



TEST REPORT

No. I15Z41818-EMC01

for

TCL Communication Ltd

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

Model Name: 5054N/5054W

FCC ID: 2ACCJA008

with

Hardware Version: 09

Software Version: SVN 01

Issued Date: 2015-09-06

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

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REPORT HISTORY

Report Number	Revision	Description	Issue Date
I15Z41818-EMC01	Rev.0	1 st edition	2015-09-06

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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℃

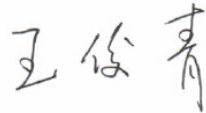
Relative Humidity: 20-75%

1.3. Project data

Testing Start Date: 2015-08-19

Testing End Date: 2015-08-25

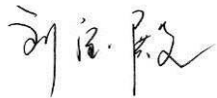
1.4. Signature



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
City: Shanghai
Postal Code: 201203
Country: P. R. China
Contact Person: Gong Zhizhou
Contact Email: zhizhou.gong@tcl.com
Telephone: 0086-21-51798260
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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
Fax: 0086-21-61460602

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

3.1. About EUT

Description	GSM Quad-band / UMTS Tri-band / LTE Tri-band mobile phone
Model Name	5054N/5054W
FCC ID	2ACCJA008
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	/	09	SVN 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
AE2	Travel	/	15TCT-CH-0917
AE3	USB cable	/	15TCT-DC-0231
AE4	USB cable	/	15TCT-DC-0099

AE1

Model	CAC2500028C2
Manufacturer	SCUD(LG)
Capacitance	2500 mAh
Nominal voltage	3.7 V

AE2

Model	CBA0057AG0C1
Manufacturer	BYD
Length of cable	/

AE3

Model	CDA3122002C2
Manufacturer	Shenhua
Length of cable	92cm

AE4

Model	CDA3122002C8
Manufacturer	Puan
Length of cable	93cm

*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/AE4	Charger
Set.3	EUT1+ AE1 + AE3	USB mode
Set.4	EUT1+ AE1 + AE4	USB mode

Note: The GSM Quad-band / UMTS Tri-band / LTE Tri-band mobile phone 5054N/5054W manufactured by TCL Communication Ltd is a variant model based on 5054S for conformance test. According to the declaration of changes, no test needs to been performed, all results are cited from the initial model. The report number for initial model is I15Z41929-EMC01.

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	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	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).

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 ($\mu\text{V/m}$)		
	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_{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 $\mu\text{V/m}$)	G_{PL} (dB)	G_A (dB/m)	P_{Mea} (dB μV)	Polarity
17983.567	43.7	-17.7	45.6	15.800	HORIZONTAL
17974.500	43.7	-17.7	45.6	15.800	VERTICAL
17994.900	43.6	-17.7	45.6	15.700	HORIZONTAL
17995.467	43.5	-17.7	45.6	15.600	VERTICAL
17996.600	43.5	-17.7	45.6	15.600	VERTICAL
17988.667	43.5	-17.7	45.6	15.600	VERTICAL

Charging Mode/Peak detector

Frequency(MHz)	Result(dB $\mu\text{V/m}$)	G_{PL} (dB)	G_A (dB/m)	P_{Mea} (dB μV)	Polarity
17999.433	55.7	-17.7	45.6	27.800	HORIZONTAL
17917.267	55.6	-17.7	45.6	27.700	VERTICAL
17990.933	55.1	-17.7	45.6	27.200	HORIZONTAL
17958.067	55.0	-17.7	45.6	27.100	VERTICAL
17979.600	54.9	-17.7	45.6	27.000	VERTICAL
17988.667	54.9	-17.7	45.6	27.000	VERTICAL

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
17993.767	43.6	-17.7	45.6	15.700	VERTICAL
17997.167	43.5	-17.7	45.6	15.600	HORIZONTAL
17986.967	43.5	-17.7	45.6	15.600	VERTICAL
17988.667	43.4	-17.7	45.6	15.500	HORIZONTAL
17983.000	43.4	-17.7	45.6	15.500	VERTICAL
17995.467	43.4	-17.7	45.6	15.500	HORIZONTAL

USB Mode/ Peak detector

Frequency(MHz)	Result(dB μ V/m)	G _{PL} (dB)	G _A (dB/m)	P _{mea} (dB μ V)	Polarity
17979.033	55.4	-17.7	45.6	27.500	VERTICAL
17929.167	55.4	-17.7	45.6	27.500	HORIZONTAL
17976.200	55.3	-17.7	45.6	27.400	HORIZONTAL
17796.000	55.1	-18.5	45.6	28.000	VERTICAL
17999.433	55.1	-17.7	45.6	27.200	HORIZONTAL
17837.933	55.1	-18.5	45.6	28.000	VERTICAL

Measurement results for Set.3:
USB Mode/Average detector

Frequency(MHz)	Result(dB μ V/m)	G _{PL} (dB)	G _A (dB/m)	P _{mea} (dB μ V)	Polarity
17964.867	43.8	-17.7	45.6	15.900	VERTICAL
17973.367	43.4	-17.7	45.6	15.500	VERTICAL
17957.500	43.4	-17.7	45.6	15.500	HORIZONTAL
17974.500	43.4	-17.7	45.6	15.500	VERTICAL
17975.633	43.4	-17.7	45.6	15.500	VERTICAL
17982.433	43.4	-17.7	45.6	15.500	HORIZONTAL

USB Mode/ Peak detector

Frequency(MHz)	Result(dB μ V/m)	G _{PL} (dB)	G _A (dB/m)	P _{mea} (dB μ V)	Polarity
17997.733	55.3	-17.7	45.6	27.400	VERTICAL
17977.333	55.3	-17.7	45.6	27.400	VERTICAL
17964.867	55.1	-17.7	45.6	27.200	HORIZONTAL
17996.600	55.1	-17.7	45.6	27.200	VERTICAL
17873.633	55.0	-18.5	45.6	27.900	HORIZONTAL
17963.733	55.0	-17.7	45.6	27.100	HORIZONTAL

Charging Mode, Set.1

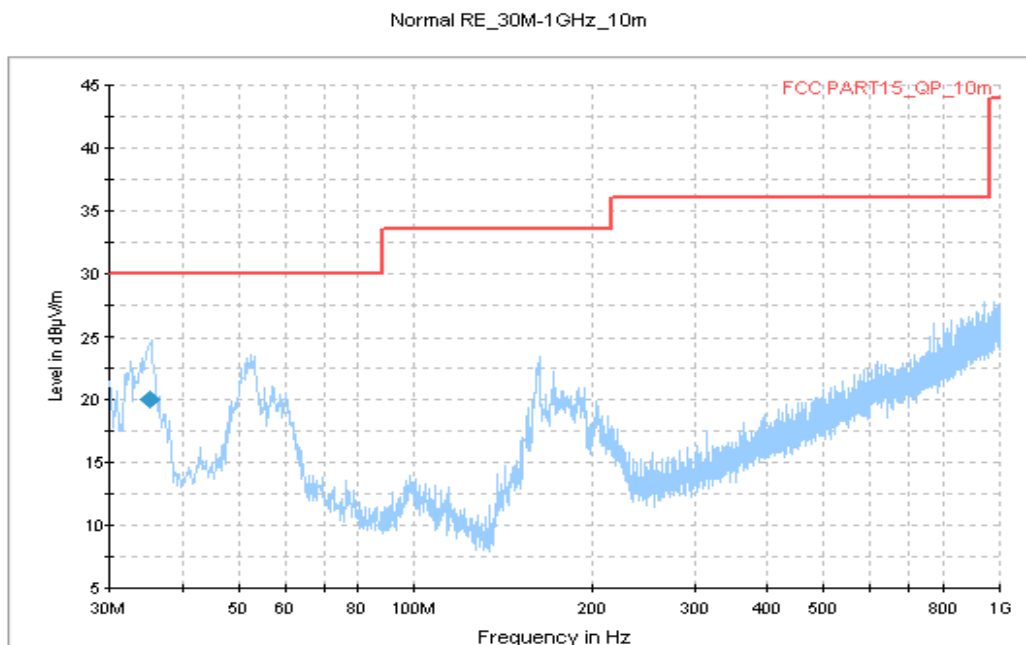


Figure A.1 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dB μV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dB μV/m)
35.143500	20.0	205.0	V	300.0	-12.9	10.0	30.0

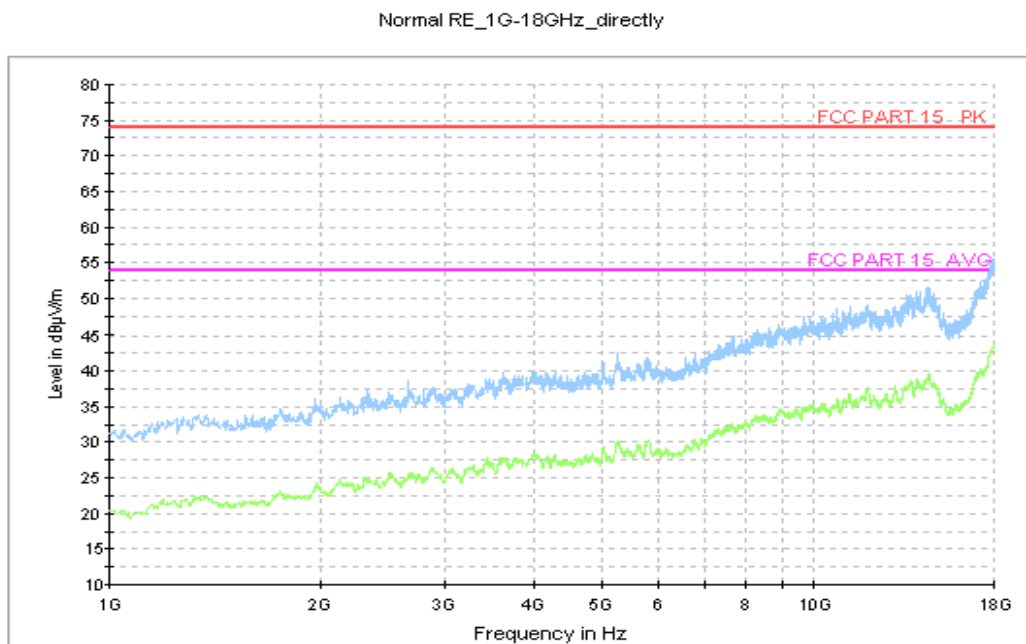


Figure A.2 Radiated Emission from 1GHz to 18GHz

USB Mode, Set.2

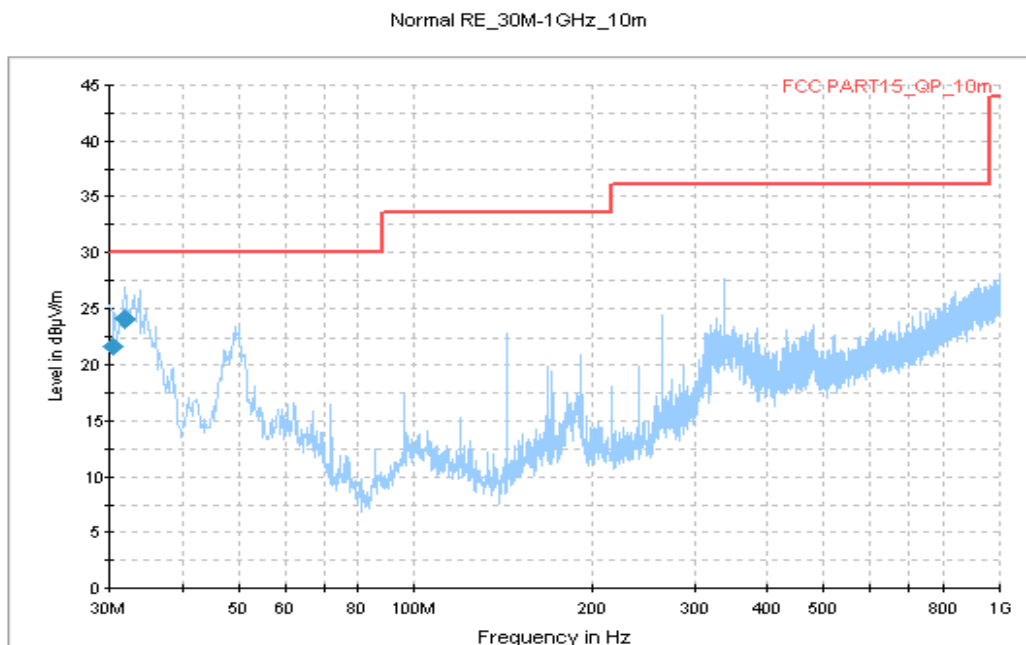


Figure A.3 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dB μV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dB μV/m)
30.480000	21.7	100.0	V	278.0	-13.9	8.3	30.0
31.843000	24.0	275.0	V	150	-13.6	6.0	30.0

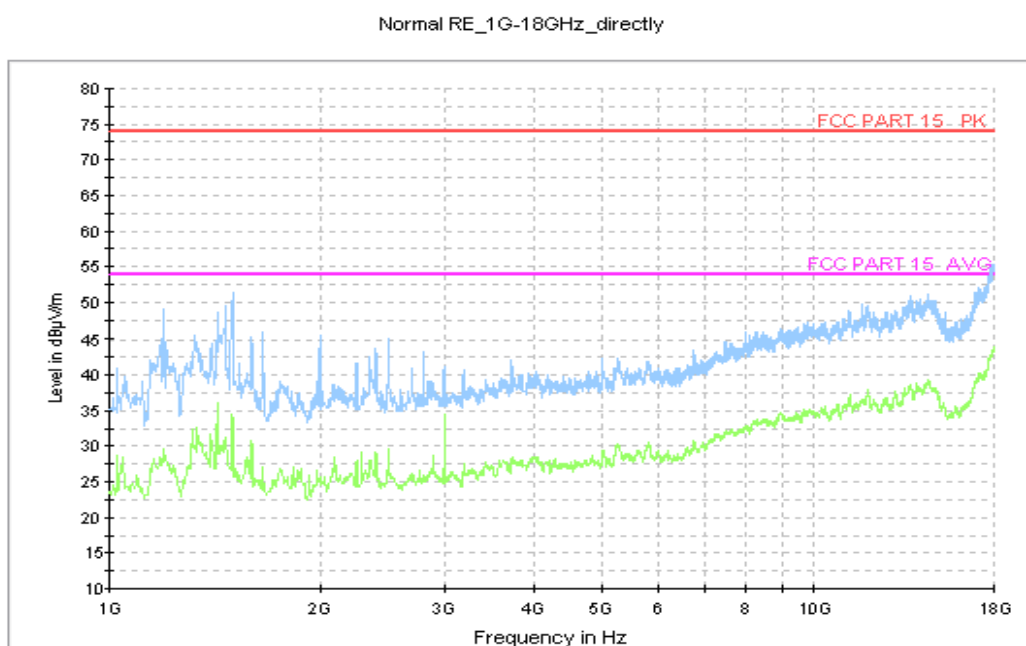


Figure A.4 Radiated Emission from 1GHz to 18GHz

USB Mode, Set.3

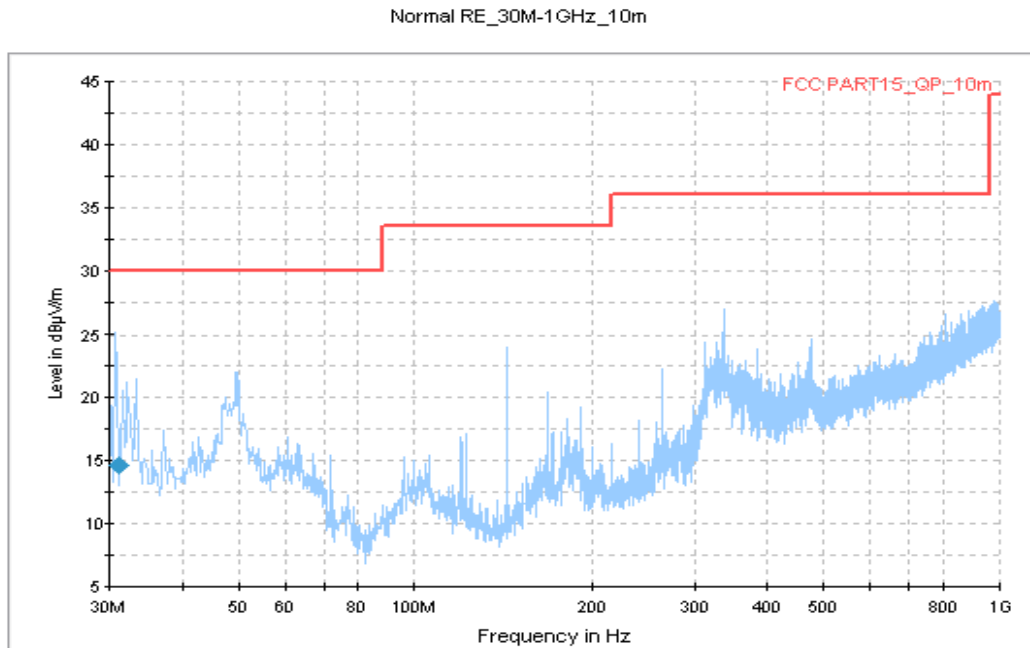


Figure A.5 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dB μV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dB μV/m)
31.267500	14.6	100.0	V	92.0	-13.7	15.4	30.0

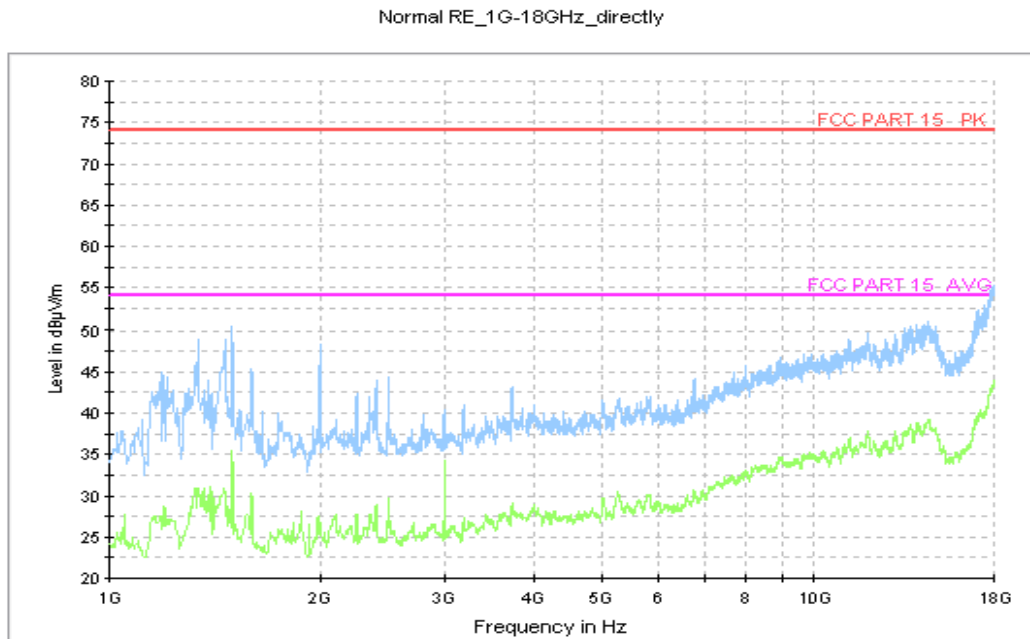


Figure A.6 Radiated Emission from 1GHz to 18GHz

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 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 (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

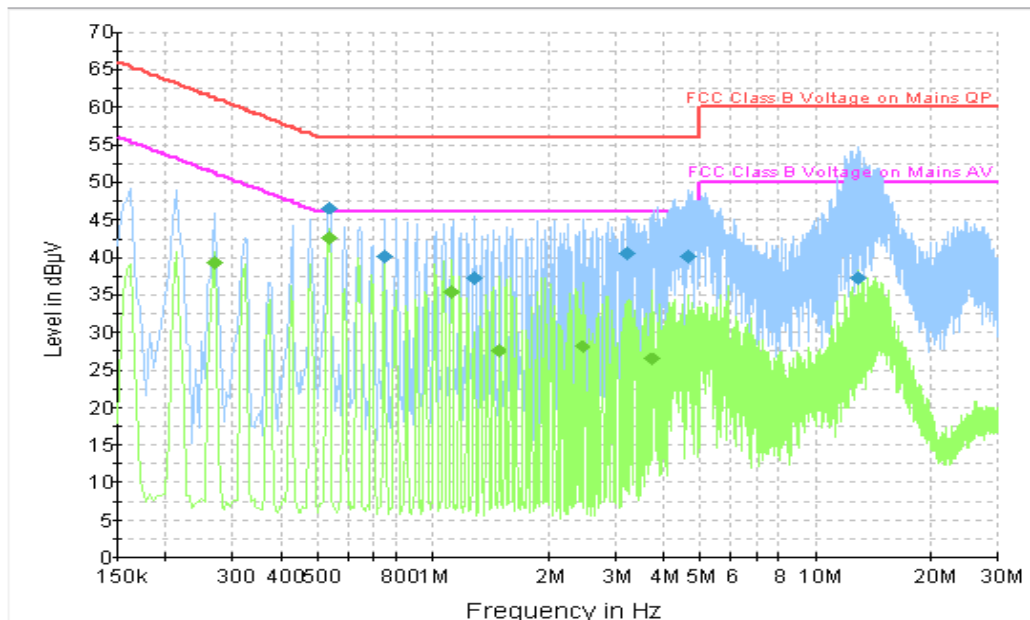


Figure A.7 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time(ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.532500	46.5	2000.0	9.000	On	L1	19.8	9.5	56.0
0.748500	40.1	2000.0	9.000	On	N	19.8	15.9	56.0
1.284000	37.2	2000.0	9.000	On	N	19.6	18.8	56.0
3.210000	40.4	2000.0	9.000	On	N	19.7	15.6	56.0
4.654500	40.2	2000.0	9.000	On	N	19.6	15.8	56.0
12.844500	37.1	2000.0	9.000	On	N	20.0	22.9	60.0

Final Result 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time(ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.267000	39.2	2000.0	9.000	On	L1	19.7	12.0	51.2
0.532500	42.6	2000.0	9.000	On	L1	19.8	3.4	46.0
1.117500	35.3	2000.0	9.000	On	L1	19.7	10.7	46.0
1.486500	27.5	2000.0	9.000	On	L1	19.6	18.5	46.0
2.449500	28.0	2000.0	9.000	On	L1	19.6	18.0	46.0
3.736500	26.4	2000.0	9.000	On	N	19.7	19.6	46.0

USB Mode, Set.2

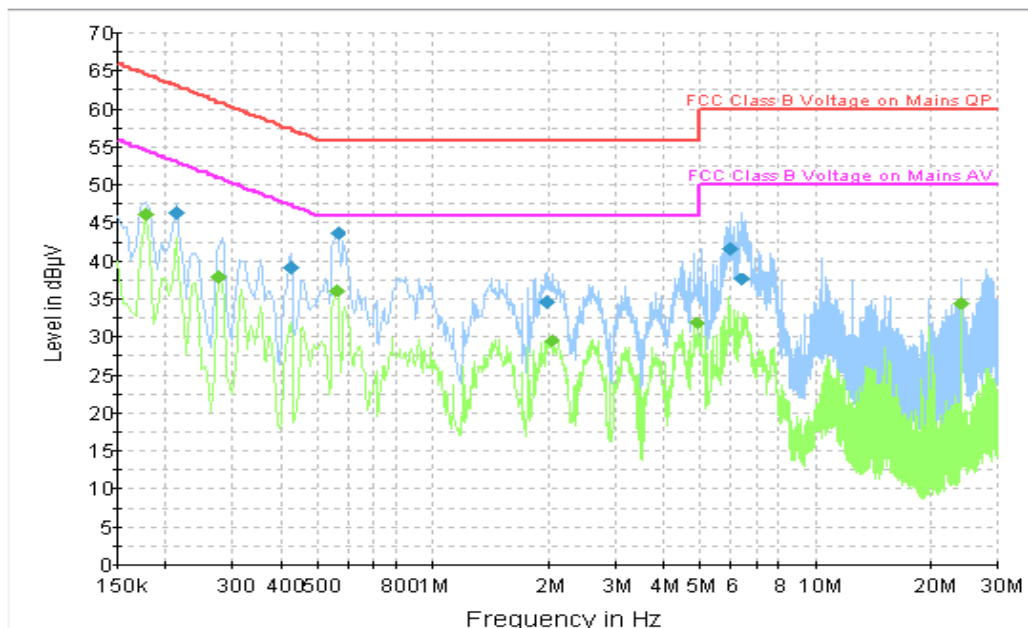


Figure A.8 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time(ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.213000	46.3	2000.0	9.000	On	N	19.8	16.8	63.1
0.424500	39.1	2000.0	9.000	On	L1	19.8	18.3	57.4
0.564000	43.7	2000.0	9.000	On	L1	19.8	12.3	56.0
1.981500	34.7	2000.0	9.000	On	L1	19.6	21.3	56.0
6.000000	41.6	2000.0	9.000	On	L1	19.7	18.4	60.0
6.369000	37.6	2000.0	9.000	On	N	19.7	22.4	60.0

Final Result 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time(ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.177000	46.2	2000.0	9.000	On	N	19.7	8.5	54.6
0.276000	37.9	2000.0	9.000	On	N	19.8	13.0	50.9
0.559500	36.2	2000.0	9.000	On	L1	19.8	9.8	46.0
2.053500	29.5	2000.0	9.000	On	N	19.6	16.5	46.0
4.920000	31.9	2000.0	9.000	On	N	19.7	14.1	46.0
24.000000	34.5	2000.0	9.000	On	L1	20.0	15.5	50.0

USB Mode, Set.3

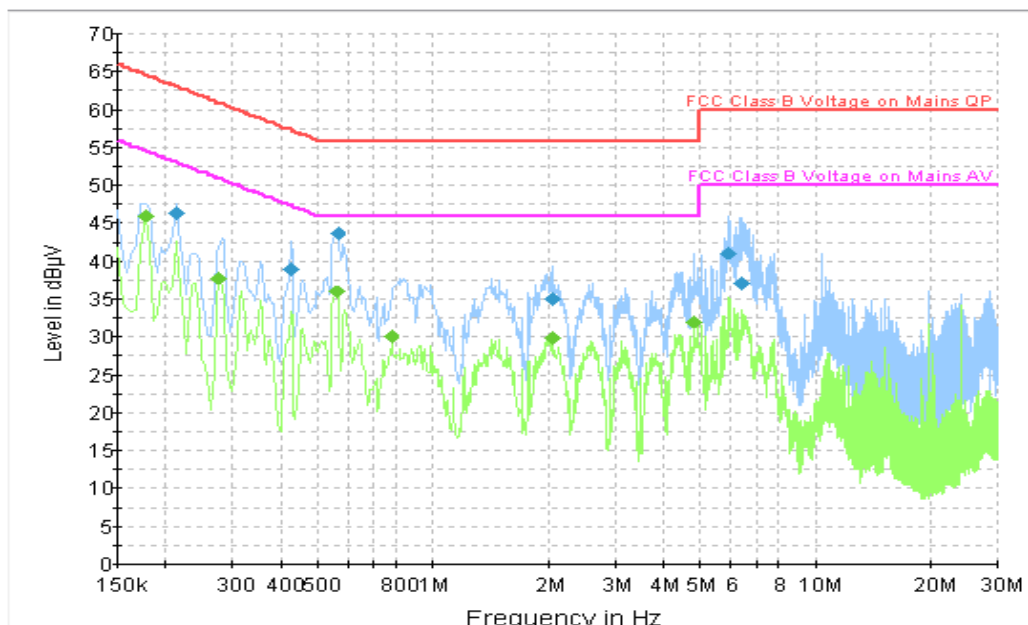


Figure A.9 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time(ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.213000	46.5	2000.0	9.000	On	N	19.8	16.6	63.1
0.424500	38.9	2000.0	9.000	On	L1	19.8	18.4	57.4
0.564000	43.8	2000.0	9.000	On	L1	19.8	12.2	56.0
2.058000	34.9	2000.0	9.000	On	L1	19.6	21.1	56.0
5.905500	41.0	2000.0	9.000	On	N	19.7	19.0	60.0
6.378000	37.1	2000.0	9.000	On	N	19.7	22.9	60.0

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time(ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.177000	46.1	2000.0	9.000	On	N	19.7	8.5	54.6
0.276000	37.8	2000.0	9.000	On	N	19.8	13.1	50.9
0.559500	36.0	2000.0	9.000	On	L1	19.8	10.0	46.0
0.780000	30.1	2000.0	9.000	On	N	19.8	15.9	46.0
2.058000	30.0	2000.0	9.000	On	N	19.6	16.0	46.0
4.821000	32.0	2000.0	9.000	On	N	19.7	14.0	46.0

END OF REPORT