FCC PART 15B
TEST REPORT

No. I21Z60989-EMC01

for

TCL Communication Ltd.

GSM/UMTS/LTE Mobile phone

Model Name: 5087Z

FCC ID: 2ACCJH138

with

Hardware Version: 07

Software Version: EPS0J000

Issued Date: 2021-07-22

Note:

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Test Laboratory:

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REPORT HISTORY

Report Number	Revision	Description	Issue Date
I21Z60989-EMC01	Rev.0	1st edition	2021-07-22

Note: the latest revision of the test report supersedes all previous version.

CONTENTS

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: 2021-06-29

Testing End Date: 2021-07-03

1.4. Signature

Wang Xue

(Prepared this test report)

Zhang Ying

(Reviewed this test report)

Zhang Xia

(Approved this test report)

2. Client Information

2.1. Applicant Information

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2.2. Manufacturer Information

Company Name:	TCL Communication Ltd.
Address:	5/F, Building 22E, 22 Science Park East Avenue, Hong Kong Science Park, Shatin, NT, Hong Kong
Contact Person	Gong Zhizhou
Contact Email	zhizhou.gong@tcl.com
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Fax:	0086-755-36612000-81722

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

3.1. About EUT

Description	GSM/UMTS/LTE Mobile phone
Model Name	5087Z
FCC ID	2ACCJH138

Note: Components list, please refer to documents of the manufacturer; it is also included in the original test record of CTTL, Telecommunication Technology Labs, CAICT.

3.2. Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version
EUT1	016000000000317	07	EPS0J000

*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	/	/
AE2	charger	/	/
AE3	DATA Cable	/	/
AE4	DATA Cable	/	/

AE1

Model	CAC4850000C1 TLp048A1
Manufacturer	BYD
Capacity	5000mAh
Nominal Voltage	/

AE2

Model	CBA0064BGTC1 QC13US
Manufacturer	BYD
Length of cable	/

AE3

Model	CDA0000128C1
Manufacturer	JUWEI
Length of cable	/

AE4

Model	CDA0000128C2
Manufacturer	SHENGHUA
Length of cable	/

*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 + AE2+ AE3	Charger1+REAR Camera+GSM 850 idle
Set.2	EUT1+ AE1 + AE2+ AE3	Charger1+MP4+WCDMA 850 idle
Set.3	EUT1+ AE1 + AE3 + headset	USB+front camera +LTE B5 idle +FM

Note:

The device supports GSM/GPRS/EGPRS 850/900/1800/1900, UMTS FDD Band 2/4/5; LTE FDD Band 2/4/5/7/12/25/26/66/71,TDD Band 41. It has WLAN (802.11a/b/g/n/ac, 802.11n supports 20MHz and 40MHz bandwidth, 802.11ac supports 20MHz,40MHz and 80MHz bandwidth), Bluetooth (EDR, BLE) and GNSS (GPS&GLONASS&BDS& GALILEO) functions.

The device contains receivers which tune and operate between 30MHz-960MHz in the following bands: GSM850, WCDMA850 ,LTE Band 5,LTE Band 12, LTE Band 26 and LTE Band 71. All licensed band receivers that tune in the range of 30MHz-960MHz are investigated. Only the worst case emissions are reported.

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	2019
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 (10 meters×6.7meters×6.1meters) 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, 3m 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 6000 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	CALIBRATION INTERVAL
1	Test Receiver	ESU26	100235	R&S	2022-02-23	1 Year
2	LISN	ENV216	101200	R&S	2022-05-30	1 year
3	Universal Radio Communication Tester	CMW500	116588	R&S	2021-12-07	1 year
4	Test Receiver	ESCI 7	100344	R&S	2022-02-23	1 Year
5	EMI Antenna	VULB 9163	483	Schwarzbeck	2021-08-27	1 year
6	EMI Antenna	3115	6914	ETS-Lindgren	2022-02-03	1 year

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 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 3/10 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 EUT was tested while operating in licensed band Rx mode. All licensed band receivers that tune in the range of 30MHz-960MHz, as listed in section 3.4, are investigated. Only the worst case emissions are reported.

All equipment is placed on the test table top and arranged in a typical configuration in accordance with ANSI C63.4-2014 and manipulated to obtain worst case emissions.

The model of the PC is M4000E-17, and the serial number of the PC is M706GWXD. 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 (μV/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:

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.

Measurement uncertainty (worst case): U = 4.74 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)	Margin (dB)	Antenna Pol. (H/V)
17940.500	47.7	-28.9	46.7	30.0	54.0	6.3	H
17937.667	47.1	-29.4	46.7	29.8	54.0	6.9	V
17964.867	47.0	-29.1	46.7	29.4	54.0	7.0	H
17926.333	47.0	-29.4	46.7	29.7	54.0	7.0	V
17964.300	46.9	-29.1	46.7	29.3	54.0	7.1	V
17996.033	46.9	-29.1	46.7	29.3	54.0	7.1	V

Charging Mode/Peak detector

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
17996.033	55.9	-29.1	46.7	38.3	74.0	18.1	H
17975.633	55.5	-29.1	46.7	37.9	74.0	18.5	H
17977.333	55.4	-29.1	46.7	37.8	74.0	18.6	V
17997.167	55.4	-29.1	46.7	37.8	74.0	18.6	H
17937.667	55.2	-29.4	46.7	37.9	74.0	18.8	V
17958.633	55.0	-28.9	46.7	37.3	74.0	19.0	H

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)	Margin (dB)	Antenna Pol. (H/V)
17979.600	47.0	-29.1	46.7	29.4	54.0	7.0	H
17973.367	46.6	-29.1	46.7	29.0	54.0	7.4	V
17985.267	46.5	-29.1	46.7	28.9	54.0	7.5	V
17985.833	46.4	-29.1	46.7	28.8	54.0	7.6	V
17975.067	46.3	-29.1	46.7	28.7	54.0	7.7	H
17926.333	46.3	-29.4	46.7	29.0	54.0	7.7	H

Charging Mode/Peak detector

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
17990.367	55.6	-29.1	46.7	38.0	74.0	18.4	H
17997.167	55.4	-29.1	46.7	37.8	74.0	18.6	H
17985.833	55.4	-29.1	46.7	37.8	74.0	18.6	V
17944.467	55.0	-28.9	46.7	37.3	74.0	19.0	V
17924.067	55.0	-29.4	46.7	37.7	74.0	19.0	H
17987.533	54.8	-29.1	46.7	37.2	74.0	19.2	V

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)	Margin (dB)	Antenna Pol. (H/V)
17999.433	47.1	-29.1	46.7	29.5	54.0	6.9	H
17956.367	46.9	-28.9	46.7	29.2	54.0	7.1	V
17975.067	46.7	-29.1	46.7	29.1	54.0	7.3	H
17947.867	46.7	-28.9	46.7	29.0	54.0	7.3	H
17977.900	46.7	-29.1	46.7	29.1	54.0	7.3	V
17894.600	46.6	-29.5	46.0	30.2	54.0	7.4	V

USB Mode/Peak detector

Frequency (MHz)	Measurement Result (dBµV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBµV)	Limit (dBµV/m)	Margin (dB)	Antenna Pol. (H/V)
17942.767	56.5	-28.9	46.7	38.8	74.0	17.5	V
17976.767	56.2	-29.1	46.7	38.6	74.0	17.8	V
17991.500	56.2	-29.1	46.7	38.6	74.0	17.8	V
17938.233	56.0	-29.4	46.7	38.7	74.0	18.0	V
17977.900	55.8	-29.1	46.7	38.2	74.0	18.2	V
17975.067	55.4	-29.1	46.7	37.8	74.0	18.6	H

Measurement results for Set.1:

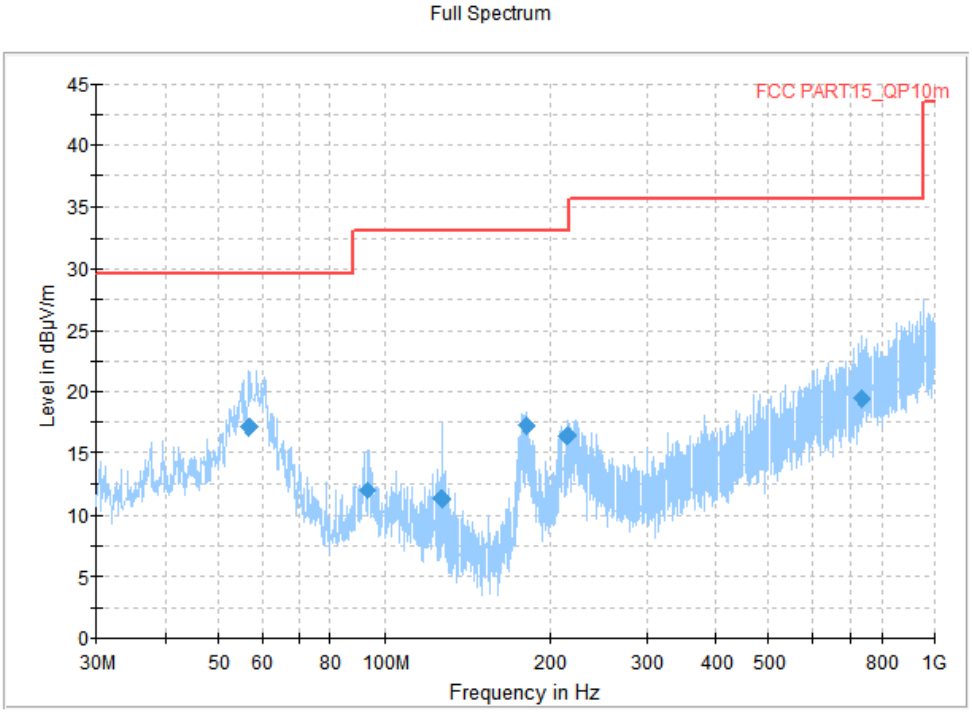

Fig A.1 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
56.675000	17.05	29.50	12.49	1000.0	120.000	226.0	V	279.0
93.244000	12.05	33.10	21.01	1000.0	120.000	125.0	V	280.0
127.388000	11.38	33.10	21.68	1000.0	120.000	117.5	V	79.0
181.223000	17.28	33.10	15.78	1000.0	120.000	111.0	V	-25.0
214.979000	16.41	33.10	16.65	1000.0	120.000	125.0	V	120.0
737.130000	19.50	35.60	16.06	1000.0	120.000	206.0	V	120.0

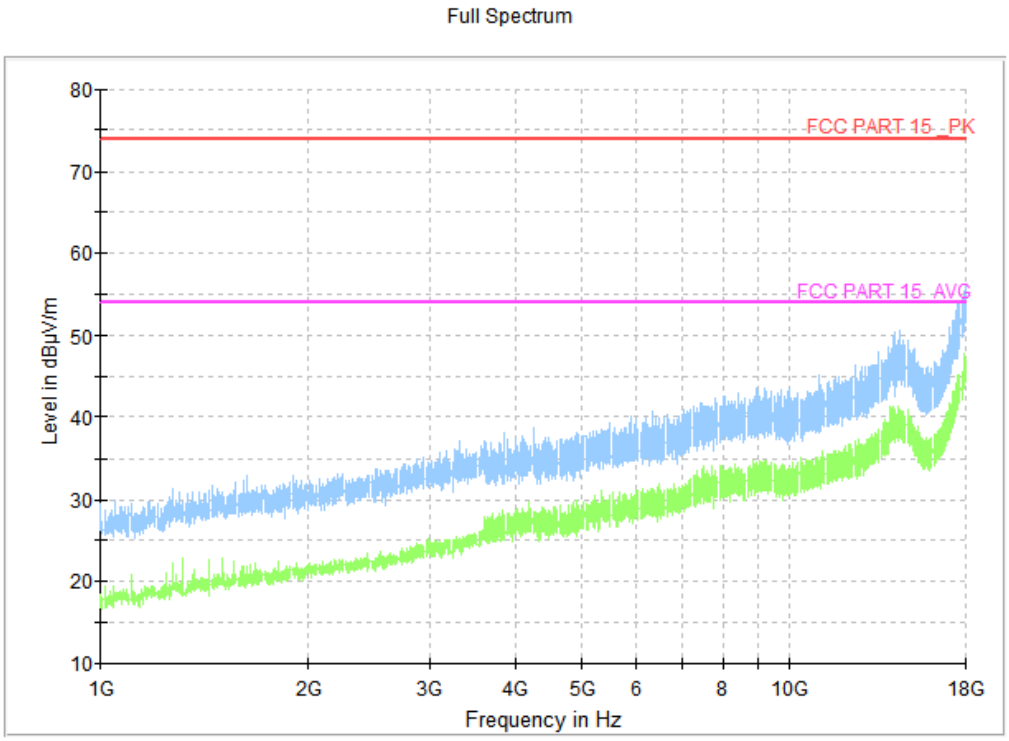

Fig A.2 Radiated Emission from 1GHz to 18GHz

Measurement results for Set. 2:

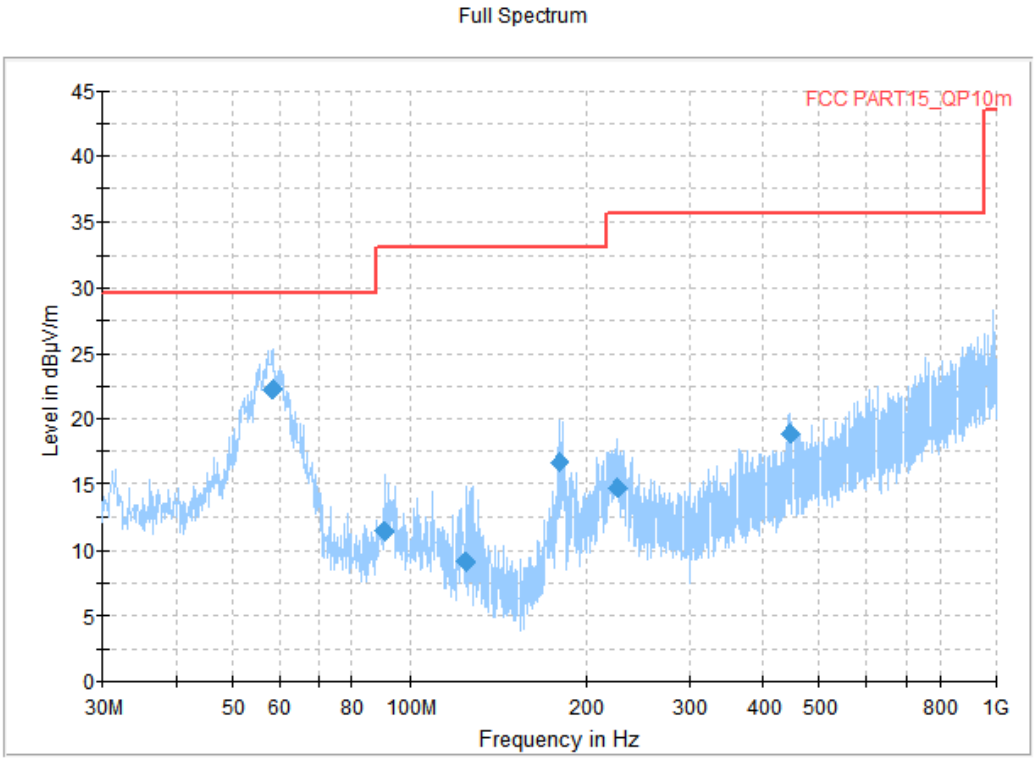

Fig A.3 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµv/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
58.324000	22.24	29.50	7.30	1000.0	120.000	312.1	V	263.0
90.722000	11.45	33.10	21.61	1000.0	120.000	125.0	V	-19.0
124.769000	9.08	33.10	23.98	1000.0	120.000	345.0	V	183.0
179.768000	16.73	33.10	16.33	1000.0	120.000	125.0	V	-17.0
225.843000	14.77	35.60	20.79	1000.0	120.000	125.0	V	176.0
445.839000	18.90	35.60	16.66	1000.0	120.000	125.0	V	120.0

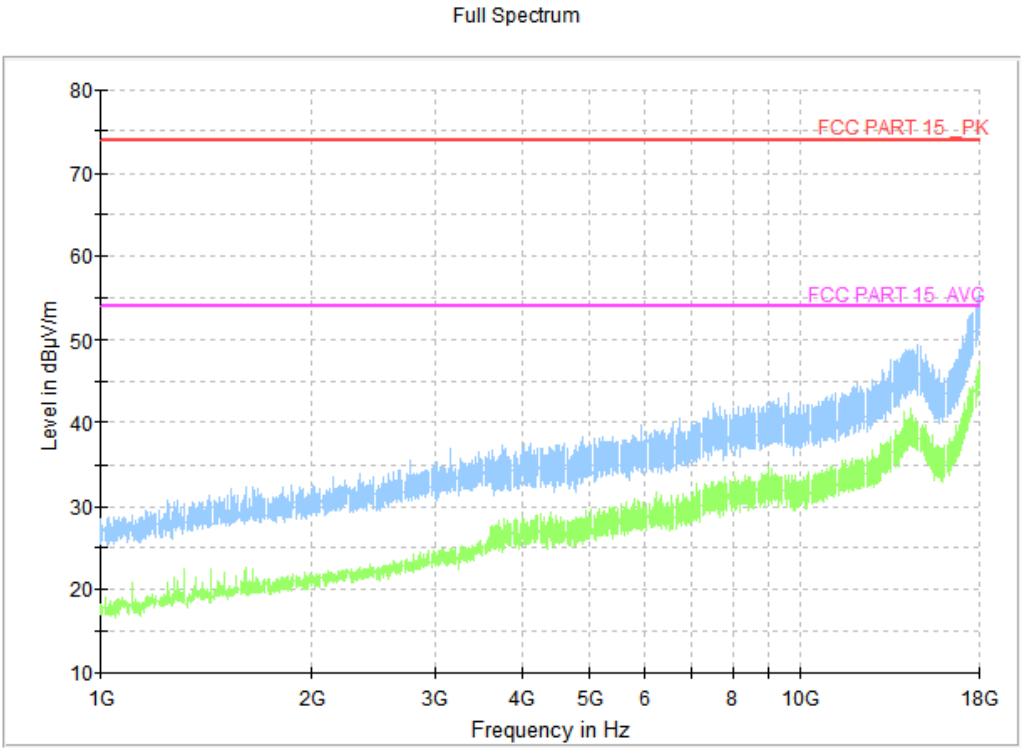

Fig A.4 Radiated Emission from 1GHz to 18GHz

Measurement results for Set.3:

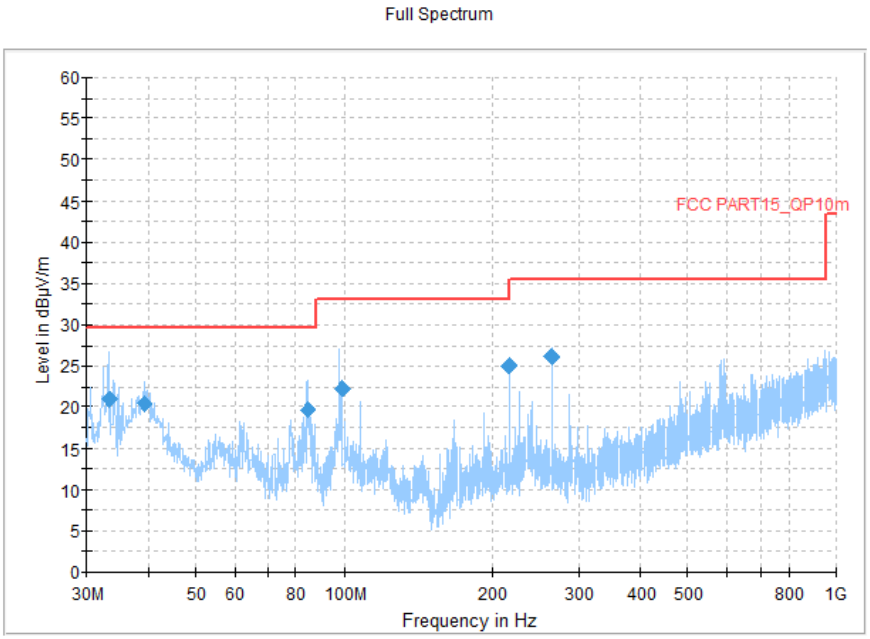

Fig A.5 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
33.298000	20.99	29.50	8.55	1000.0	120.000	204.0	H	248.0
39.215000	20.39	29.50	9.15	1000.0	120.000	108.0	H	250.0
84.320000	19.70	29.50	9.84	1000.0	120.000	116.0	H	250.0
99.064000	22.35	33.10	10.71	1000.0	120.000	205.0	H	-25.0
215.949000	25.02	33.10	8.04	1000.0	120.000	109.0	H	150.0
263.964000	26.08	35.60	9.48	1000.0	120.000	112.0	H	177.0

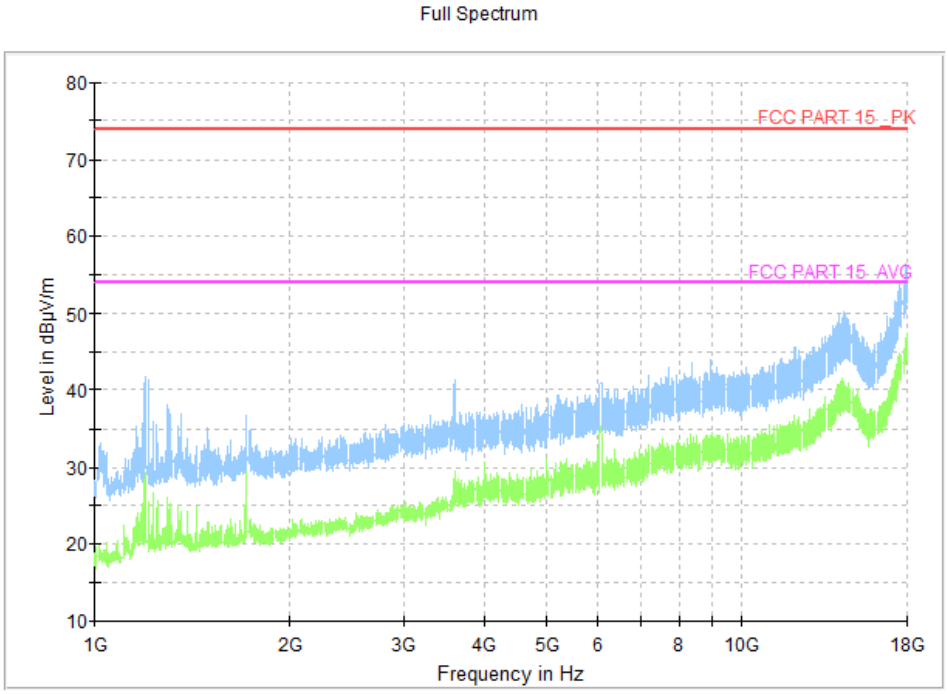

Fig A.6 Radiated Emission from 1GHz to 18GHz

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 M4000E-17, and the serial number of the PC is M706GWXD. 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*= 3.1 dB, *k*=2.

Charging Mode, Set.1:

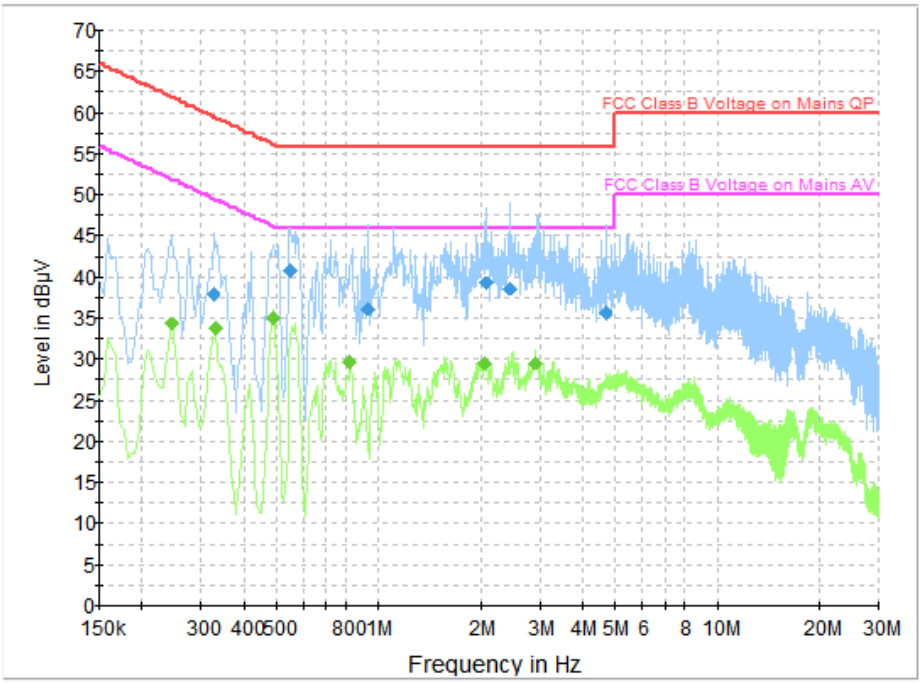

Fig A.7 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.325500	37.9	1000.0	9.000	On	N	19.8	21.6	59.6	
0.550500	40.7	1000.0	9.000	On	N	19.9	15.3	56.0	
0.924000	36.2	1000.0	9.000	On	N	12.8	26.8	56.0	
2.076000	39.3	1000.0	9.000	On	N	19.7	16.7	56.0	
2.427000	38.7	1000.0	9.000	On	N	19.7	17.3	56.0	
4.695000	35.7	1000.0	9.000	On	N	19.7	20.3	56.0	

Final Result 2

Frequency (MHz)	Average (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.244500	34.4	1000.0	9.000	On	L1	20.0	17.5	51.9	
0.330000	33.8	1000.0	9.000	On	L1	19.9	15.7	49.5	
0.487500	34.9	1000.0	9.000	On	L1	19.9	11.3	46.2	
0.825000	29.7	1000.0	9.000	On	L1	19.6	16.3	46.0	
2.058000	29.5	1000.0	9.000	On	L1	19.5	16.5	46.0	
2.908500	29.6	1000.0	9.000	On	N	19.7	16.4	46.0	

Charging Mode, Set.2:

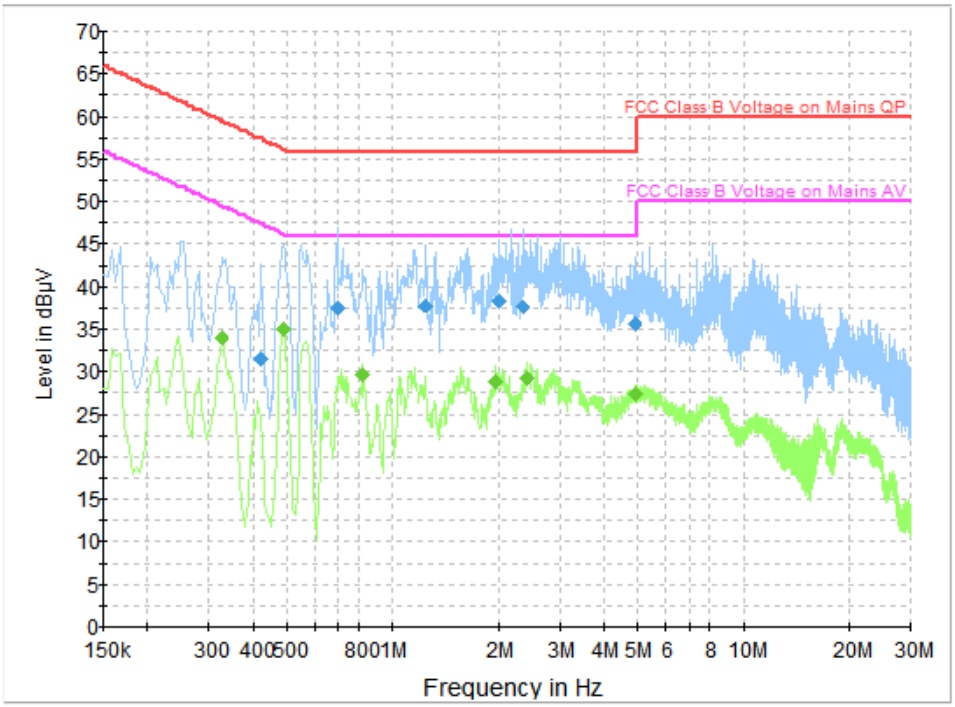

Fig A.8 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.420000	31.5	1000.0	9.000	On	N	19.9	25.9	57.4	
0.694500	37.5	1000.0	9.000	On	N	19.8	18.5	56.0	
1.248000	37.9	1000.0	9.000	On	N	19.8	18.1	56.0	
2.004000	38.4	1000.0	9.000	On	N	19.7	17.6	56.0	
2.346000	37.7	1000.0	9.000	On	N	19.8	18.3	56.0	
4.915500	35.7	1000.0	9.000	On	N	19.7	20.3	56.0	

Final Result 2

Frequency (MHz)	Average (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.325500	34.0	1000.0	9.000	On	L1	19.9	15.6	49.6	
0.487500	35.0	1000.0	9.000	On	L1	19.9	11.2	46.2	
0.825000	29.7	1000.0	9.000	On	L1	19.6	16.3	46.0	
1.977000	28.9	1000.0	9.000	On	N	19.7	17.1	46.0	
2.418000	29.2	1000.0	9.000	On	L1	19.5	16.8	46.0	
4.951500	27.4	1000.0	9.000	On	N	19.7	18.6	46.0	

USB Mode, Set.3:

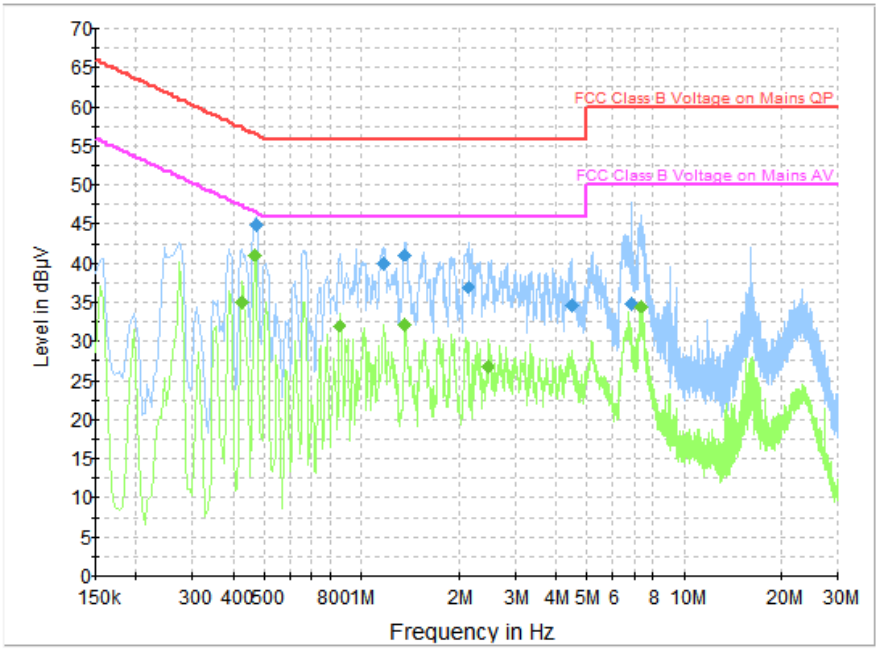

Fig A.9 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.474000	45.0	1000.0	9.000	On	L1	19.9	11.5	56.4	
1.162500	39.9	1000.0	9.000	On	N	19.8	16.1	56.0	
1.369500	41.2	1000.0	9.000	On	L1	19.5	14.8	56.0	
2.139000	37.0	1000.0	9.000	On	N	19.8	19.0	56.0	
4.492500	34.6	1000.0	9.000	On	N	19.7	21.4	56.0	
6.864000	34.9	1000.0	9.000	On	N	19.7	25.1	60.0	

Final Result 2

Frequency (MHz)	Average (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.424500	35.0	1000.0	9.000	On	L1	19.9	12.3	47.4	
0.465000	41.2	1000.0	9.000	On	N	20.0	5.4	46.6	
0.852000	32.0	1000.0	9.000	On	N	19.8	14.0	46.0	
1.365000	32.3	1000.0	9.000	On	N	19.8	13.7	46.0	
2.463000	26.7	1000.0	9.000	On	N	19.7	19.3	46.0	
14000	34.5	1000.0	9.000	On	N	19.7	15.5	50.0	

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