



TEST REPORT

No. 2013TAR671

TCT Mobile Limited

GSM/EGPRS quadband mobile phone

Model Name: Tigris Plus 2SIM

Marketing Name: ALCATEL 3020D

FCC ID: RAD415

with

Hardware Version: Proto

Software Version: VF15

Issued Date: Sep. 27th, 2013

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 TMC Beijing.

Test Laboratory:

FCC 2.948 Listed: No.733176

IC O.A.T.S listed: No.6629B-1

TMC Beijing, Telecommunication Metrology Center of Ministry of Industry and Information Technology

No. 52, Huayuan Bei Road, Haidian District, Beijing, P. R. China 100191

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1. Test Laboratory

1.1. Testing Location

Location D

Company Name: TMC Beijing, Telecommunication Metrology Center of MIIT
Address: No.18A, Kangding Street, Beijing Economic-Technological
Development Area, Beijing, China
Postal Code: 100176

1.2. Testing Environment

Normal Temperature: 15-35°C
Relative Humidity: 20-75%

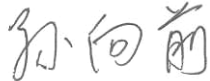
1.3. Project data

Testing Start Date: Aug. 24th, 2013
Testing End Date: Aug. 26th, 2013

1.4. Signature



Qu Pengfei
(Prepared this test report)



Sun Xiangqian
(Reviewed this test report)



Lu Bingsong
Deputy Director of the laboratory
(Approved this test report)

2. Client Information

2.1. Applicant Information

Company Name: TCT Mobile Limited
Address /Post: 5F, C building, No. 232, Liang Jing Road ZhangJiang High-Tech Park,
Pudong Area Shanghai, P.R. China.
City: Shanghai
Postal Code: 201203
Country: China
Contact Person: Gong Zhizhou
Contact Email: zhizhou.gong@jrdcom.com
Telephone: 0086-21-61460890
Fax: 0086-21-61460602

2.2. Manufacturer Information

Company Name: TCT Mobile Limited
Address /Post: 5F, C building, No. 232, Liang Jing Road ZhangJiang High-Tech Park,
Pudong Area Shanghai, P.R. China.
City: Shanghai
Postal Code: 201203
Country: China
Telephone: 0086-21-61460890
Fax: 0086-21-61460602

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

3.1. About EUT

Description	GSM/EGPRS quadband mobile phone
Model Name	Tigris Plus 2SIM
Marketing Name	ALCATEL 3020D
FCC ID	RAD415
Extreme vol. Limits	3.5VDC to 4.2VDC (nominal: 3.8VDC)
Description	GSM/EGPRS quadband mobile phone
Model Name	Tigris Plus 2SIM
Marketing Name	ALCATEL 3020D
FCC ID	RAD415
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 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	013816000000095	Proto	VF15

*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
AE1	Battery	B0860642E3A
AE12	Battery	B086063AB2A
AE13	Battery	B152153A17A
AE2	Travel Adapter	/
AE3	Travel Adapter	/
AE6	USB cable	/
AE7	USB cable	/

AE1、AE12、AE13

Model	CAB3120000C1
Manufacturer	BYD
Capacitance	850 mAh
Nominal voltage	3.7V

AE2

Model	CBA3002AG0C2
Manufacturer	Tenpao,
Length of cable	120 cm

AE3

Model	CBA3002AG0C1
Manufacturer	BYD

Length of cable	120 cm
AE6	
Model	CDA3122002C1
Manufacturer	JUWEI
Length of cable	98 cm
AE7	
Model	CDA3122002C2
Manufacturer	JUWEI
Length of cable	98 cm

*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.3	EUT1+ AE1+AE2	Charging
Set.4	EUT1+ AE1+AE3	Charging
Set.5	EUT1+ AE1+AE6	USB

Note: The GSM/EGPRS quadband mobile phone ALCATEL 3020D manufactured by TCT Mobile Limited is a variant model based on ALCATEL 3020G for conformance test. According to the change declared by manufacturer, no additional tests are required. The test results are inherited from the initial model. The report number of initial model is 2013TAR679.

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	10-1-12 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	2003

5. LABORATORY ENVIRONMENT

Semi-anechoic chamber SAC-2 (10 meters×6.7 meters×6.15 meters) 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, 3 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

Fully-anechoic chamber FAC-3 (9 meters×6.5 meters×4 meters) 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
Site voltage standing-wave ratio (S_{VSWR})	Between 0 and 6 dB, from 1GHz to 18GHz
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

Clause	List	Clause in FCC rules	Verdict	Location
1	Radiated Emission	15.109(a)	P	D
2	Conducted Emission	15.107(a)	P	D

7. Test Equipments Utilized

NO.	Description	TYPE	SERIES NUMBER	MANUFACTURE	CAL DUE DATE
1	Test Receiver	ESU26	100376	R&S	2013-11-07
2	Test Receiver	ESCI	100766	R&S	2014-04-08
3	EMI Antenna	VULB 9163	9163-514	Schwarzbeck	2014-11-10
4	EMI Antenna	3117	00139065	ETS-Lindgren	2014-07-31
5	LISN	ESH3-Z5	825562/028	R&S	2014-06-12
6	Universal Radio Communication Tester	E5515C	MY48361083	Agilent	2014-03-16
7	Universal Radio Communication Tester	CMU200	100680	R&S	2013-09-05

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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 a distance of 3 meters is tested. Tested in accordance with the procedures of ANSI C63.4 - 2003, 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 DELL OPTIPLEX 755, and the serial number of the PC is 3908243625. 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 ($\mu\text{V}/\text{m}$)		
	Quasi-peak	Average	Peak
30-88	100		
88-216	150		
216-960	200		
960-1000	500		
>1000		500	5000

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): $U = 4.3 \text{ dB}$, $k=2$.

Charging Mode/Set.1/Average detector

Frequency(MHz)	Result(dB μ V/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea} (dB μ V)	Polarity
2413.000	44.6	-30.3	30.7	44.227	H
2995.000	42.9	-29.0	33.2	38.679	H
2995.200	42.8	-29.0	33.2	38.579	H
2995.800	42.8	-29.0	33.2	38.579	H
2996.000	42.8	-29.0	33.2	38.579	V
2997.000	42.7	-29.0	33.2	38.479	H

Charging Mode/Set.1/Peak detector

Frequency(MHz)	Result(dB μ V/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea} (dB μ V)	Polarity
2997.000	54.9	-29.0	33.2	50.679	V
2869.000	54.8	-27.8	31.9	50.703	H
2413.000	54.7	-30.3	30.7	54.327	H
2995.200	54.4	-29.0	33.2	50.179	H
2998.400	54.2	-29.0	33.2	49.979	H
2989.000	54.1	-29.0	33.2	49.879	V

Charging Mode/Set.2/Average detector

Frequency(MHz)	Result(dB μ V/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea} (dB μ V)	Polarity
2994.400	42.9	-29.0	33.2	38.679	H
2997.000	42.8	-29.0	33.2	38.579	H
2994.000	42.8	-29.0	33.2	38.579	H
2999.400	42.7	-29.0	33.2	38.479	V
2993.400	42.7	-29.0	33.2	38.479	H
2999.800	42.7	-29.0	33.2	38.479	H

Charging Mode/Set.2/Peak detector

Frequency(MHz)	Result(dB μ V/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea} (dB μ V)	Polarity
2997.000	55.0	-29.0	33.2	50.779	H
2997.200	54.8	-29.0	33.2	50.579	H
2983.600	54.3	-29.0	33.2	50.079	V
2981.600	54.3	-29.0	33.2	50.079	H
2997.800	54.3	-29.0	33.2	50.079	H
2971.000	54.0	-28.6	33.1	49.515	V

USB Mode/ Peak detector

Frequency(MHz)	Result(dB μ V/m)	G _{PL} (dB)	G _A (dB/m)	P _{mea} (dB μ V)	Polarity
2989.600	55.0	-29.0	33.2	50.779	H
2984.400	54.8	-29.0	33.2	50.579	H
2994.200	54.6	-29.0	33.2	50.379	V
2938.400	54.5	-28.1	32.5	50.111	H
2941.800	54.3	-28.1	32.5	49.911	V
2985.600	54.3	-29.0	33.2	50.079	V

USB Mode/Average detector

Frequency(MHz)	Result(dB μ V/m)	G _{PL} (dB)	G _A (dB/m)	P _{mea} (dB μ V)	Polarity
3000.000	42.9	-28.4	32.8	38.472	V
2996.000	42.8	-29.0	33.2	38.579	V
2999.800	42.8	-29.0	33.2	38.579	V
2999.400	42.8	-29.0	33.2	38.579	H
2995.200	42.8	-29.0	33.2	38.579	H
2994.400	42.8	-29.0	33.2	38.579	V

Charging Mode: Set.3

15B RE 30MHz-1GHz

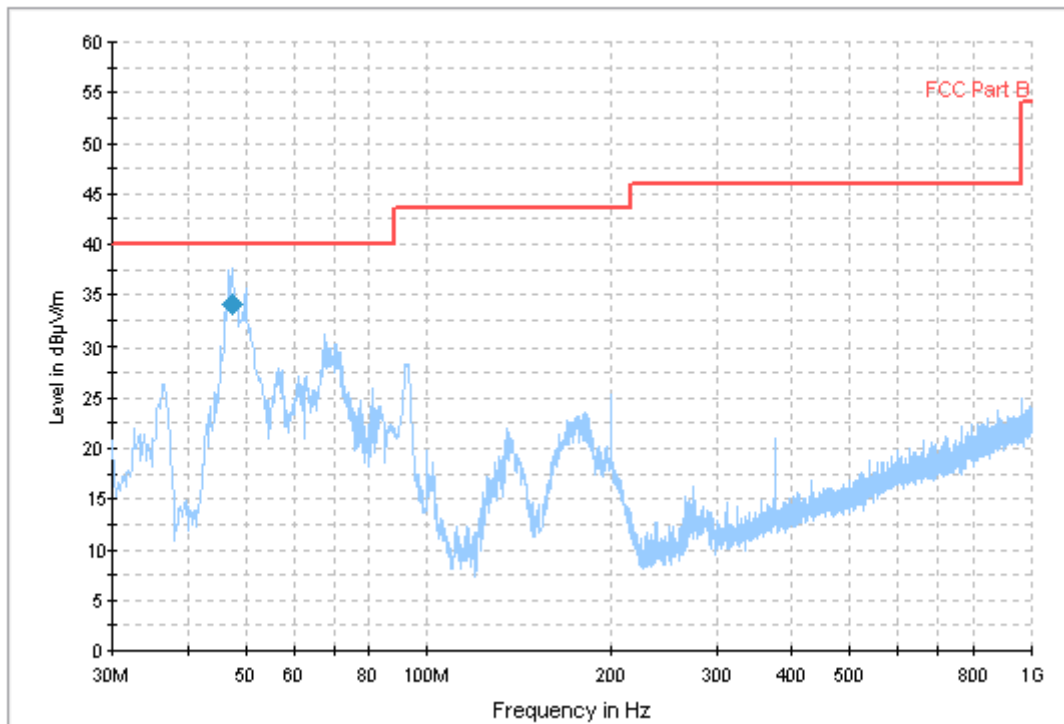


Figure A.1 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)
47.460000	34.1	100.0	V	45.0	-26.1	5.9

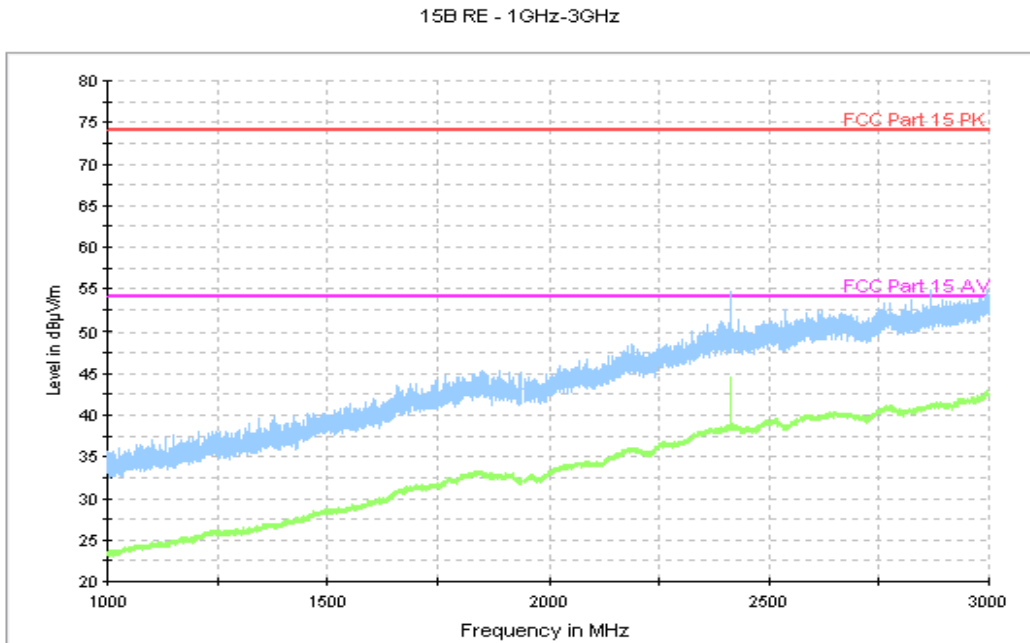


Figure A.2 Radiated Emission from 1GHz to 3GHz

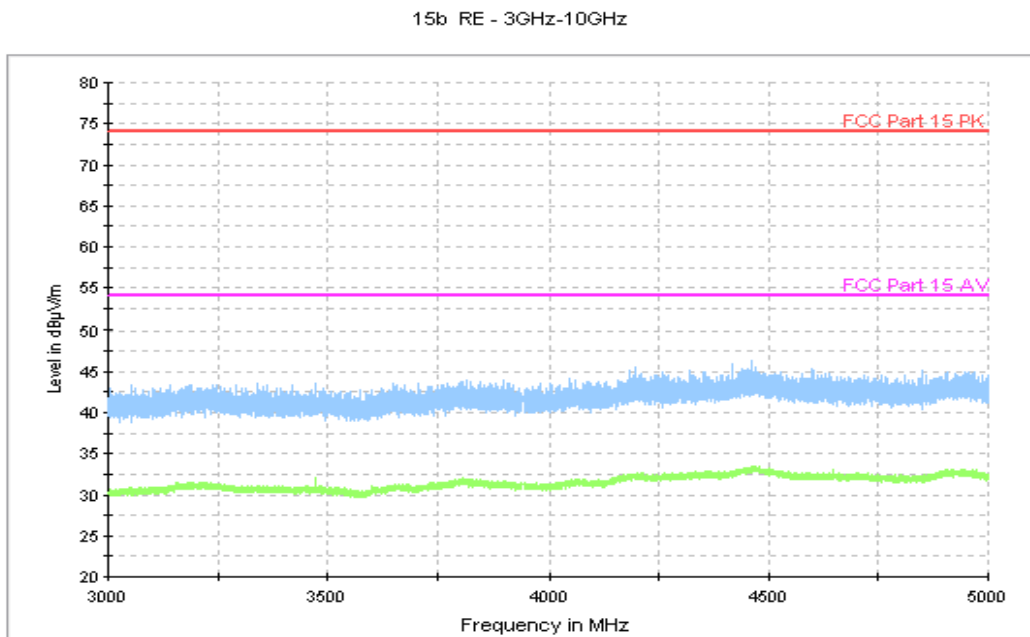


Figure A.3 Radiated Emission from 3GHz to 5GHz

Charging Mode: Set.4

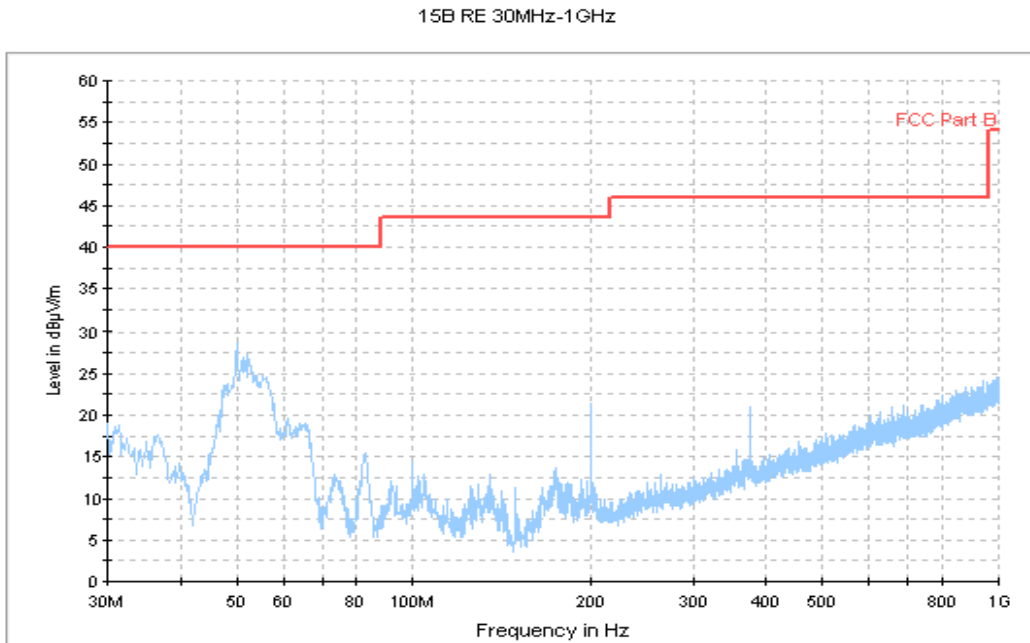


Figure A.4 Radiated Emission from 30MHz to 1GHz

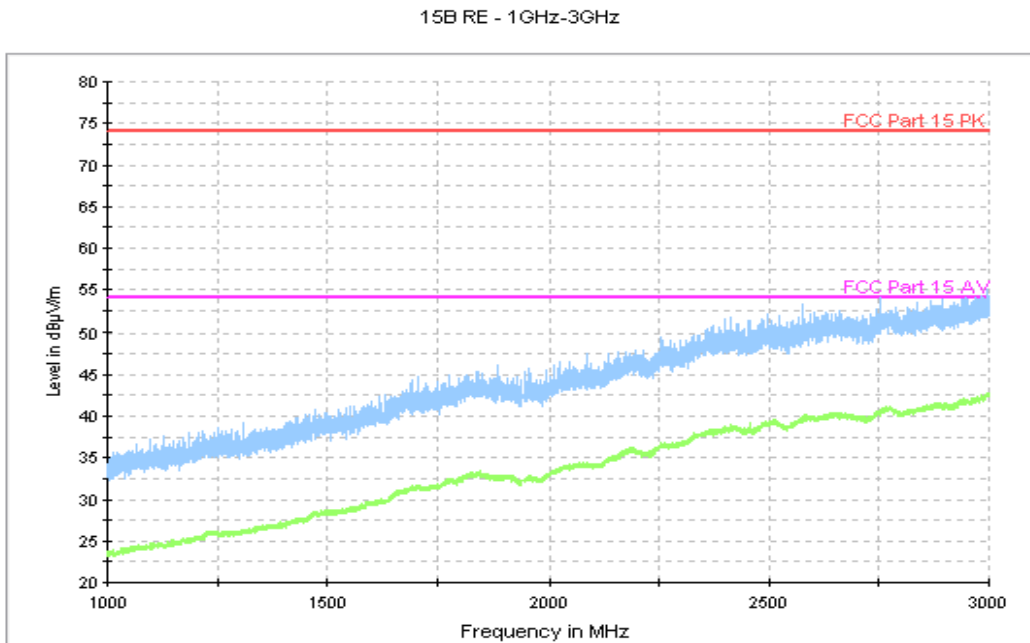


Figure A.5 Radiated Emission from 1GHz to 3GHz

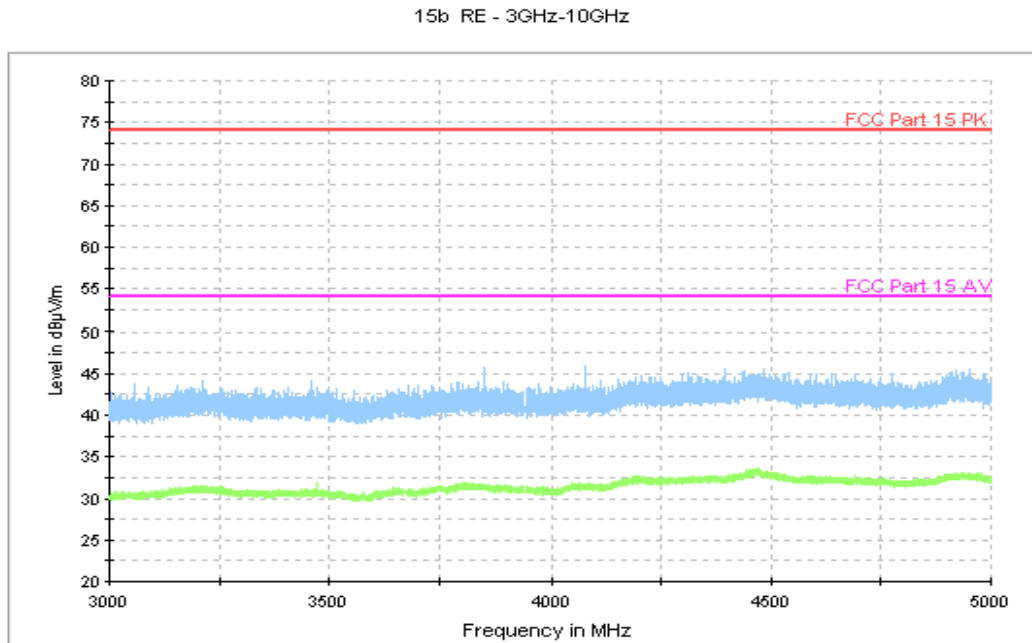


Figure A.6 Radiated Emission from 3GHz to 5GHz

USB Mode

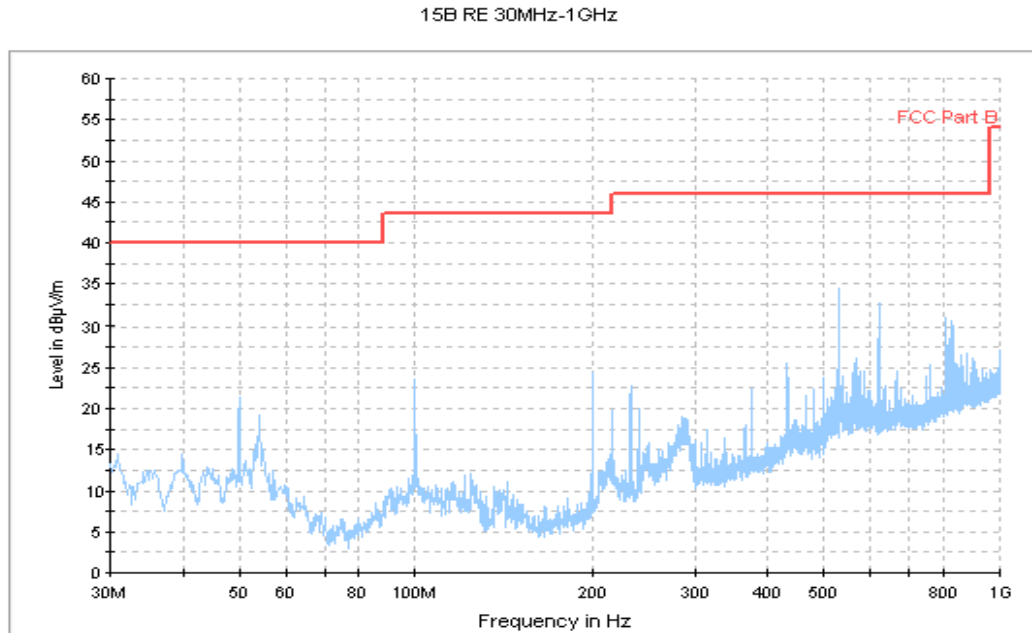


Figure A.7 Radiated Emission from 30MHz to 1GHz

15B RE - 1GHz-3GHz

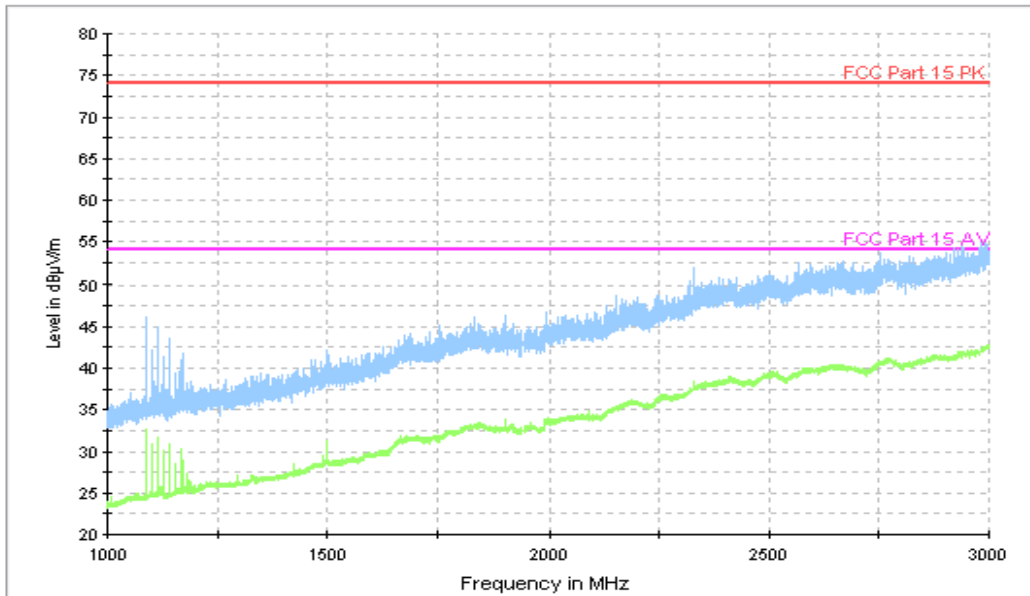


Figure A.8 Radiated Emission from 1GHz to 3GHz

15b RE - 3GHz-10GHz

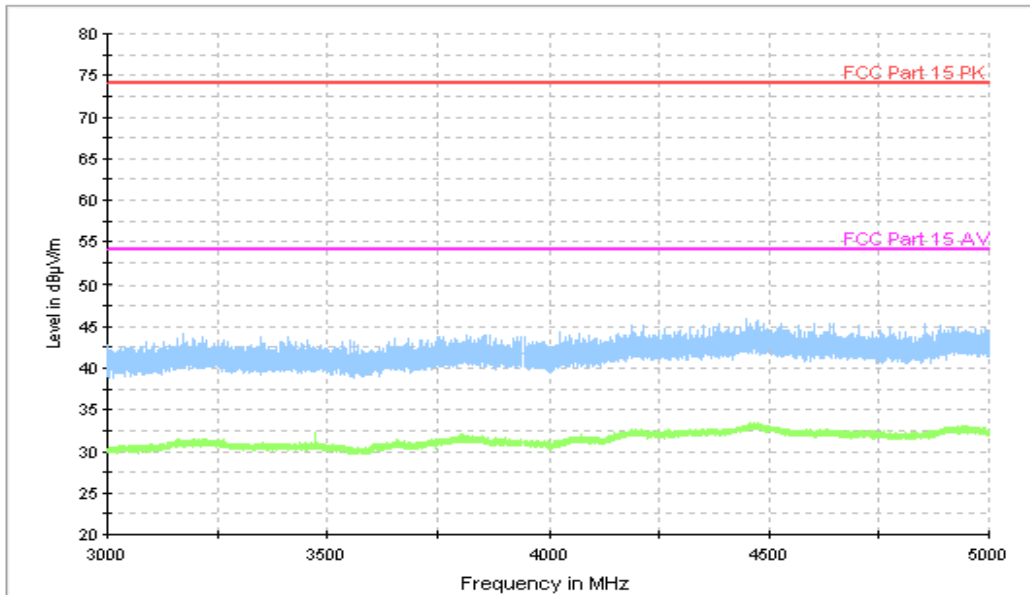


Figure A.9 Radiated Emission from 3GHz to 5GHz

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 - 2003, 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 755, and the serial number of the PC is 3908243625. 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 (dB μ V)	
	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.3

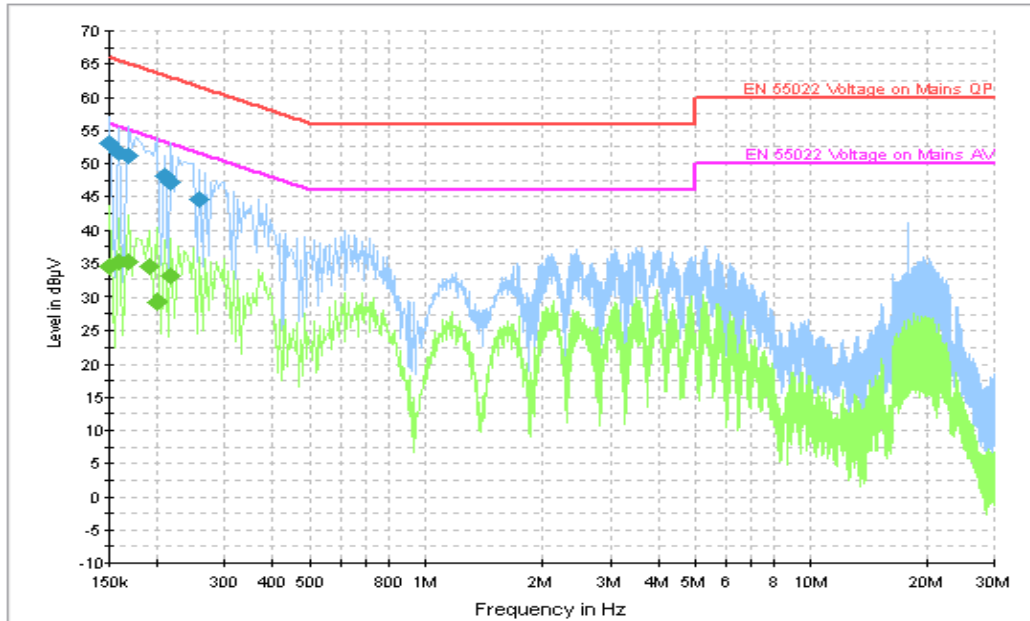


Figure A.10 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150001	53.1	GND	L1	9.9	12.9	66.0
0.159001	51.6	GND	L1	9.9	13.9	65.5
0.168001	51.1	GND	L1	9.9	13.9	65.1
0.208501	48.2	GND	L1	9.9	15.1	63.3
0.217501	47.2	GND	N	9.9	15.7	62.9
0.258001	44.6	GND	L1	9.9	16.9	61.5

Final Result 2

Frequency (MHz)	CAverage (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150001	34.4	GND	N	9.9	21.6	56.0
0.159001	35.3	GND	L1	9.9	20.3	55.5
0.168001	35.3	GND	L1	9.9	19.8	55.1
0.190501	34.6	GND	N	9.9	19.5	54.0
0.199501	29.4	GND	N	9.9	24.2	53.6
0.217501	33.2	GND	N	9.9	19.8	52.9

Charging Mode:Set.4

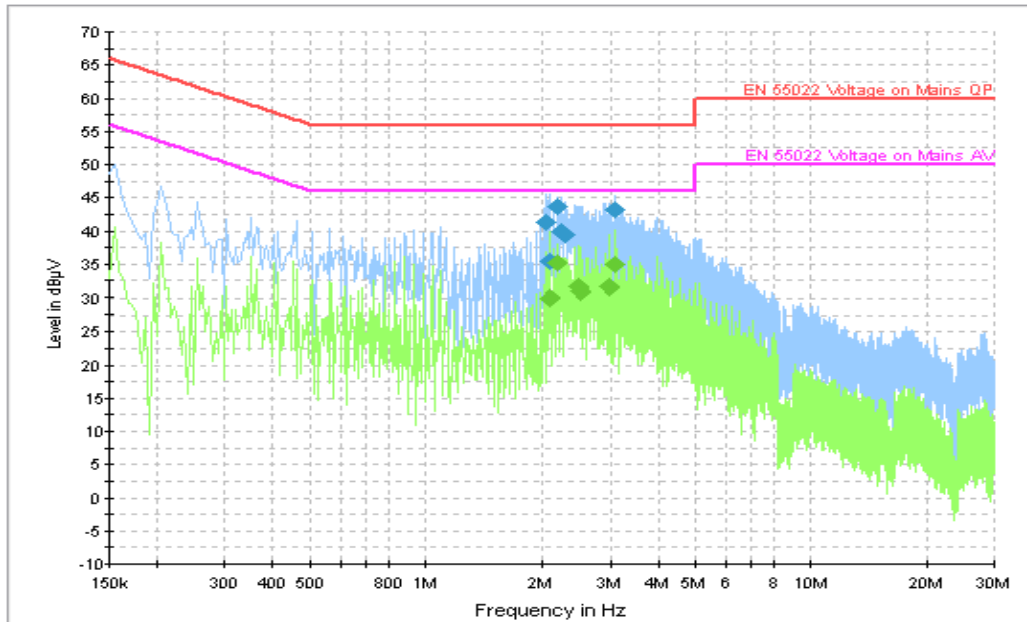


Figure A.11 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
2.026501	41.3	GND	N	9.9	14.7	56.0
2.076001	35.4	GND	N	9.9	20.6	56.0
2.184001	43.7	GND	N	9.9	12.3	56.0
2.229001	39.9	GND	N	9.9	16.1	56.0
2.278501	39.4	GND	N	9.9	16.6	56.0
3.070501	43.1	GND	N	9.9	12.9	56.0

Final Result 2

Frequency (MHz)	CAverage (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
2.076001	29.9	GND	N	9.9	16.1	46.0
2.184001	35.2	GND	N	9.9	10.8	46.0
2.481001	31.7	GND	N	9.9	14.3	46.0
2.512501	30.9	GND	N	9.9	15.1	46.0
2.962501	31.6	GND	N	9.9	14.4	46.0
3.070501	34.9	GND	N	9.9	11.1	46.0

USB Mode

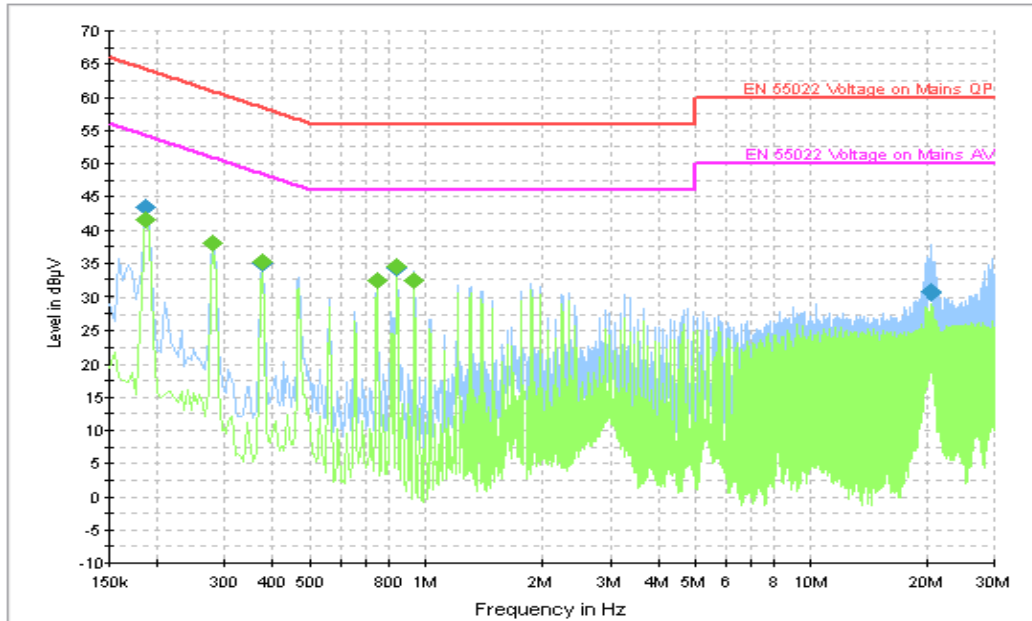


Figure A.12 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.186001	43.4	GND	N	9.9	20.9	64.2
0.280501	38.1	GND	L1	9.9	22.7	60.8
0.375001	34.9	GND	L1	9.9	23.5	58.4
0.843001	34.2	GND	L1	9.9	21.8	56.0
0.937501	32.4	GND	L1	9.9	23.6	56.0
20.598001	30.7	GND	L1	9.5	29.3	60.0

Final Result 2

Frequency (MHz)	CAverage (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.186001	41.4	GND	N	9.9	12.8	54.2
0.280501	38.1	GND	L1	9.9	12.7	50.8
0.375001	35.1	GND	L1	9.9	13.2	48.4
0.748501	32.4	GND	L1	9.9	13.6	46.0
0.843001	34.4	GND	L1	9.9	11.6	46.0
0.937501	32.3	GND	L1	9.9	13.7	46.0

END OF REPORT