TEST REPORT

No.I15N01419-EMC

for

Yulong Computer Telecommunication Scientific (Shenzhen) Co., Ltd

Smart Phone

Model Name: Coolpad 3622A

Marketing Name: Coolpad Catalyst

FCC ID: R38YL3622A

with

Hardware Version: P2

Software Version: 091.00.160130

Issued Date: 2016-02-19

Test Laboratory:

FCC 2.948 Listed: No.342690

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:

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

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REPORT HISTORY

Report Number	Revision	Description	Issue Date
I15N01419-EMC	Rev.0	1st edition	2016-02-19

CONTENTS

1. Test Laboratory

1.1. Testing Location

Address:	TCL International E city No. 1001 Zhongshanyuan Road, Nanshan District, Shenzhen, Guangdong, China
Postal Code:	518048
Telephone:	+86(755)33322000
Fax:	+86(755)33322000

1.2. Testing Environment

Normal Temperature:	15-35℃
Relative Humidity:	20-75%

1.3. Project data

Testing Start Date:	2015-12-31
Testing End Date:	2016-01-25

1.4. Signature

Liang Yong
(Prepared this test report)

Du Zhaoxuan
(Reviewed this test report)

Cao Junfei
Director of the laboratory
(Approved this test report)

2. Client Information

2.1. Applicant Information

Company Name:	Yulong Computer Telecommunication Scientific (Shenzhen) Co., Ltd
Address:	Coolpad Information Harbor, 2nd Mengxi Road, Hi-Tech Industrial Park(North), Nanshan district, Shenzhen, P.R.C

2.2. Manufacturer Information

Company Name:	Yulong Computer Telecommunication Scientific (Shenzhen) Co., Ltd
Address:	Coolpad Information Harbor, 2nd Mengxi Road, Hi-Tech Industrial Park(North), Nanshan district, Shenzhen, P.R.C

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

3.1. About EUT

Description	Smart Phone
Model Name	Coolpad 3622A
Marketing Name	Coolpad Catalyst
FCC ID	R38YL3622A
TX Band	GSM850/900/1800/1900,WCDMA Band 2/4/5,FDD Band 2/4/12
RX Band	GSM850/900/1800/1900,WCDMA Band 2/4/5,FDD Band 2/4/12

The Equipment Under Test (EUT)are a model of Smart Phone with integrated antenna.
The EUT supports GPRS service and EGPRS service. It has MP3,camera,USB memory, FM radio, GPS receiver ,Bluetooth and WLAN functions.
Remark: The above EUT's information is declared by manufacturer. Please refer to the specifications or user's manual for more detailed information.

3.2. Internal Identification of EUT

EUT ID*	SN or IMEI
N0.1	869630020000919

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

3.3. Internal Identification of AE

AE ID*	Description	SN
AE1	Battery	/
AE2	Travel charger	/
AE3	USB cable	/

AE1

Model	CPLD-390
Manufacturer	ZHUHAI COSLIGHT BATTERY CO., LTD.
Capacitance	2200mAh
Nominal voltage	3.7V

AE2

Model	CYSK05-050100
Manufacturer	JIANGSU CHENYANG ELECTRON CO.,LTD
Length of cable	/
SN	CPSJD1551000198

AE3

Model	/
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	Charging mode
Set.2	EUT1+ AE1 + AE3	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	10-1-2015 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	2014

5. LABORATORY ENVIRONMENT

Semi-anechoic chamber did not exceed following limits along the EMC testing:

Temperature	Min. = 15 ℃, Max. = 30 ℃
Relative humidity	Min. = 35 %, Max. = 60 %
Shielding effectiveness	0.014MHz-1MHz,>60dB; 1MHz-1000MHz,>90dB
Electrical insulation	> 2MΩ
Ground system resistance	< 4 Ω
Normalised site attenuation (NSA)	< ±4 dB, 3 m distance, from 30 to 1000 MHz
Uniformity of field strength	Between 0 and 6 dB, from 80 to 3000 MHz

Shidlded room did not exceed following limits along the EMC testing:

Temperature	Min. = 15 ℃, Max. = 30 ℃
Relative humidity	Min. =35 %, Max. = 60 %
Shielding effectiveness	0.014MHz-1MHz,>60dB; 1MHz-1000MHz,>90dB
Electrical insulation	> 2MΩ
Ground system resistance	< 4 Ω

Fully-anechoic chamber did not exceed following limits along the EMC testing:

Temperature	Min. = 15 ℃, Max. = 30 ℃
Relative humidity	Min. = 35 %, Max. = 60 %
Shielding effectiveness	0.014MHz-1MHz,>60dB; 1MHz-1000MHz,>90dB
Electrical insulation	> 2MΩ
Ground system resistance	< 4 Ω
Voltage Standing Wave Ratio （VSWR）	≤ 6 dB, from 1 to 18 GHz， 3 m distance

6. SUMMARY OF TEST RESULTS

Abbreviations used in this clause:	
P	Pass
NA	Not applicable
F	Fail

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

7. Test Facilities Utilized

NO.	NAME	TYPE	SERIES NUMBER	PRODUCER	CALDUE DATE	CAL PERIOD
1.	Test Receiver	ESCI	100701	R&S	2016.08.10	1 year
2.	Test Receiver	ESCI	100702	R&S	2016.05.30	1 year
3.	Spectrum Analyzer	FSP 40	100378	R&S	2016.12.18	1 year
4.	BiLog Antenna	VULB9163	9163 329	Schwarzbeck	2017.01.20	3 years
5.	LISN	ESH2-Z5	100196	R&S	2017.01.12	1 year
6.	Horn Antenna	3117	00066577	ETS-Lindgren	2016.04.01	3 years
7.	Universal Radio Communication Tester	E5515C	GB44051324	Agilent	2016.05.19	1 year
8.	PC	M4099t	SA08850737	Lenovo	/	/
9.	Monitor	L1710d	0M04340B10 01010	Lenovo	/	/
10.	Printer	P1008	VNF6C12491	HP	/	/
11.	Keyboard	KB-0225	0723779	Lenovo	/	/
12.	Mouse	MO28UOL	44B39412	Lenovo	/	/

ANNEX A: MEASUREMENT RESULTS

A.1 Radiated Emission (§15.109(a))

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 a distance of 3 meters 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 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 Lenovo Thinkcentre M4099t, and the serial number of the PC is SA08850737. 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

Limit from CFR Part 15.109(a)

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 original limit is defined at 10m test distance. This limit is calculated according to CISPR requirements.

A.1.4 Test Condition

Frequency of emission (MHz)	RBW/VBW	Sweep Time(s)
30-1000	120kHz (IF bandwidth)	5
Above 1000	1MHz/3MHz	15

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.

Note: the result contains vertical part and Horizontal part

RE Measurement uncertainty: 30M-1GHz: 5.08dB (k=2);
1GHz-18GHz: 4.56 dB (k=2)

Set.1 Charging mode / Peak detector

Frequency(MHz)	Result(dBuV/m)	Polarity	A_{Rpl} (dB)	Margin(dB)	Limit (dBμV/m)
14123.000000	57.8	H	13.3	16.2	74.0
14881.000000	58.2	V	13.8	15.8	74.0
15715.000000	59.5	H	14.5	14.5	74.0
16360.000000	58.9	H	15.7	15.1	74.0
16789.000000	59.8	V	15.8	14.2	74.0
17338.000000	59.5	V	16.1	14.5	74.0

Set.1 Charging mode / Average detector

Frequency(MHz)	Result(dBuV/m)	Polarity	A_{Rpl} (dB)	Margin(dB)	Limit (dBμV/m)
14148.000000	45.0	H	13.3	9.0	54.0
15135.000000	45.9	V	14.2	8.1	54.0
15745.000000	47.1	V	14.6	6.9	54.0
16216.000000	46.9	V	15.1	7.1	54.0
16814.000000	47.5	V	15.9	6.5	54.0
17409.000000	47.2	H	16.5	6.8	54.0

Set.2 USB mode / Peak detector

Frequency(MHz)	Result(dBuV/m)	Polarity	A_{Rpl} (dB)	Margin(dB)	Limit (dBµV/m)
14218.000000	58.2	H	13.4	15.8	74.0
15171.000000	58.6	H	14.3	15.4	74.0
15679.000000	60.0	V	14.5	14.0	74.0
16336.000000	60.0	H	15.6	14.0	74.0
16633.000000	60.5	V	15.8	13.5	74.0
17345.000000	60.3	V	16.1	13.7	74.0

Set.2 USB mode / Average detector

Frequency(MHz)	Result(dBuV/m)	Polarity	A_{Rpl} (dB)	Margin(dB)	Limit (dBµV/m)
14143.000000	45.7	V	13.3	8.3	54.0
15132.000000	46.9	V	14.2	7.1	54.0
15786.000000	48.0	V	14.7	6.0	54.0
16324.000000	48.0	V	15.5	6.0	54.0
16842.000000	48.6	V	16.1	5.4	54.0
17432.000000	48.3	H	16.4	5.7	54.0

Note: The measurement result of Set.1, and Set.2 showed here are worst cases of combinations of different batteries and USB cables.

Charging mode: Set 1

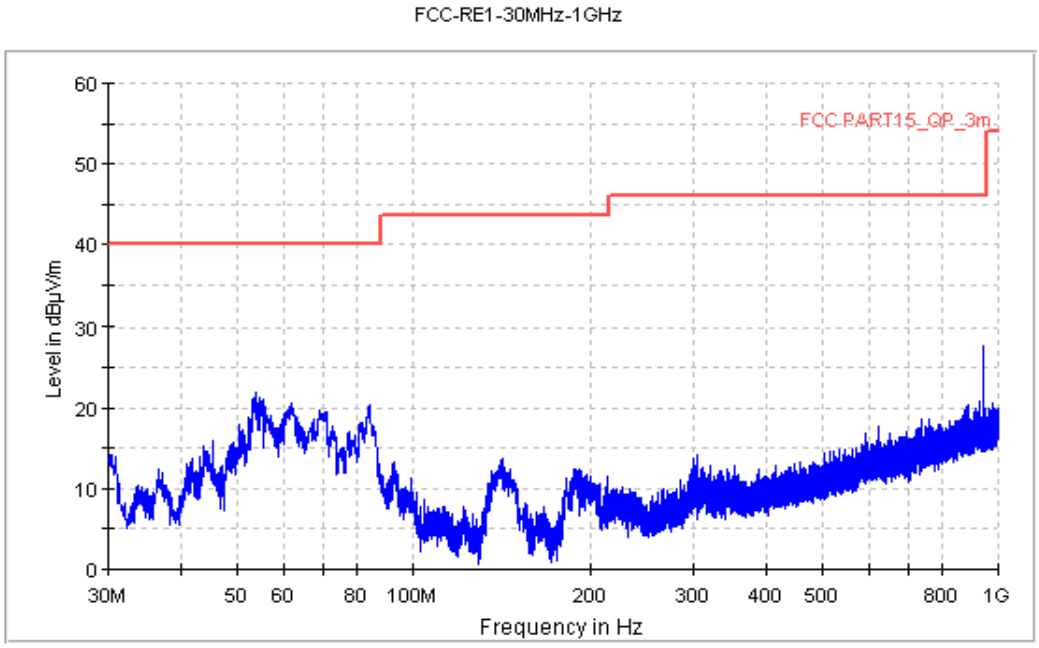

Figure A.1 Radiated Emission from 30MHz to 1GHz

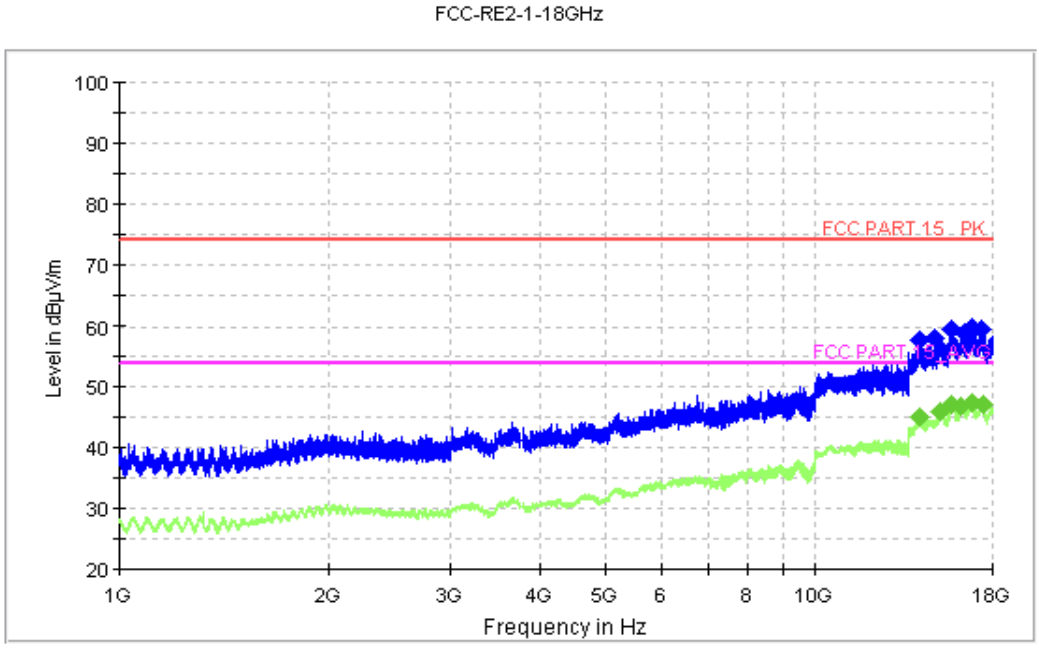

Figure A.2 Radiated Emission from 1GHz to 18GHz

USB mode: Set 2

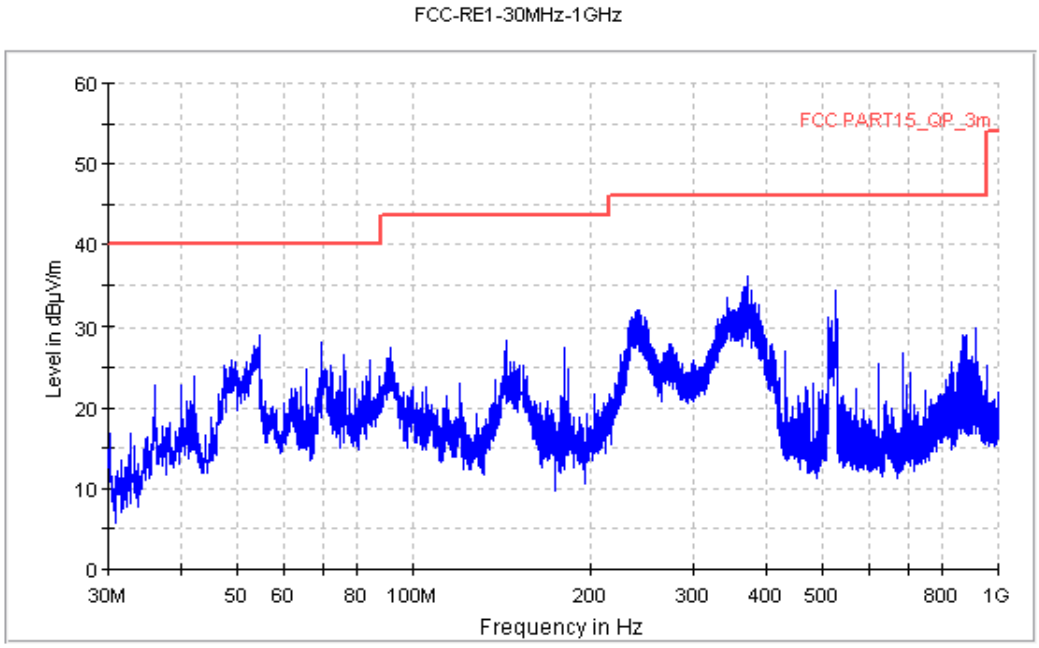

Figure A.3 Radiated Emission from 30MHz to 1GHz

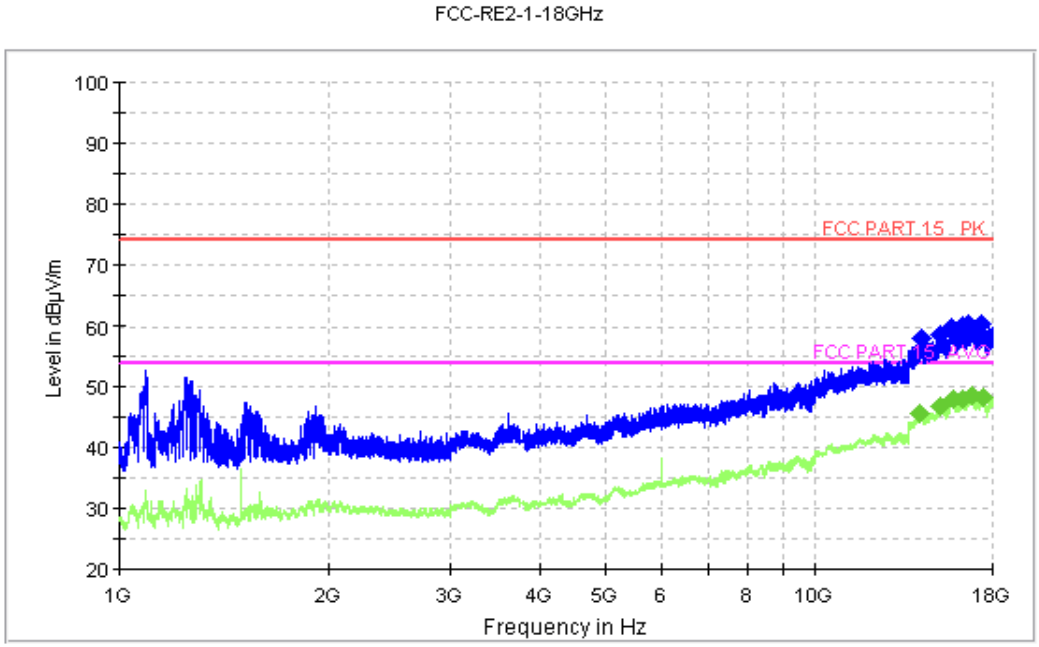

Figure A.4 Radiated Emission from 1GHz to 18GHz

A.2 Conducted Emission (§15.107(a))

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 Lenovo Thinkcentre M4099t, and the serial number of the PC is SA08850737. 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 (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	Sweep Time(s)
9kHz	1

CE Measurement uncertainty: 2.7 dB (k=2)

A.2.5 Measurement Results

Charging mode:Set.1

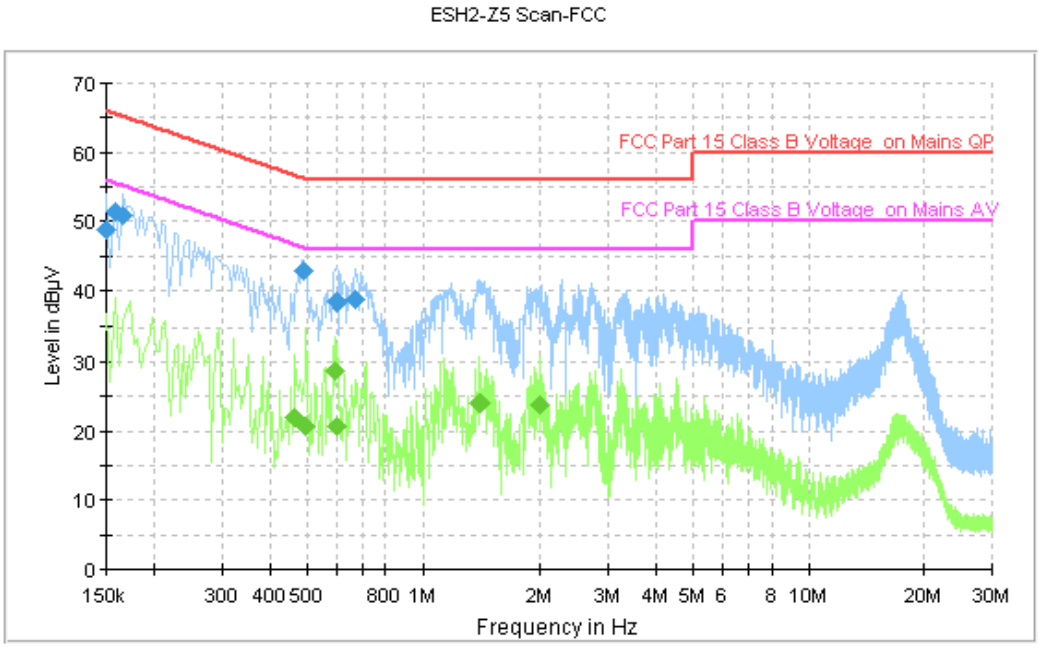

Figure A.5 Conducted Emission

Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	48.9	GND	N	10.1	17.1	66.0
0.158000	51.3	GND	L1	10.0	14.3	65.6
0.166000	50.8	GND	L1	10.0	14.4	65.2
0.490000	42.8	GND	L1	10.0	13.3	56.2
0.598000	38.6	GND	L1	10.1	17.4	56.0
0.666000	38.6	GND	L1	10.0	17.4	56.0

Final Measurement Detector 2

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.466000	22.0	GND	L1	10.0	24.6	46.6
0.498000	20.7	GND	L1	10.0	25.3	46.0
0.590000	28.8	GND	L1	10.1	17.2	46.0
0.598000	20.6	GND	L1	10.1	25.4	46.0
1.402000	24.1	GND	L1	10.1	21.9	46.0
1.998000	23.8	GND	L1	10.1	22.2	46.0

USB mode:Set.2

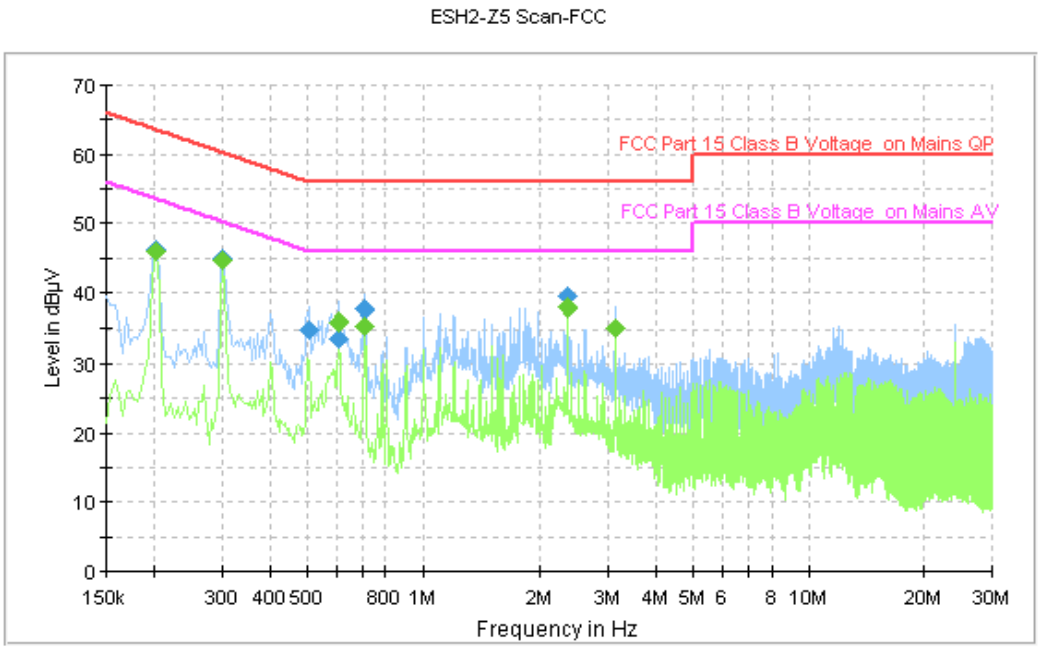

Figure A.6 Conducted Emission

Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.202000	46.3	GND	N	10.1	17.2	63.5
0.302000	45.1	GND	N	10.1	15.1	60.2
0.506000	34.9	GND	N	10.1	21.1	56.0
0.602000	33.6	GND	N	10.1	22.4	56.0
0.706000	37.7	GND	N	10.0	18.4	56.0
2.354000	39.6	GND	L1	10.1	16.4	56.0

Final Measurement Detector 2

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.202000	46.0	GND	N	10.1	7.5	53.5
0.302000	44.7	GND	N	10.1	5.5	50.2
0.606000	35.8	GND	N	10.1	10.2	46.0
0.706000	35.4	GND	N	10.0	10.6	46.0
2.354000	37.9	GND	L1	10.1	8.1	46.0
3.138000	35.2	GND	L1	10.2	10.8	46.0

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