



TEST REPORT

No. I16Z42410-EMC01

for

TCL Communication Ltd.

LTE / UMTS / GSM mobile phone

Model Name: 5046J

FCC ID: 2ACCJH070

with

Hardware Version: PIO

Software Version: v5JE3

Issued Date: 2017-01-13

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
I16Z42410-EMC01	Rev.0	1 st edition	2017-1-13

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1. Test Laboratory

1.1. Testing Location

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

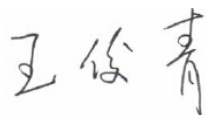
Relative Humidity: 20-75%

1.3. Project data

Testing Start Date: 2016-12-22

Testing End Date: 2017-01-06

1.4. Signature



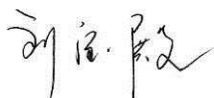
Wang Junqing

(Prepared this test report)



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(Reviewed this test report)



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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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Contact Person: Gong Zhizhou
Contact Email: zhizhou.gong@tcl.com
Telephone: 0086-21-31363544
Fax: 0086-21-61460602

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
Contact Person: Gong Zhizhou
Contact Email: zhizhou.gong@tcl.com
Telephone: 0086-21-31363544
Fax: 0086-21-61460602

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

3.1. About EUT

Description	LTE / UMTS / GSM mobile phone
Model Name	5046J
Marketing Name	/
FCC ID	2ACCJH070
Extreme vol. Limits	3.5VDC to 4.2VDC (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
EUT2	355157080200156 /355157080200164	PIO	v5JE3

*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	Battery	/	inbuilt
AE3	Battery	/	inbuilt
AE4	Charger	/	16TCT-CH-1485
AE5	Charger	/	16TCT-CH-1018
AE6	USB Cable	/	16TCT-DC-0026
AE7	USB Cable	/	16TCT-DC-0703

AE1

Model	CAC2400008C1
Manufacturer	BYD
Capacitance	2400 mAh
Nominal voltage	V

AE2

Model	CAC2400006CJ
Manufacturer	COSLIGHT
Capacitance	2400 mAh
Nominal voltage	V

AE3

Model	CAC2400022CC
Manufacturer	JINNENG
Capacitance	2400 mAh
Nominal voltage	V



AE4

Model	CBA0058AGAC2
Manufacturer	TEPAO
Length of cable	/

AE5

Model	CBA0058AGAC3
Manufacturer	Yingju
Length of cable	/

AE6

Model	CDA3122005C1
Manufacturer	JUWEI
Length of cable	100cm

AE7

Model	CDA3122005C8
Manufacturer	PUAN
Length of cable	100cm

*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	EUT2+ AE1+ AE4+ AE6/AE7	Charger
Set.2	EUT2+ AE1+ AE5+ AE6/AE7	Charger
Set.3	EUT2+ AE1+ AE6/AE7	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	10-1-15 Edition
ANSI C63.4	American National Standard for Methods of Measurement of Radio- Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz	2014

Note: The test methods have no deviation with standards.

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

Items	Test Name	Clause in FCC rules	Section in this report	Verdict	Test Location
1	Radiated Emission	15.109(a)	B.1	P	CTTL(huayuan North Road)
2	Conducted Emission	15.107(a)	B.2	P	CTTL(huayuan North Road)

7. Test Equipments Utilized

NO.	Description	TYPE	SERIES NUMBER	MANUFACTURE	CAL DUE DATE	CALIBRATI ON INTERVAL
1	Test Receiver	ESU26	100235	R&S	2017-03-02	1 year
2	Test Receiver	ESCI 7	100344	R&S	2017-07-05	1 year
3	Universal Radio Communication Tester	CMW500	143008	R&S	2017-12-01	1 year
4	Universal Radio Communication Tester	CMW500	155415	R&S	2017-01-11	1 year
5	LISN	ENV216	101200	R&S	2017-07-10	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	Printer	P1606dn	VNC3L52122	HP	N/A	N/A
10	Keyboard	L100	CN0RH6596589 07ATOI40	DELL	N/A	N/A
11	Mouse	M-UAE119	LZ935220ZRC	Lenovo	N/A	N/A

Test Item	Test Software and Version	Software Vendor
Radiated Continuous Emission	EMC32 V9.01	R&S
Conducted Emission	EMC32 V8.52.0	R&S

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.

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_{PL} : Path Loss

P_{Mea} : Measurement result on receiver.

Measurement uncertainty (worst case): $U = 5.26 \text{ dB}$, $k=2$.

Measurement results for Set.1:

Charging Mode/Average detector

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Antenna Pol. (H/V)
17990.933	50.3	-17.7	45.6	22.4	54.0	H
17960.333	50.3	-17.7	45.6	22.4	54.0	H
17901.967	50.2	-18.5	45.6	23.1	54.0	V
17920.100	50.2	-17.7	45.6	22.3	54.0	H
17890.633	50.2	-18.5	45.6	23.1	54.0	H
17870.800	50.1	-18.5	45.6	23	54.0	H

Charging Mode/Peak detector

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Antenna Pol. (H/V)
17938.800	61.7	-17.7	45.6	33.800	74.0	H
17900.833	61.7	-18.5	45.6	34.600	74.0	H
17891.767	61.6	-18.5	45.6	34.500	74.0	V
17931.433	61.4	-17.7	45.6	33.500	74.0	H
17888.933	61.3	-18.5	45.6	34.200	74.0	H
17990.933	61.2	-17.7	45.6	33.300	74.0	H

Sample calculation: Peak detector, 17938.800MHz

$$\text{Result} = P_{\text{Mea}} (33.800 \text{ dBμV/m}) + G_A (45.6 \text{ dB/m}) + G_{\text{PL}} (-17.7 \text{ dB}) = 61.7 \text{ dBμV/m}$$

Measurement results for Set.2:
Charging Mode/Average detector

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Antenna Pol. (H/V)
17890.067	50.5	-18.5	45.6	23.400	74.0	H
17900.833	50.5	-18.5	45.6	23.400	74.0	H
17879.867	50.4	-18.5	45.6	23.300	74.0	V
17878.733	50.4	-18.5	45.6	23.300	74.0	H
17881.567	50.2	-18.5	45.6	23.100	74.0	H
17989.233	50.2	-17.7	45.6	22.300	74.0	H

Charging Mode/Peak detector

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Antenna Pol. (H/V)
17967.700	62.5	-17.7	45.6	34.600	74.0	H
17916.700	62.4	-17.7	45.6	34.500	74.0	H
17960.333	61.8	-17.7	45.6	33.900	74.0	V
17888.367	61.7	-18.5	45.6	34.600	74.0	H
17886.667	61.5	-18.5	45.6	34.400	74.0	H
17946.733	61.4	-17.7	45.6	33.500	74.0	H

Sample calculation: Peak detector, 17967.700MHz

Result = P_{Mea} (34.600 dBμV/m)+ G_A (45.6dB/m)+ G_{PL} (-17.7 dB) =62.5dBμV/m

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

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Antenna Pol. (H/V)
17998.867	50.4	-17.7	45.6	22.500	54.0	H
17887.233	50.2	-18.5	45.6	23.100	54.0	H
17915.000	50.2	-17.7	45.6	22.300	54.0	V
17958.067	50.2	-17.7	45.6	22.300	54.0	H
17916.700	50.2	-17.7	45.6	22.300	54.0	H
17894.033	50.2	-18.5	45.6	23.100	54.0	H

USB Mode/ Peak detector

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Antenna Pol. (H/V)
17983.000	62.6	-17.7	45.6	34.700	74.0	H
17884.967	62.1	-18.5	45.6	35.000	74.0	H
17899.133	62.1	-18.5	45.6	35.000	74.0	V
17916.133	61.9	-17.7	45.6	34.000	74.0	H
17988.667	61.8	-17.7	45.6	33.900	74.0	H
17929.167	61.8	-17.7	45.6	33.900	74.0	H

Sample calculation: Peak detector, 17983.000MHz

Result = P_{Mea} (34.700dBμV/m) + G_A (45.6dB/m) + G_{PL} (-17.7 dB) =62.6dBμV/m

Charging Mode, Set.1

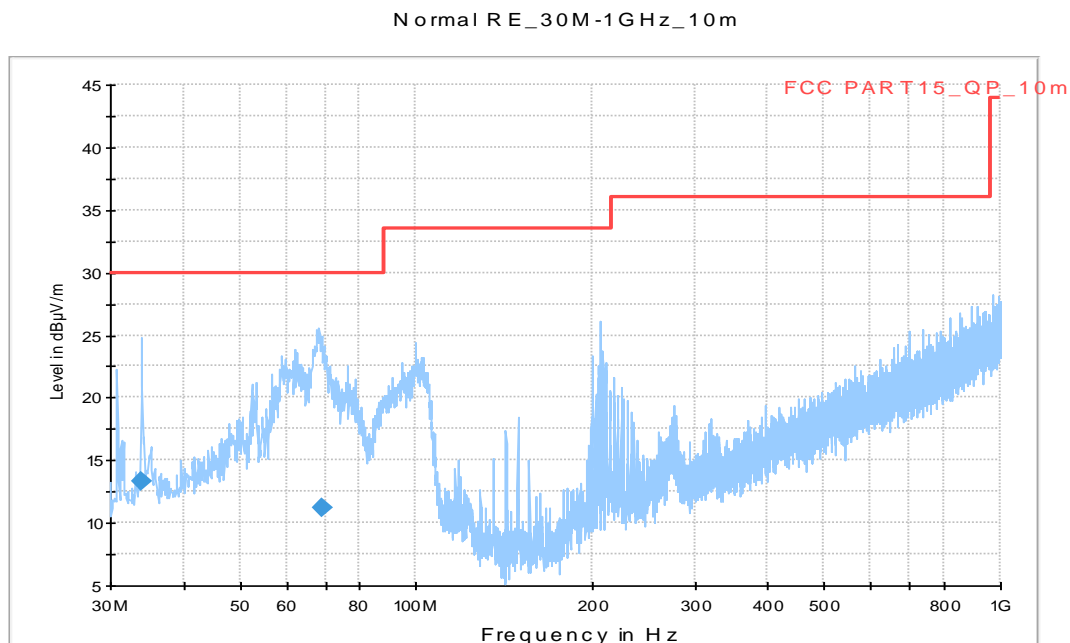


Fig A.1 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
33.880000	13.3	275.0	V	25.0	-12.5	16.7	30.0
68.855000	11.1	212.0	V	241.0	-14.7	18.9	30.0

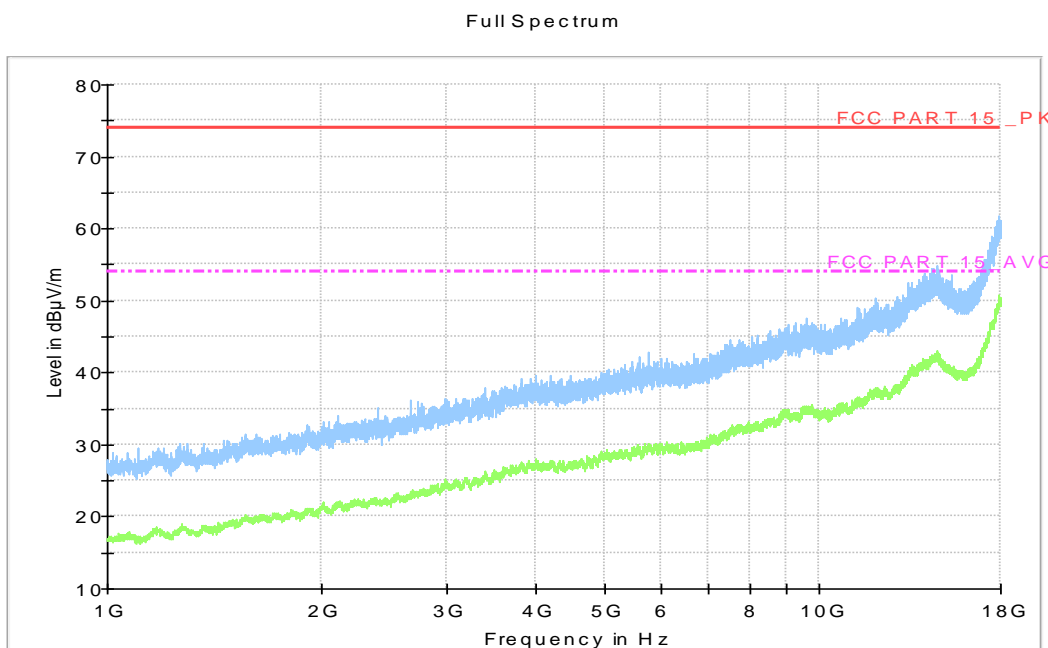


Fig A.2 Radiated Emission from 1GHz to 18GHz

Charging Mode, Set.2

Normal RE_30M-1GHz_10m

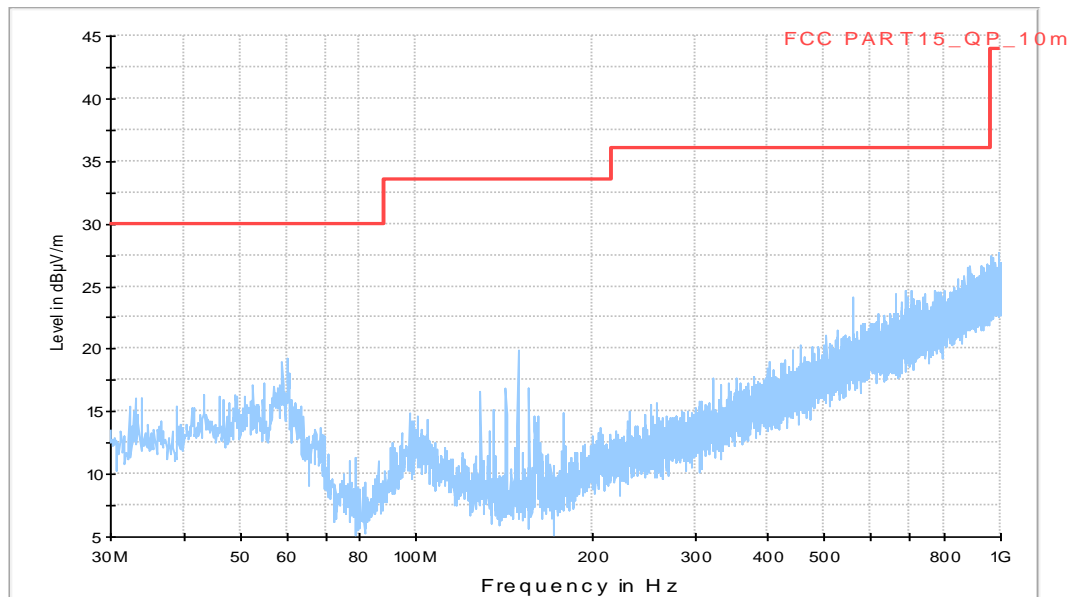


Fig A.3 Radiated Emission from 30MHz to 1GHz

Full Spectrum

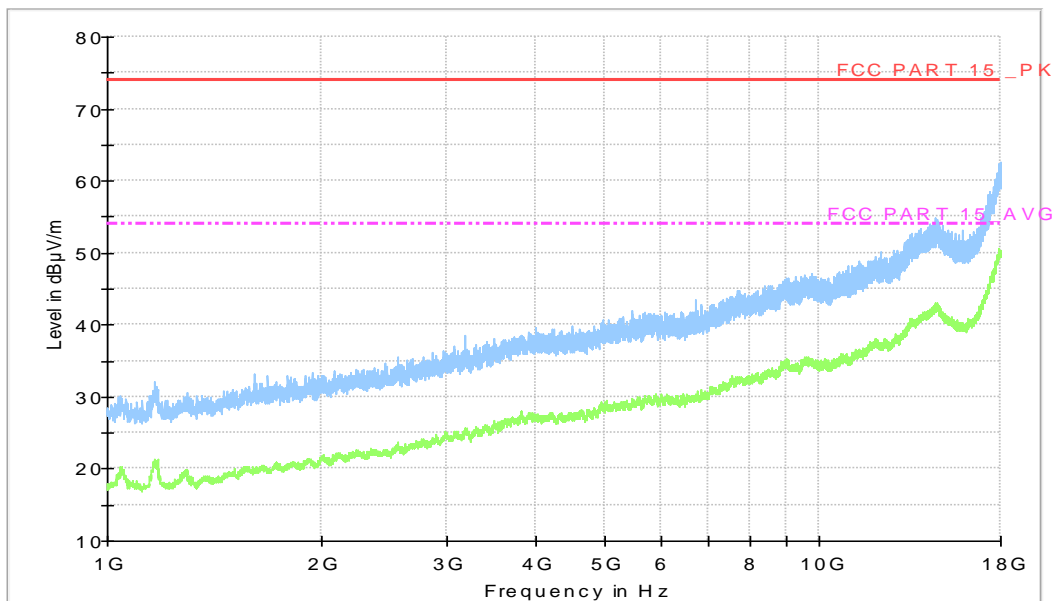


Fig A.4 Radiated Emission from 1GHz to 18GHz

USB Mode, Set.3

Full Spectrum

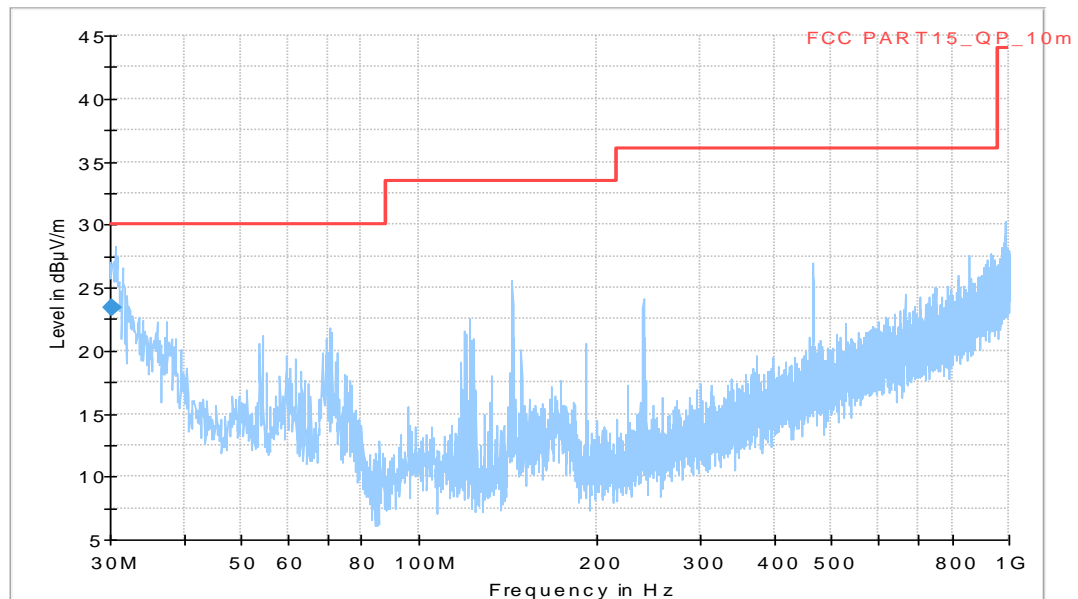


Fig A.5 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
30.180000	23.37	30.00	6.63	1000.0	120.000	225.0	V

Full Spectrum

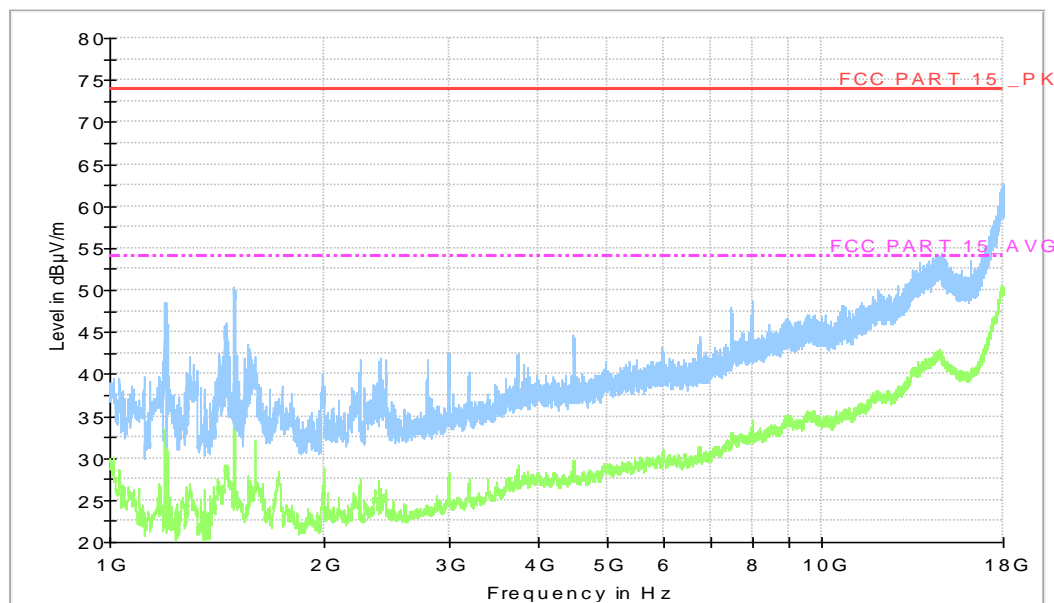


Fig A.6 Radiated Emission from 1GHz to 18GHz

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.

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= 3.38 dB, k=2.

Charging Mode, Set.1

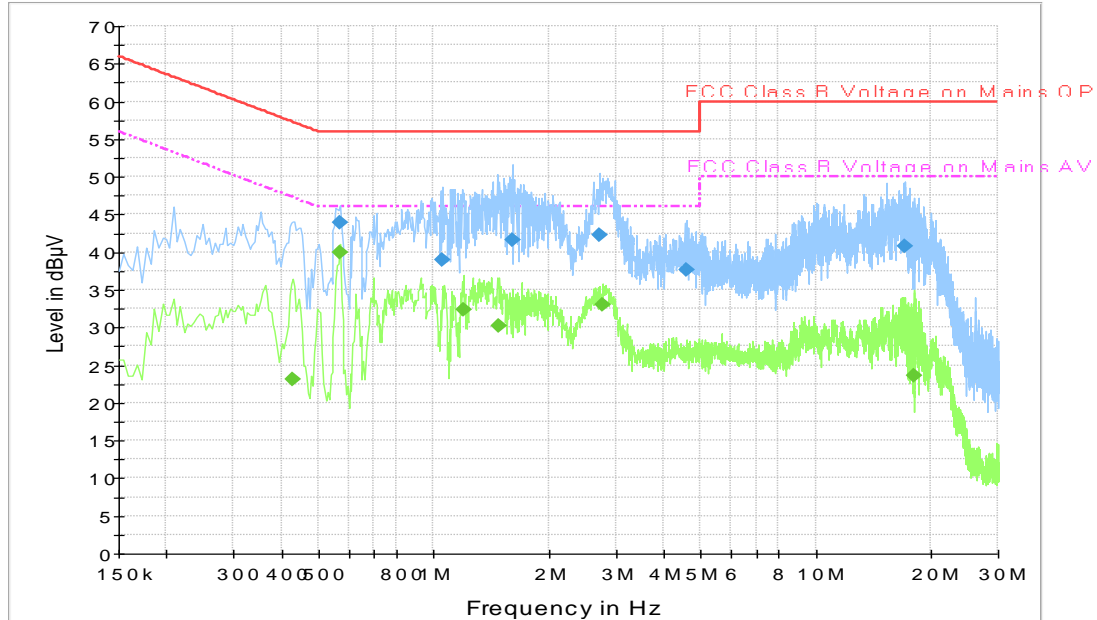


Fig A.7 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.568500	43.8	2000.0	9.000	On	N	19.9	12.2	56.0
1.059000	38.9	2000.0	9.000	On	L1	19.7	17.1	56.0
1.603500	41.7	2000.0	9.000	On	L1	19.7	14.3	56.0
2.715000	42.3	2000.0	9.000	On	N	19.2	13.7	56.0
4.605000	37.6	2000.0	9.000	On	L1	19.6	18.4	56.0
17.088000	40.8	2000.0	9.000	On	L1	19.9	19.2	60.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Meas. Time	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.429000	23.1	2000.0	9.000	On	L1	19.9	24.2	47.3
0.568500	39.9	2000.0	9.000	On	N	19.9	6.1	46.0
1.198500	32.3	2000.0	9.000	On	N	19.7	13.7	46.0
1.486500	30.1	2000.0	9.000	On	L1	19.7	15.9	46.0
2.778000	33.0	2000.0	9.000	On	L1	18.9	13.0	46.0
18.055500	23.6	2000.0	9.000	On	L1	19.9	26.4	50.0

Charging Mode, Set.2

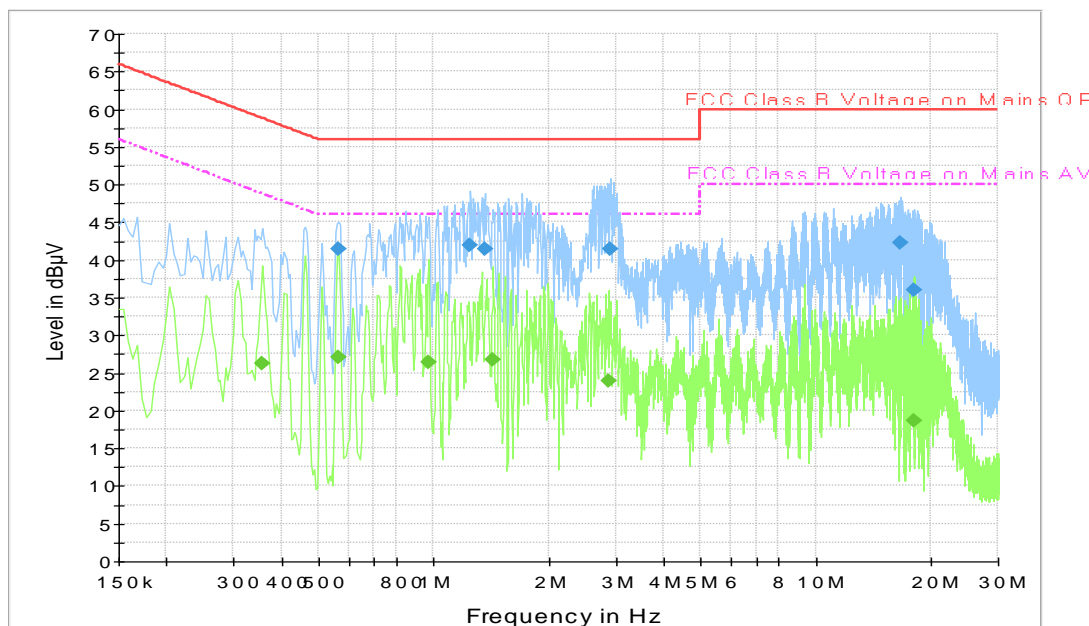


Fig A.8 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.564000	41.5	2000.0	9.000	On	N	19.9	14.5	56.0
1.248000	41.9	2000.0	9.000	On	L1	19.7	14.1	56.0
1.360500	41.4	2000.0	9.000	On	N	19.7	14.6	56.0
2.890500	41.4	2000.0	9.000	On	L1	18.9	14.6	56.0
16.611000	42.2	2000.0	9.000	On	N	19.8	17.8	60.0
18.096000	36.0	2000.0	9.000	On	N	19.9	24.0	60.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Meas. Time	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.357000	26.2	2000.0	9.000	On	L1	19.8	22.6	48.8
0.564000	27.0	2000.0	9.000	On	N	19.9	19.0	46.0
0.969000	26.4	2000.0	9.000	On	L1	19.8	19.6	46.0
1.428000	26.8	2000.0	9.000	On	L1	19.7	19.2	46.0
2.872500	23.9	2000.0	9.000	On	N	18.9	22.1	46.0
18.096000	18.7	2000.0	9.000	On	N	19.9	31.3	50.0

USB Mode, Set.3

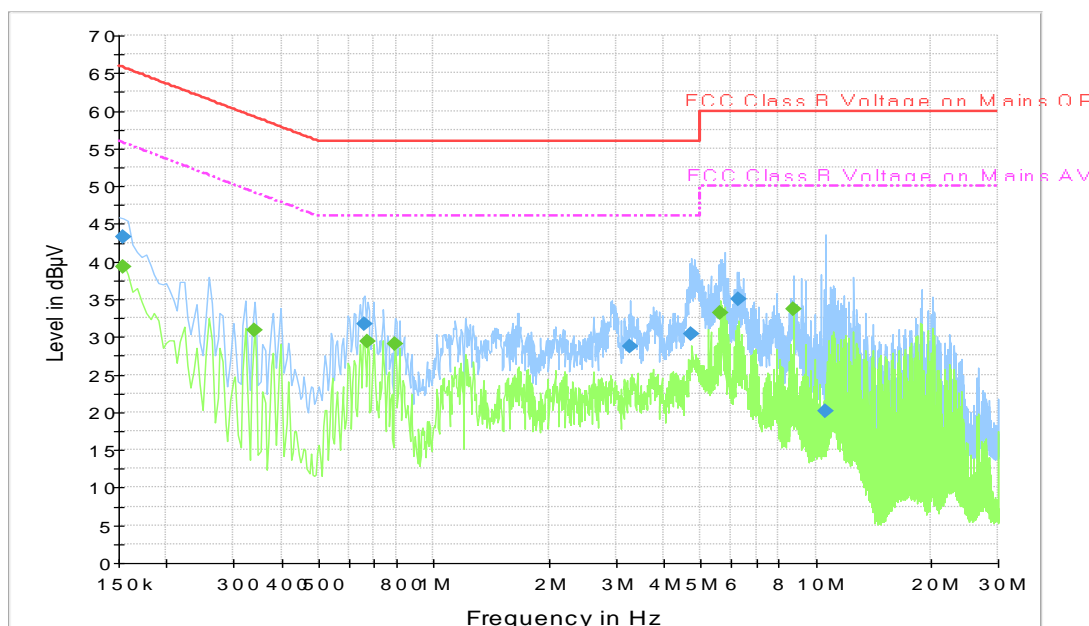


Fig A.9 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.154500	43.2	2000.0	9.000	On	L1	20.1	22.5	65.8
0.658500	31.7	2000.0	9.000	On	N	19.8	24.3	56.0
3.264000	28.7	2000.0	9.000	On	L1	19.4	27.3	56.0
4.717500	30.4	2000.0	9.000	On	L1	19.6	25.6	56.0
6.256500	35.1	2000.0	9.000	On	L1	19.6	24.9	60.0
10.581000	20.2	2000.0	9.000	On	L1	19.7	39.8	60.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Meas. Time	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.154500	39.3	2000.0	9.000	On	L1	20.1	16.4	55.8
0.339000	30.9	2000.0	9.000	On	L1	19.9	18.3	49.2
0.672000	29.4	2000.0	9.000	On	L1	19.8	16.6	46.0
0.793500	29.0	2000.0	9.000	On	L1	19.8	17.0	46.0
5.604000	33.2	2000.0	9.000	On	N	19.6	16.8	50.0
8.718000	33.7	2000.0	9.000	On	N	19.7	16.3	50.0

END OF REPORT