



# TEST REPORT

## No. I15Z42770-EMC01

for

**TCL Communication Ltd**

**GSM Quad-band / UMTS Tri-band / LTE Quad-band mobile phone**

**Model Name: 5054O**

**FCC ID: 2ACCJA009**

**with**

**Hardware Version: 02**

**Software Version: 01**

**Issued Date: 2015-11-23**

**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**

**IC O.A.T.S listed: No.12389A-1**

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## **REPORT HISTORY**

<b>Report Number</b>	<b>Revision</b>	<b>Description</b>	<b>Issue Date</b>
I15Z42770-EMC01	Rev.0	1 <sup>st</sup> edition	2015-11-23

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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: 2015-08-19  
Testing End Date: 2015-11-19

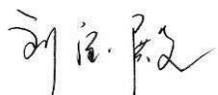
### 1.4. Signature



Wang Junqing  
(Prepared this test report)



Qu Pengfei  
(Reviewed this test report)



Liu Baodian  
Deputy Director of the laboratory  
(Approved this test report)

## **2. Client Information**

### **2.1. Applicant Information**

Company Name: TCL Communication Ltd  
Address /Post: 5F, C building, No. 232, Liang Jing Road ZhangJiang High-Tech Park,  
Pudong Area Shanghai, P.R. China. 201203  
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### **2.2. Manufacturer Information**

Company Name: TCL Communication Ltd  
Address /Post: 5F, C building, No. 232, Liang Jing Road ZhangJiang High-Tech Park,  
Pudong Area Shanghai, P.R. China. 201203  
City: Shanghai  
Postal Code: 201203  
Country: P. R. China  
Telephone: 0086-21-51798260  
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### **3. Equipment Under Test (EUT) and Ancillary Equipment (AE)**

#### **3.1. About EUT**

Description	GSM Quad-band / UMTS Tri-band / LTE Quad-band mobile phone
Model Name	50540
FCC ID	2ACCJA009
Extreme vol. Limits	3.5VDC 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 CTTL, Telecommunication Technology Labs, Academy of Telecommunication Research, MIIT.

#### **3.2. Internal Identification of EUT used during the test**

EUT ID*	SN or IMEI	HW Version	SW Version
EUT1	014556000002761	02	01

\*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	/	Inbuilt
AE5	Travel	/	15TCT-CH-0917
AE6	USB cable	/	15TCT-DC-0231
AE1			
Model	CAC2500028C2		
Manufacturer	SCUD(LG)		
Capacitance	2500 mAh		
Nominal voltage	3.7 V		
AE5			
Model	CBA0057AG6C2		
Manufacturer	Tenpao		
Length of cable	/		
AE6			
Model	CDA3122006C1		
Manufacturer	Juwei		
Length of cable	92cm		

\*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.4	EUT1+ AE1 + AE5+ AE6	Charger
Set.5	EUT1+ AE1 + AE6	USB mode

## 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
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	Edition 2014
ICES-003	Information Technology Equipment (ITE) – Limits and methods of measurement	Issue 5

## 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	A/B/C/D	The test is performed in test location A, B, C or D which are described in section 1.1 of this report		

Items	Test Name	Clause in FCC rules	Clause in IC rules	Section in this report	Verdict	Test Location
1	Radiated Emission	15.109(a)	Section 5	B.1	P	A
2	Conducted Emission	15.107(a)	Section 5	B.2	P	A

## 7. Test Equipments Utilized

NO.	Description	TYPE	SERIES NUMBER	MANUFACTUR E	CAL DUE DATE	CALIBRATI ON INTERVAL
1	Test Receiver	ESU26	100235	R&S	2016-03-02	1 year
2	Universal Radio Communication Tester	CMU200	109914	R&S	2016-03-26	1 year
3	Universal Radio Communication Tester	CMW500	143008	R&S	2015-12-09	1 year
4	LISN	ENV216	101200	R&S	2016-07-07	1 year
5	EMI Antenna	VULB 9163	9163-514	Schwarzbeck	2017-11-24	3 years
6	EMI Antenna	3115	6914	ETS-Lindgren	2016-12-15	3 years
7	PC	OPTIPLEX 380	2X1YV2X	DELL	N/A	N/A
8	Printer	P1606dn	VNC3L52122	HP	N/A	N/A
9	Keyboard	L100	CN0RH6596589 07ATOI40	DELL	N/A	N/A
10	Mouse	M-UAE119	LZ935220ZRC	Lenovo	N/A	N/A

## **ANNEX A: MEASUREMENT RESULTS**

### **A.1 Radiated Emission**

#### **Reference**

FCC: CFR Part 15.109(a).

IC: ICES-003 Section 5.

#### **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 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 ( $\mu$ V/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:

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

Where

$G_A$ : Antenna factor of receive antenna

$G_{PL}$ : Path Loss

$P_{\text{Mea}}$ : Measurement result on receiver.

Measurement uncertainty (worst case):  $U = 4.3 \text{ dB}$ ,  $k=2$ .

### Measurement results for Set.4:

#### Charging Mode/Average detector

Frequency(MHz)	Result(dB $\mu$ V/m)	$G_{PL}$ (dB)	$G_A$ (dB/m)	$P_{\text{Mea}}$ (dB $\mu$ V)	Polarity
17985.550	49.4	-17.7	45.6	21.500	HORIZONTAL
17999.150	49.2	-17.7	45.6	21.300	HORIZONTAL
17991.500	49.1	-17.7	45.6	21.200	VERTICAL
17988.100	49.0	-17.7	45.6	21.100	HORIZONTAL
17984.700	49.0	-17.7	45.6	21.100	VERTICAL
17967.700	49.0	-17.7	45.6	21.100	HORIZONTAL

#### Charging Mode/Peak detector

Frequency(MHz)	Result(dB $\mu$ V/m)	$G_{PL}$ (dB)	$G_A$ (dB/m)	$P_{\text{Mea}}$ (dB $\mu$ V)	Polarity
17963.450	61.1	-17.7	45.6	33.200	HORIZONTAL
17992.350	60.9	-17.7	45.6	33.000	HORIZONTAL
17981.300	60.6	-17.7	45.6	32.700	VERTICAL
17968.550	60.5	-17.7	45.6	32.600	HORIZONTAL
17978.750	60.5	-17.7	45.6	32.600	HORIZONTAL
17995.750	60.4	-17.7	45.6	32.500	HORIZONTAL

**Measurement results for Set.5:****USB Mode/Average detector**

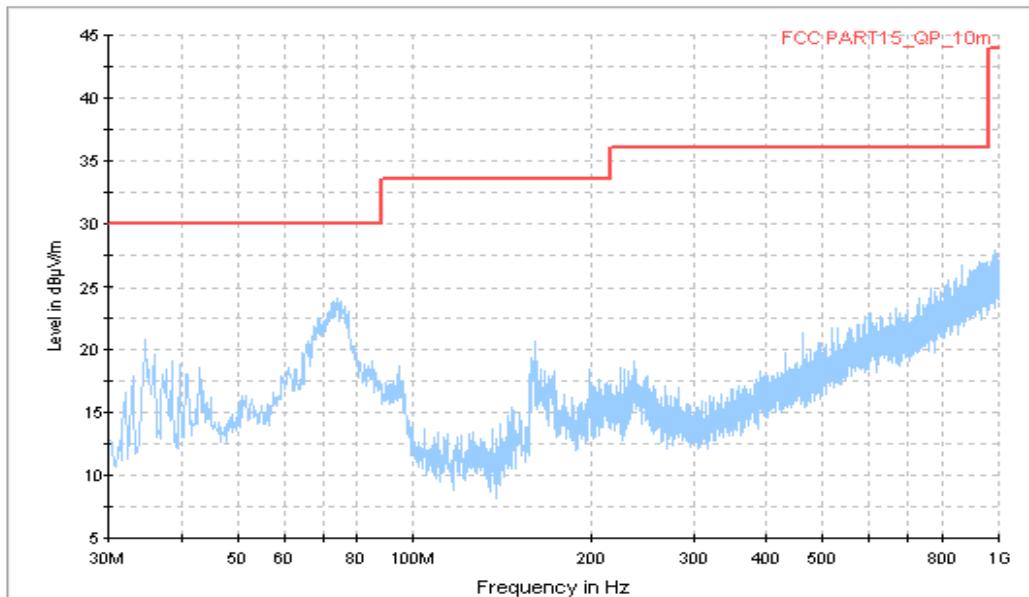
Frequency(MHz)	Result(dB $\mu$ V/m)	G <sub>PL</sub> (dB)	G <sub>A</sub> (dB/m)	P <sub>mea</sub> (dB $\mu$ V)	Polarity
17985.550	49.6	-17.7	45.6	21.700	HORIZONTAL
17999.150	49.2	-17.7	45.6	21.300	HORIZONTAL
17991.500	49.1	-17.7	45.6	21.200	VERTICAL
17988.100	49.1	-17.7	45.6	21.200	VERTICAL
17984.700	49.0	-17.7	45.6	21.100	HORIZONTAL
17967.700	49.0	-17.7	45.6	21.100	HORIZONTAL

**USB Mode/ Peak detector**

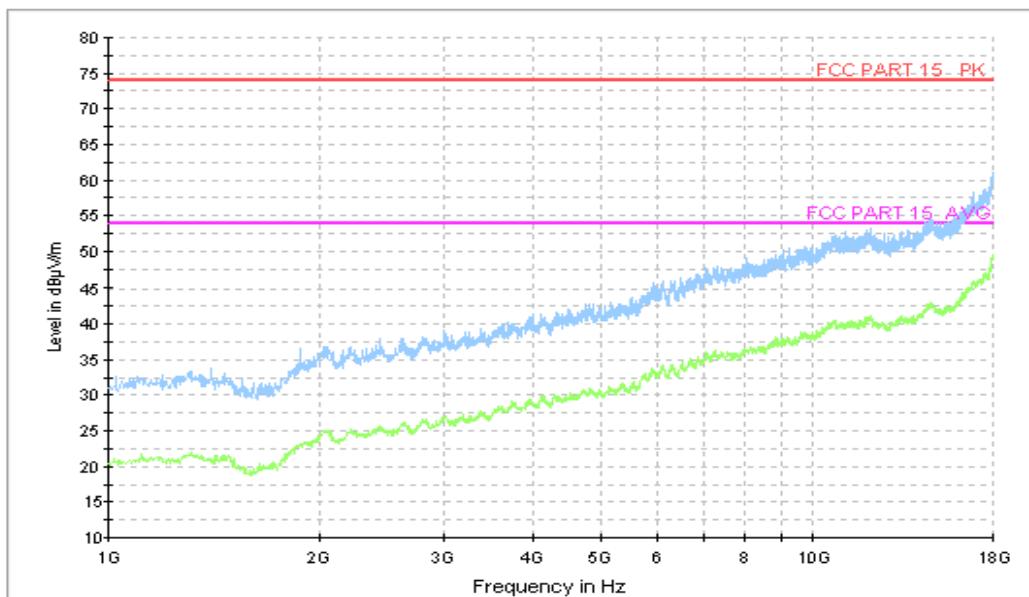
Frequency(MHz)	Result(dB $\mu$ V/m)	G <sub>PL</sub> (dB)	G <sub>A</sub> (dB/m)	P <sub>mea</sub> (dB $\mu$ V)	Polarity
17985.550	60.8	-17.7	45.6	32.900	VERTICAL
17999.150	60.7	-17.7	45.6	32.800	HORIZONTAL
17991.500	60.6	-17.7	45.6	32.700	VERTICAL
17988.100	60.6	-17.7	45.6	32.700	HORIZONTAL
17984.700	60.2	-17.7	45.6	32.300	HORIZONTAL
17967.700	60.1	-17.7	45.6	32.200	VERTICAL

**Charging Mode, Set.4**

Normal RE\_30M-1GHz\_10m

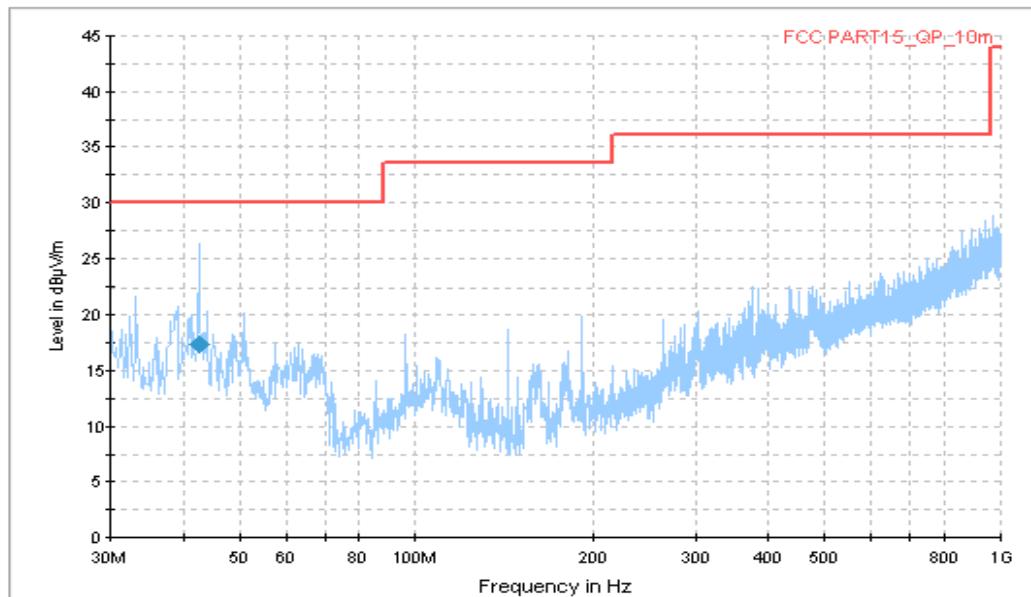
**Figure A.1 Radiated Emission from 30MHz to 1GHz**

Normal RE\_1G-18GHz\_directly

**Figure A.2 Radiated Emission from 1GHz to 18GHz**

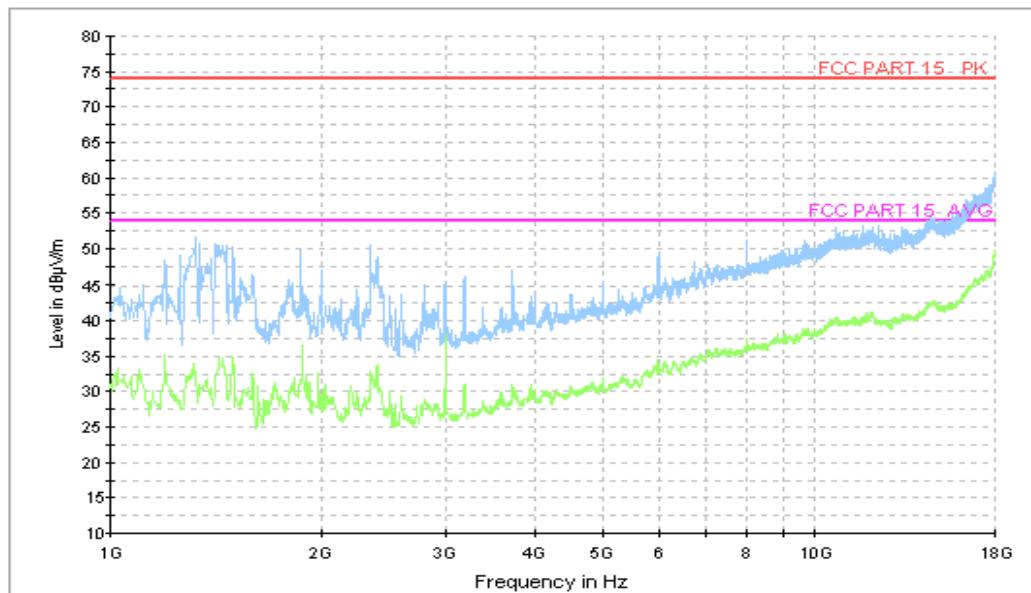
**USB Mode, Set.5**

Normal RE\_30M-1GHz\_10m


**Figure A.3 Radiated Emission from 30MHz to 1GHz**
**Final Result 1**

Frequency (MHz)	QuasiPeak (dB μV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dB μV/m)
42.600000	17.3	294.0	V	-13.0	-11.9	12.7	30.0

Normal RE\_1G-18GHz\_directly


**Figure A.4 Radiated Emission from 1GHz to 18GHz**

## A.2 Conducted Emission

### Reference

FCC: CFR Part 15.107(a).

IC: ICES-003 Section 5.

### 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 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 $\mu$ 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

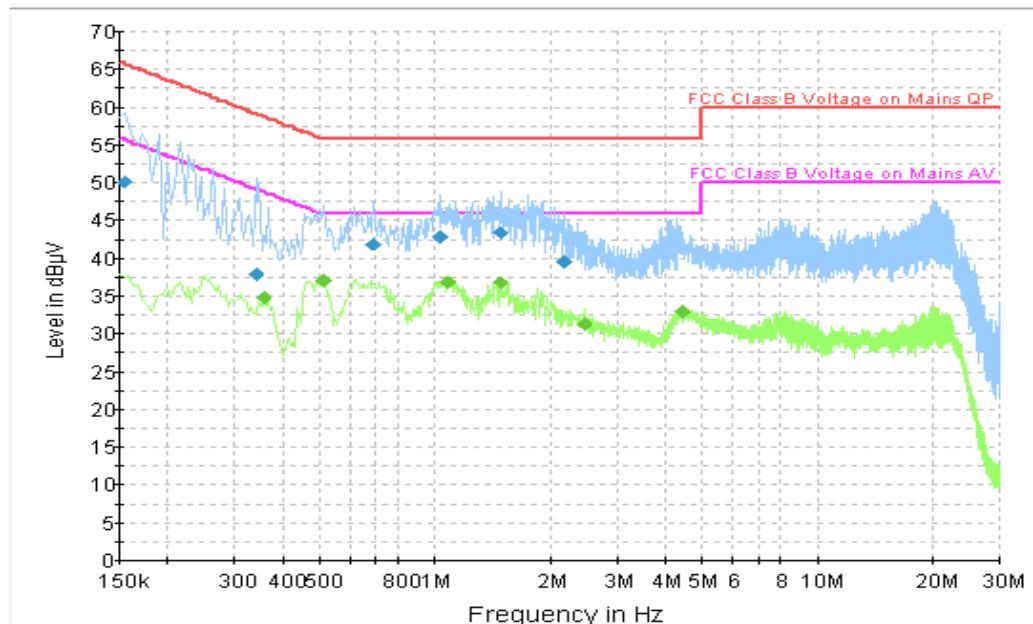
Voltage (V)	Frequency (Hz)
120	60

RBW/IF bandwidth	Sweep Time(s)
9kHz	1

### A.2.5 Measurement Results

Measurement uncertainty:  $U= 2.9$  dB,  $k=2$ .

#### Charging Mode, Set.4



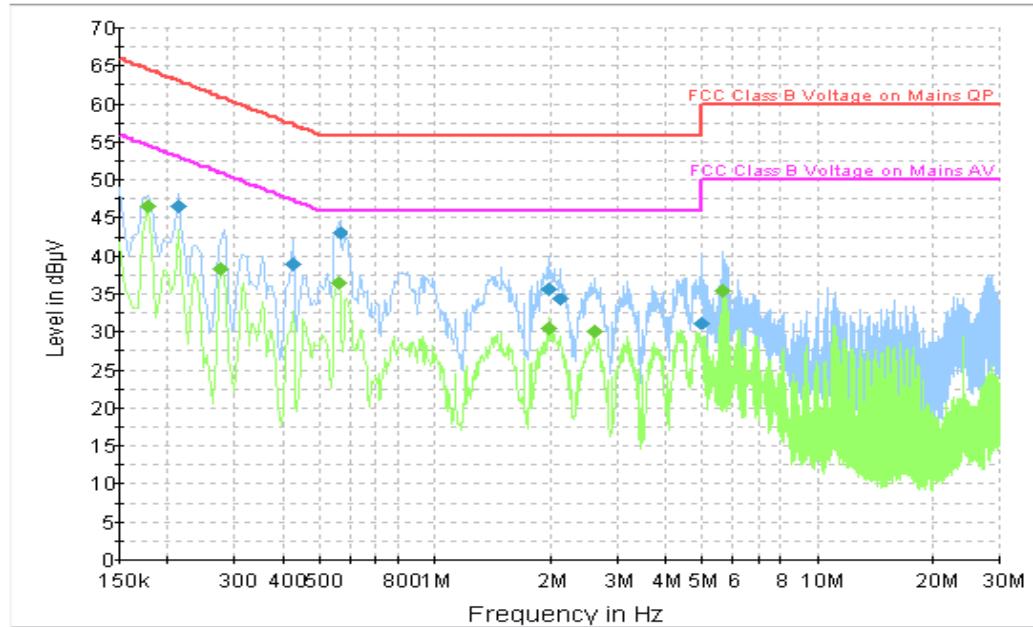
**Figure A.7 Conducted Emission**

#### Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time(ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.154500	50.3	2000.0	9.000	On	N	20.0	15.5	65.8
0.339000	38.0	2000.0	9.000	On	L1	19.9	21.2	59.2
0.690000	41.9	2000.0	9.000	On	N	19.8	14.1	56.0
1.036500	42.9	2000.0	9.000	On	N	19.7	13.1	56.0
1.482000	43.4	2000.0	9.000	On	N	19.7	12.6	56.0
2.188500	39.6	2000.0	9.000	On	L1	19.3	16.4	56.0

#### Final Result 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time(ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.357000	34.8	2000.0	9.000	On	N	19.8	14.0	48.8
0.510000	37.2	2000.0	9.000	On	N	19.9	8.8	46.0
1.081500	36.9	2000.0	9.000	On	N	19.7	9.1	46.0
1.486500	36.8	2000.0	9.000	On	N	19.7	9.2	46.0
2.449500	31.4	2000.0	9.000	On	N	19.1	14.6	46.0
4.425000	33.0	2000.0	9.000	On	N	19.6	13.0	46.0

**USB Mode, Set.5**

**Figure A.8 Conducted Emission**
**Final Result 1**

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time(ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.213000	46.6	2000.0	9.000	On	N	19.8	16.5	63.1
0.424500	38.9	2000.0	9.000	On	L1	19.9	18.4	57.4
0.564000	43.1	2000.0	9.000	On	L1	19.9	12.9	56.0
1.986000	35.7	2000.0	9.000	On	N	19.7	20.3	56.0
2.125500	34.4	2000.0	9.000	On	N	19.5	21.6	56.0
4.983000	31.2	2000.0	9.000	On	L1	19.6	24.8	56.0

**Final Result 2**

Frequency (MHz)	CAverage (dBµV)	Meas. Time(ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.177000	46.5	2000.0	9.000	On	N	19.8	8.1	54.6
0.276000	38.2	2000.0	9.000	On	N	19.8	12.7	50.9
0.559500	36.6	2000.0	9.000	On	L1	19.9	9.4	46.0
1.986000	30.6	2000.0	9.000	On	N	19.7	15.4	46.0
2.625000	30.0	2000.0	9.000	On	L1	19.2	16.0	46.0
5.635500	35.5	2000.0	9.000	On	L1	19.6	14.5	50.0

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