



# TEST REPORT

No. I16Z41065-EMC01

for

**TCL Communication Ltd.**

**GSM/WCDMA/LTE mobile phone**

**Model Name: 4060W**

**FCC ID: 2ACCJB039**

with

**Hardware Version: 02**

**Software Version: v3P12**

**Issued Date: 2016-07-01**



**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**

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## **REPORT HISTORY**

<b>Report Number</b>	<b>Revision</b>	<b>Description</b>	<b>Issue Date</b>
I16Z41065-EMC01	Rev.0	1st edition	2016-07-01

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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℃  
Relative Humidity: 20-75%

### **1.3. Project data**

Testing Start Date: 2016-06-21  
Testing End Date: 2016-06-23

### **1.4. Signature**



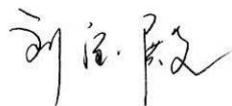
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**Zhang Hui**  
**(Prepared this test report)**



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**Qu Pengfei**  
**(Reviewed this test report)**



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



## **2. Client Information**

### **2.1. Applicant Information**

Company Name: TCL Communication Ltd.  
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### **2.2. Manufacturer Information**

Company Name: TCL Communication Ltd.  
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City: Shanghai  
Postal Code: 201203  
Country: China  
Telephone: 0086-21-31363544  
Fax: 0086-21-61460602

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

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

Description	GSM/WCDMA/LTE mobile phone
Model Name	4060W
FCC ID	2ACCJB039
Extreme vol. Limits	3.6VDC 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	014724000000223	02	v3P12

\*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	/	15TCT-BA-0775
AE2	Battery	/	15TCT-BA-0799
AE3	Battery	/	15TCT-BA-0800
AE4	Travel charger	/	15TCT-CH-1352
AE5	Travel charger	/	15TCT-CH-1344
AE6	USB cable	/	15TCT-DC-0047
AE7	USB cable	/	15TCT-DC-0038

AE1, AE2, AE3

Model	TLi017C1(CAB1780002C1 )
Manufacturer	BYD
Capacitance	1780mAh
Nominal voltage	3.8V

AE4, AE5

Model	CBA0066AGAC1
Manufacturer	BYD
Length of cable	120cm

AE6, AE7

Model	CDA312200CC2
Manufacturer	shenghua
Length of cable	95cm

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

Note: The USB cables are shielded.

### 3.4. EUT set-ups

EUT set-up No.	Combination of EUT and AE	Remarks
Set.1	EUT1 +AE1 +AE4	Charging mode
Set.2	EUT1 +AE1 +AE6	USB mode

Note: GSM/WCDMA/LTE mobile phone 4060W manufactured by TCL Communication Ltd is a variant model based on 4060O for conformance test. According to the declaration of changes, the results of 4060W are newly tested.

## 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	2015
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	2014

## 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	The test is performed in test location 1 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.	Description	TYPE	SERIES NUMBER	MANUFACTURE	CAL DUE DATE	CALIBRATION INTERVAL
1	Test Receiver	ESCI	100235	R&S	2017-03-02	1 year
2	Test Receiver	ESCI 7	100948	R&S	2016-07-07	1 year
3	Universal Radio Communication Tester	CMW500	143008	R&S	2016-12-09	1 year
4	Universal Radio Communication Tester	CMW500	155415	R&S	2017-01-11	1 year
5	LISN	ENV216	101200	R&S	2016-07-07	1 year
6	EMI Antenna	VULB 9163	9163-301	Schwarzbeck	2017-12-16	3 years
7	EMI Antenna	3115	6914	ETS-Lindgren	2017-12-15	3 years
8	PC	OPTIPLEX 380	2X1YV2X	DELL	N/A	N/A
9	Monitor	E178FPc	CN-OWR979-64180-7AJ-D2MS	DELL	N/A	N/A
10	Printer	P1606dn	VNC3L52122	HP	N/A	N/A
11	Keyboard	L100	CN0RH659658907 ATOI40	DELL	N/A	N/A
12	Mouse	M-UAE119	LZ935220ZRC	Lenovo	N/A	N/A

## **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 - 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.

Note: I/O information: Printer – USB, Mouse – PS/2, Keyboard – USB.

#### **A.1.3 Measurement Limit**

Frequency range (MHz)	Field strength limit ( $\mu\text{V/m}$ )		
	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:

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

Where

$G_A$ : Antenna factor of receive antenna

$G_{\text{PL}}$ : Path Loss

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

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

#### Measurement results for Set.1:

##### Charging Mode/Average detector

Frequency(MHz)	Result(dB $\mu$ V/m)	$G_{\text{PL}}$ (dB)	$G_A$ (dB/m)	$P_{\text{Mea}}$ (dB $\mu$ V)	Polarity
17963.450	51.4	-17.7	45.6	23.500	H
17972.800	51.3	-17.7	45.6	23.400	H
17933.700	51.3	-17.7	45.6	23.400	V
17992.350	51.2	-17.7	45.6	23.300	V
17957.500	51.1	-17.7	45.6	23.200	H
17936.250	51.1	-17.7	45.6	23.200	V

##### Charging Mode/Peak detector

Frequency(MHz)	Result(dB $\mu$ V/m)	$G_{\text{PL}}$ (dB)	$G_A$ (dB/m)	$P_{\text{Mea}}$ (dB $\mu$ V)	Polarity
17915.850	61.1	-17.7	45.6	33.200	V
17950.700	60.9	-17.7	45.6	33.000	H
17991.500	60.9	-17.7	45.6	33.000	V
17982.150	60.7	-17.7	45.6	32.800	V
17923.500	60.5	-17.7	45.6	32.600	H
17910.750	60.5	-18.5	45.6	33.400	V

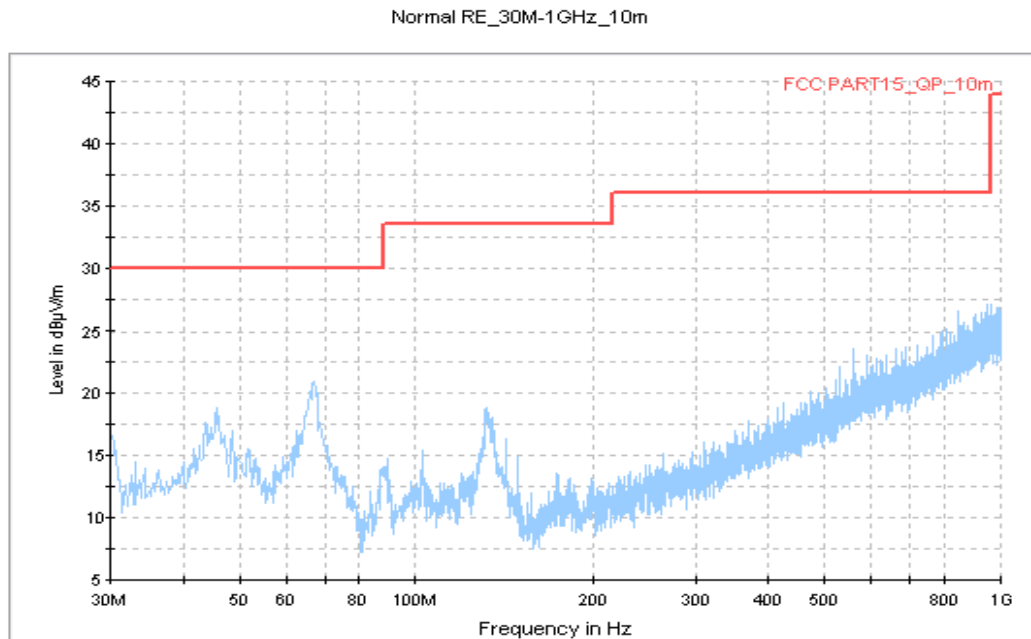
**Measurement results for Set.2:****USB Mode/Average detector**

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
17990.650	51.9	-17.7	45.6	24.000	H
17872.500	51.7	-18.5	45.6	24.600	V
17991.500	51.5	-17.7	45.6	23.600	V
17927.750	51.4	-17.7	45.6	23.500	H
17962.600	51.3	-17.7	45.6	23.400	H
17945.600	51.3	-17.7	45.6	23.400	H

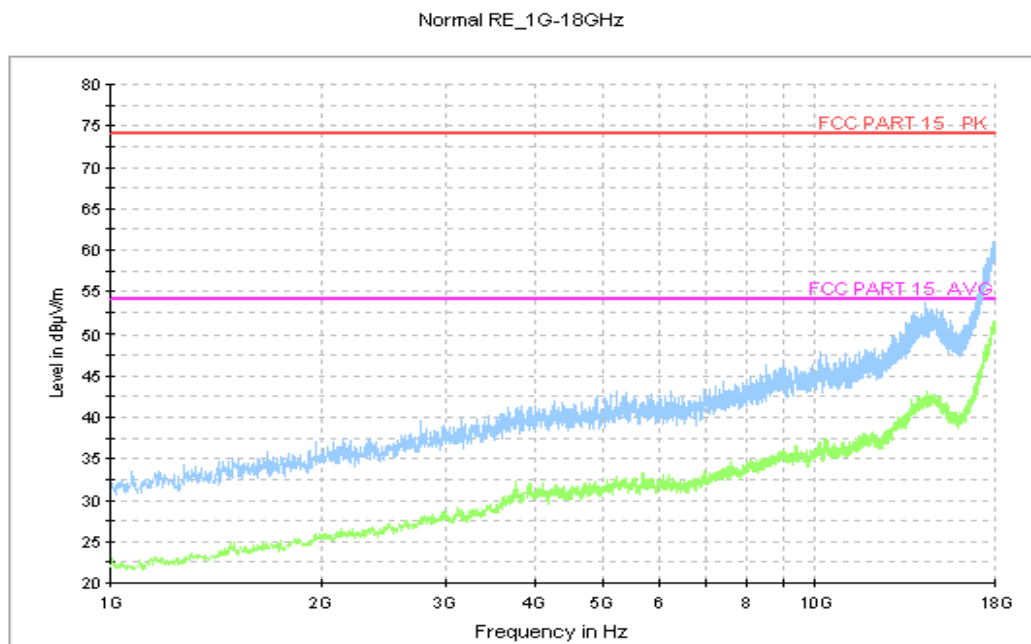
**USB Mode/Peak detector**

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
17994.900	61.7	-17.7	45.6	33.800	H
17935.400	61.5	-17.7	45.6	33.600	H
17804.500	61.4	-18.5	45.6	34.300	V
17951.550	61.4	-17.7	45.6	33.500	H
17941.350	61.3	-17.7	45.6	33.400	H
17945.600	61.3	-17.7	45.6	33.400	V

### Charging Mode, Set.1



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



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

USB Mode, Set.2

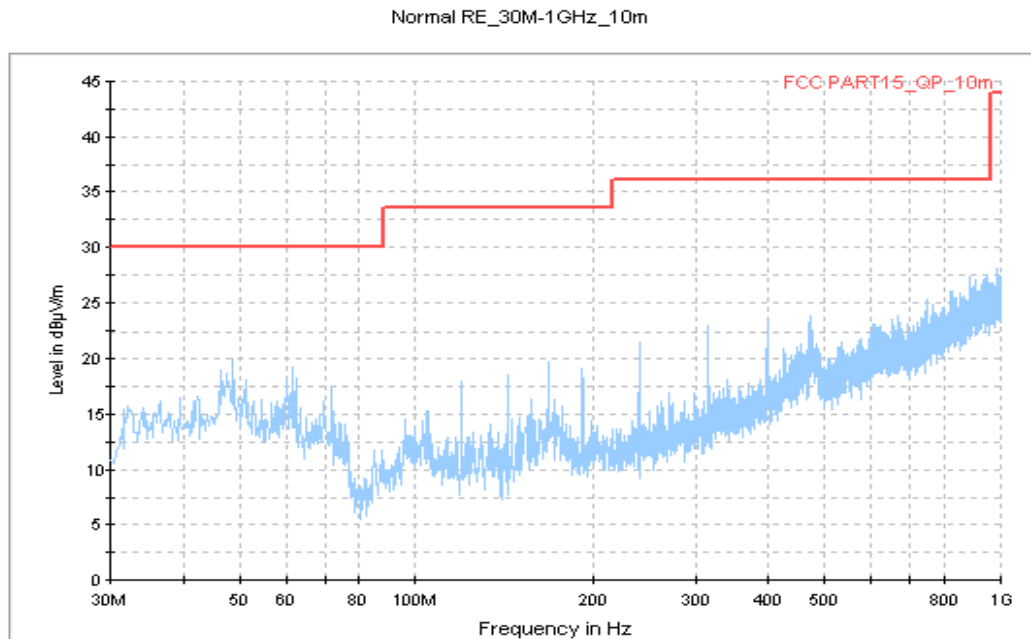


Fig.3 Radiated Emission from 30MHz to 1GHz

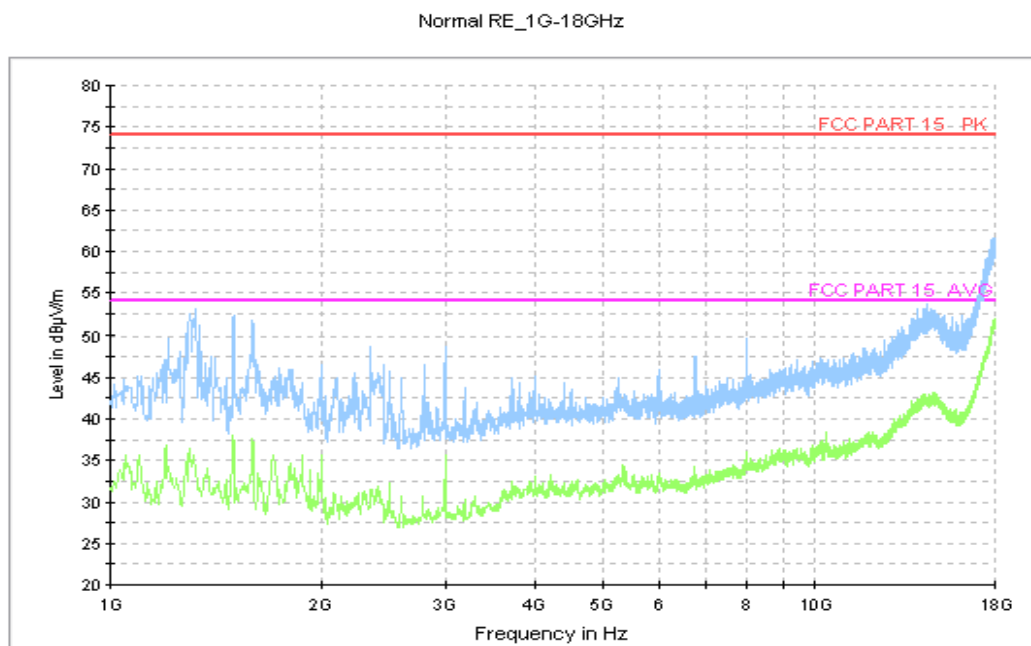


Fig.4 Radiated Emission from 1GHz to 18GHz

## 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 - 2014, 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.

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

#### Charging Mode, Set.1

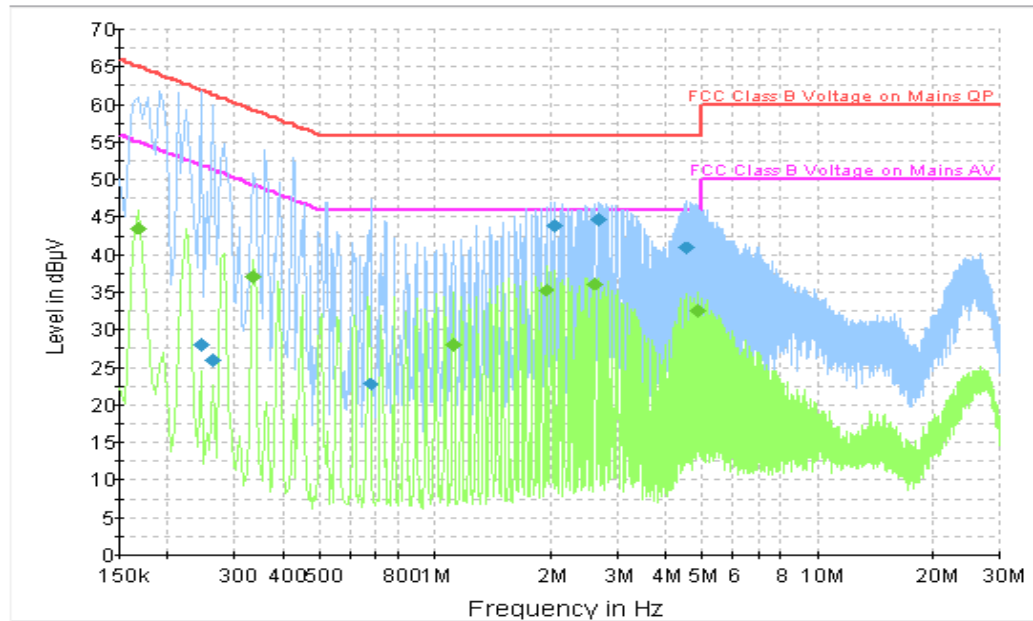


Fig.5 Conducted Emission

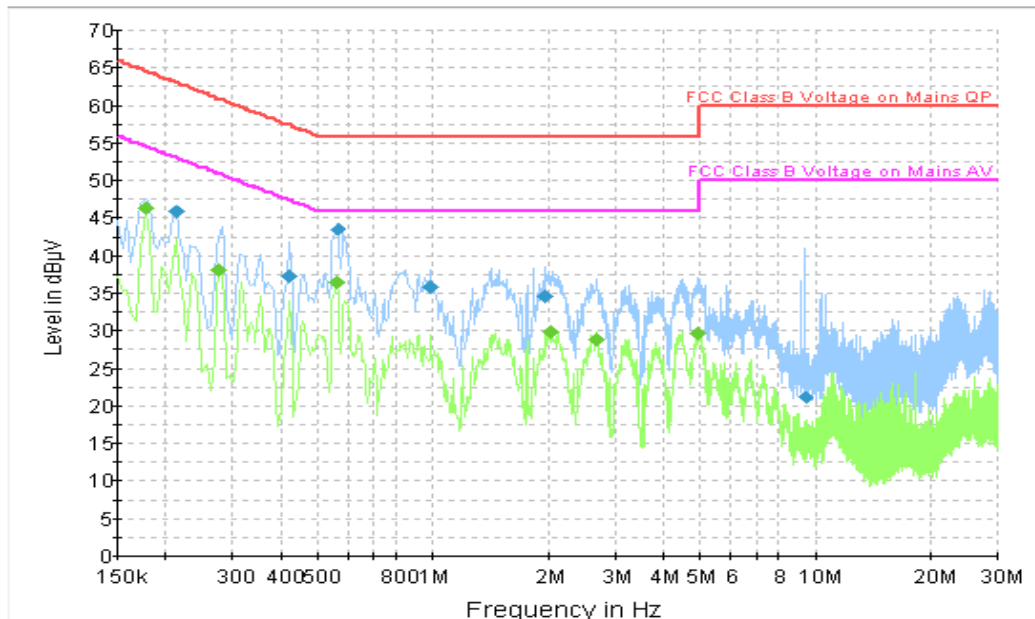
#### Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.244500	28.0	2000.0	9.000	On	L1	19.8	33.9	61.9
0.262500	25.9	2000.0	9.000	On	L1	19.8	35.5	61.4
0.676500	22.7	2000.0	9.000	On	L1	19.8	33.3	56.0
2.058000	43.9	2000.0	9.000	On	L1	19.7	12.1	56.0
2.670000	44.8	2000.0	9.000	On	L1	19.4	11.2	56.0
4.564500	40.9	2000.0	9.000	On	L1	19.6	15.1	56.0

#### Final Result 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.168000	43.6	2000.0	9.000	On	L1	19.8	11.5	55.1
0.334500	37.1	2000.0	9.000	On	N	19.9	12.2	49.3
1.117500	28.1	2000.0	9.000	On	L1	19.7	17.9	46.0
1.950000	35.3	2000.0	9.000	On	L1	19.7	10.7	46.0
2.616000	36.2	2000.0	9.000	On	L1	19.2	9.8	46.0
4.843500	32.6	2000.0	9.000	On	L1	19.6	13.4	46.0

## USB Mode, Set.2



**Fig.6 Conducted Emission**

## Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.213000	45.9	2000.0	9.000	On	N	19.8	17.2	63.1
0.420000	37.2	2000.0	9.000	On	L1	19.9	20.2	57.4
0.564000	43.6	2000.0	9.000	On	L1	19.9	12.4	56.0
0.987000	35.8	2000.0	9.000	On	N	19.7	20.2	56.0
1.972500	34.6	2000.0	9.000	On	L1	19.7	21.4	56.0
9.411000	21.2	2000.0	9.000	On	L1	19.7	38.8	60.0

## Final Result 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.177000	46.3	2000.0	9.000	On	N	19.8	8.3	54.6
0.276000	38.1	2000.0	9.000	On	N	19.8	12.8	50.9
0.559500	36.4	2000.0	9.000	On	L1	19.9	9.6	46.0
2.031000	29.9	2000.0	9.000	On	L1	19.7	16.1	46.0
2.670000	28.9	2000.0	9.000	On	L1	19.4	17.1	46.0
4.933500	29.7	2000.0	9.000	On	N	19.6	16.3	46.0

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