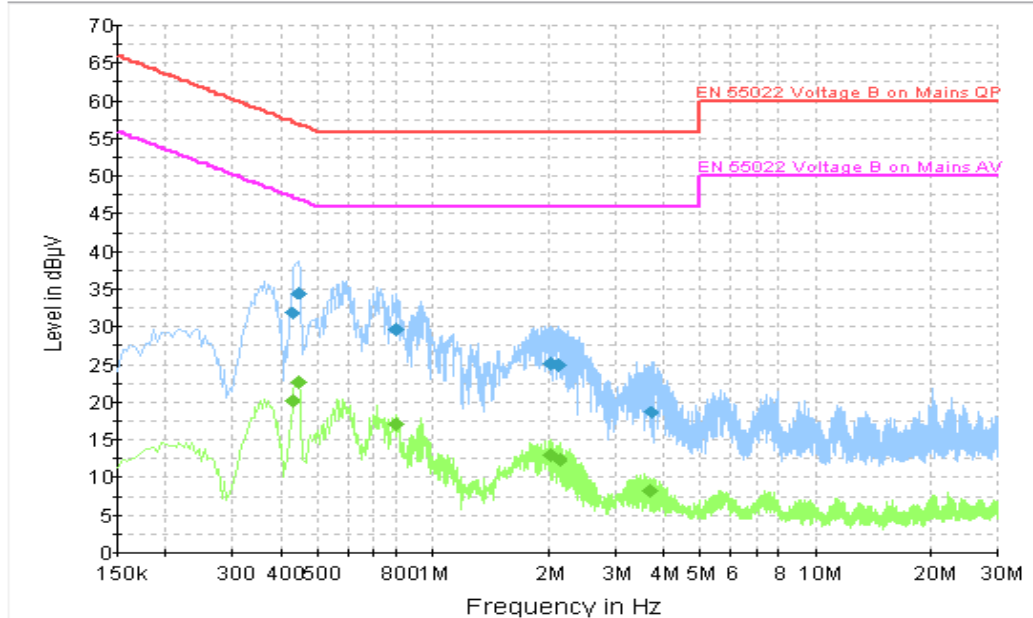


Fig.5 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dB µV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dB µV)
0.429000	31.9	GND	L1	20.0	25.4	57.3
0.442500	34.4	GND	L1	20.0	22.6	57.0
0.798000	29.7	GND	L1	19.9	26.3	56.0
2.026500	25.1	GND	L1	19.7	30.9	56.0
2.130000	25.0	GND	L1	19.7	31.0	56.0
3.723000	18.6	GND	L1	19.7	37.4	56.0

Final Result 2

Frequency (MHz)	CAverage (dB µV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dB µV)
0.429000	20.2	GND	L1	20.0	27.1	47.3
0.442500	22.6	GND	L1	20.0	24.4	47.0
0.798000	17.2	GND	L1	19.9	28.8	46.0
2.026500	13.1	GND	L1	19.7	32.9	46.0
2.139000	12.5	GND	L1	19.7	33.5	46.0
3.691500	8.3	GND	L1	19.7	37.7	46.0

Note: The measurement results showed here are worst cases of the combinations of different USB cables.

USB Mode, Set.2

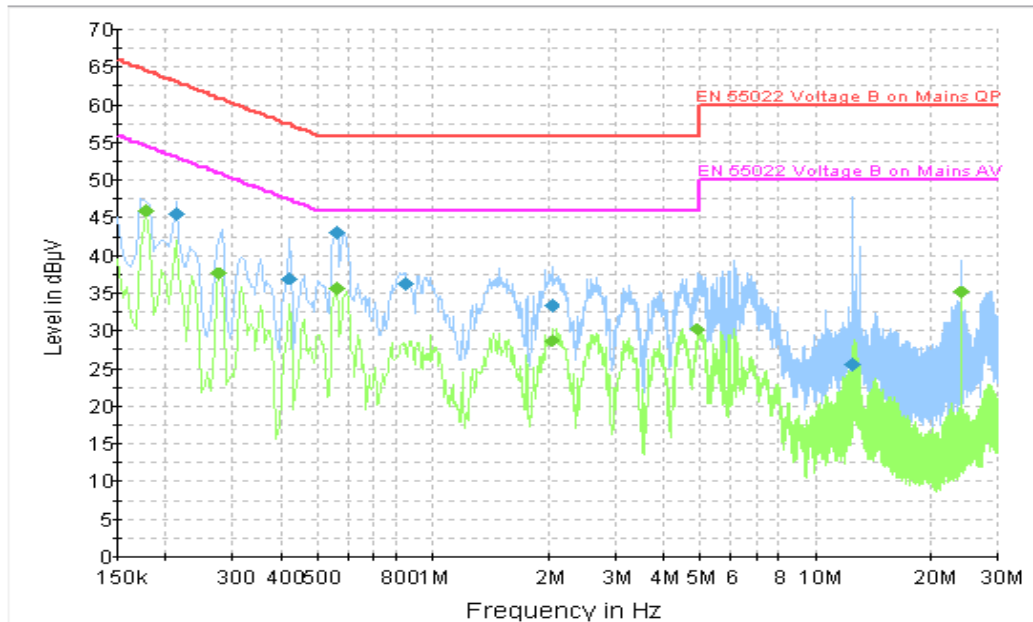


Fig.6 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dB µV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dB µV)
0.213000	45.6	GND	N	19.9	17.5	63.1
0.420000	36.9	GND	L1	20.0	20.5	57.4
0.559500	43.1	GND	L1	20.0	12.9	56.0
0.843000	36.3	GND	N	19.9	19.7	56.0
2.044500	33.4	GND	N	19.7	22.6	56.0
12.570000	25.5	GND	L1	19.8	34.5	60.0

Final Result 2

Frequency (MHz)	CAverage (dB µV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dB µV)
0.177000	46.0	GND	N	19.9	8.6	54.6
0.276000	37.6	GND	N	19.9	13.3	50.9
0.559500	35.6	GND	N	20.0	10.4	46.0
2.044500	28.7	GND	N	19.7	17.3	46.0
4.915500	30.3	GND	N	19.7	15.7	46.0
24.054000	35.2	GND	L1	19.8	14.8	50.0

Note: The measurement results showed here are worst cases of the combinations of different USB cables.

END OF REPORT