



TEST REPORT

No. 2012TAR032

for

TCT Mobile Limited

UMTS TriBand / GSM Quadband mobile phone

Model Name: Highway US

Marketing Name: one touch 870A

FCC ID : RAD245

with

Hardware Version: PIO2

Software Version: SW61E

Issued Date: 2012-02-17

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:

DAR accreditation (DIN EN ISO/IEC 17025): No. DGA-PL-114/01-02

FCC 2.948 Listed: No.733176

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

Company Name: TMC Beijing, Telecommunication Metrology Center of MIIT
Address: No 52, Huayuan beilu, Haidian District, Beijing, P. R. China
Postal Code: 100191
Telephone: 00861062304633
Fax: 00861062304633

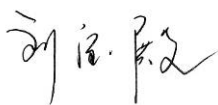
1.2. Testing Environment

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

1.3. Project data

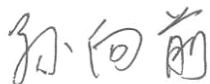
Testing Start Date: Jan 17, 2012
Testing End Date: Feb 13, 2012

1.4. Signature



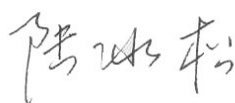
Liu Baodian

(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, E building, No. 232, Liang Jing Road ZhangJiang High-Tech Park,
Pudong Area Shanghai, P.R. China.
City: Shanghai
Postal Code: 201203
Country: China
Telephone: +86-21-61460890
Fax: +86-21-61460602

2.2. Manufacturer Information

Company Name: TCT Mobile Limited
Address /Post: 5F, E building, No. 232, Liang Jing Road ZhangJiang High-Tech Park,
Pudong Area Shanghai, P.R. China.
City: Shanghai
Postal Code: 201203
Country: China
Telephone: +86-21-61460890
Fax: +86-21-61460602

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

3.1. About EUT

Description	UMTS TriBand / GSM Quadband mobile phone
Model Name	Highway US
FCC ID	RAD245
Extreme vol. Limits	3.5VDC to 4.2VDC (nominal: 3.7VDC)

Note: Components list, please refer to documents of the manufacturer; it is also included in the original test record of Telecommunication Metrology Center of MII 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	013083000000555	PIO2	SW61E

*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	/
AE2	Battery	/
AE3	Travel Adapter	/
AE4	USB Cable	/
AE5	USB Cable	/
AE6	USB Cable	/
AE7	USB Cable	/

AE1

Model	CAB3120000C1
Manufacturer	BYD
Capacitance	850mAh
Nominal Voltage	3.7V

AE2

Model	CAB3120000C3
Manufacturer	BAK
Capacitance	850mAh
Nominal Voltage	3.7V

AE3

Model	CBA3002AG0C1
Manufacturer	BYD
Length of DC line	120cm

AE4

Model	CDA3122002C1
Manufacturer	/
Length of headset line	120cm

AE5

Model	CDA3122002C2
Manufacturer	/
Length of headset line	120cm

AE6

Model	CDA3122005C1
Manufacturer	/
Length of headset line	100cm

AE7

Model	CDA3122005C2
Manufacturer	/
Length of headset line	100cm

*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
Set.2	EUT1+ AE1/AE2+AE4	USB

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	July 10, 2008 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 (23 meters×17meters×10meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 30 °C
Relative humidity	Min. = 30 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 2MΩ
Ground system resistance	< 0.5 Ω
Normalised site attenuation (NSA)	< ±3.2 dB, 10 m distance, from 30 to 1000 MHz
Uniformity of field strength	Between 0 and 6 dB, from 80 to 3000 MHz

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

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. =30 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 2MΩ
Ground system resistance	< 0.5 Ω

Conducted chamber did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 30 °C
Relative humidity	Min. = 30 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 2MΩ
Ground system resistance	< 0.5 Ω

Fully-anechoic chamber (6.8 meters×3.08 meters×3.53 meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 30 °C
Relative humidity	Min. = 30 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 2MΩ
Ground system resistance	< 0.5 Ω
Uniformity of field strength	Between 0 and 6 dB, from 80 to 3000 MHz

6. SUMMARY OF TEST RESULTS

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

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

7. Test Equipments Utilized

NO.	Description	TYPE	SERIES NUMBER	MANUFACTURE	CAL DUE DATE
1	Test Receiver	ESCI	100344	R&S	2012-03-12
2	Test Receiver	ESCI	100766	R&S	2012-12-06
3	Test Receiver	ESI40	831564/002	R&S	2013-02-12
4	BiLog Antenna	VUL9163	9163-302	Schwarzbeck	2013-02-10
5	Signal Generator	SMB100A	102063	R&S	2012-03-05
6	LISN	ESH2-Z5	829991/012	R&S	2012-04-20
7	Universal Radio Communication Tester	CMU200	102228	R&S	2012-09-05
8	Dual-Ridge Waveguide Horn Antenna	3115	6914	EMCO	2013-01-18
9	PC	OPTIPLEX 755	3908243625	DELL	N/A
10	Monitor	E178FPc	CN-OWR979-64 180-7AJ-D2MS	DELL	N/A
11	Printer	DeskJet D2368	TH72E12G7Q	HP	N/A
12	Keyboard	L100	CN0RH6596589 07ATOI40	DELL	N/A
13	Mouse	VR-301	6927225500198	XINGYU	N/A

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.

A.1.2 EUT Operating Mode:

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. 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 of emission (MHz)	Field strength (microvolts/meter)
30-88	100
88-216	150
216-960	200
Above 960	500

A.1.4 Test Condition

Frequency of emission (MHz)	RBW/VBW	Sweep Time(s)
30-1000	100KHz/300KHz	5
1000-4000	1MHz/1MHz	15

A.1.5 Measurement Results

A "reference path loss" is established and the A_{Rpl} is the attenuation of "reference path loss", and including the gain of receive antenna and the path loss.

The measurement results are obtained as described below:

$$\text{Result} = P_{\text{Mea}} + F_A + G_{\text{PL}}$$

Where

F_A : Receive Antenna Factor

G_{PL} : Cable Loss

P_{Mea} : The measurement result on receiver.

Charging Mode

Frequency(MHz)	Result(dBuV/m)	G_{PL} (dB)	F_A (dB/m)	P_{Mea} (dBuV)	Polarity
3699.399	38.99	-19.5	33.4	25.09	VERTICAL
3701.403	38.95	-19.4	33.4	24.95	VERTICAL
3697.395	38.94	-19.5	33.4	25.04	VERTICAL
3695.391	38.92	-19.5	33.4	25.02	VERTICAL
3703.407	38.92	-19.4	33.4	24.92	VERTICAL
3709.419	38.89	-19.4	33.4	24.89	VERTICAL

USB Mode

Frequency(MHz)	Result(dBuV/m)	G_{PL} (dB)	F_A (dB/m)	P_{mea} (dBuV)	Polarity
3699.399	39.08	-19.5	33.4	25.18	VERTICAL
3701.403	39.04	-19.4	33.4	25.04	VERTICAL
3697.395	39.03	-19.5	33.4	25.13	HORIZONTAL
3695.391	38.98	-19.5	33.4	25.08	VERTICAL
3535.07	38.96	-19.4	33.4	24.96	VERTICAL
3703.407	38.95	-19.4	33.4	24.95	VERTICAL

Charging Mode

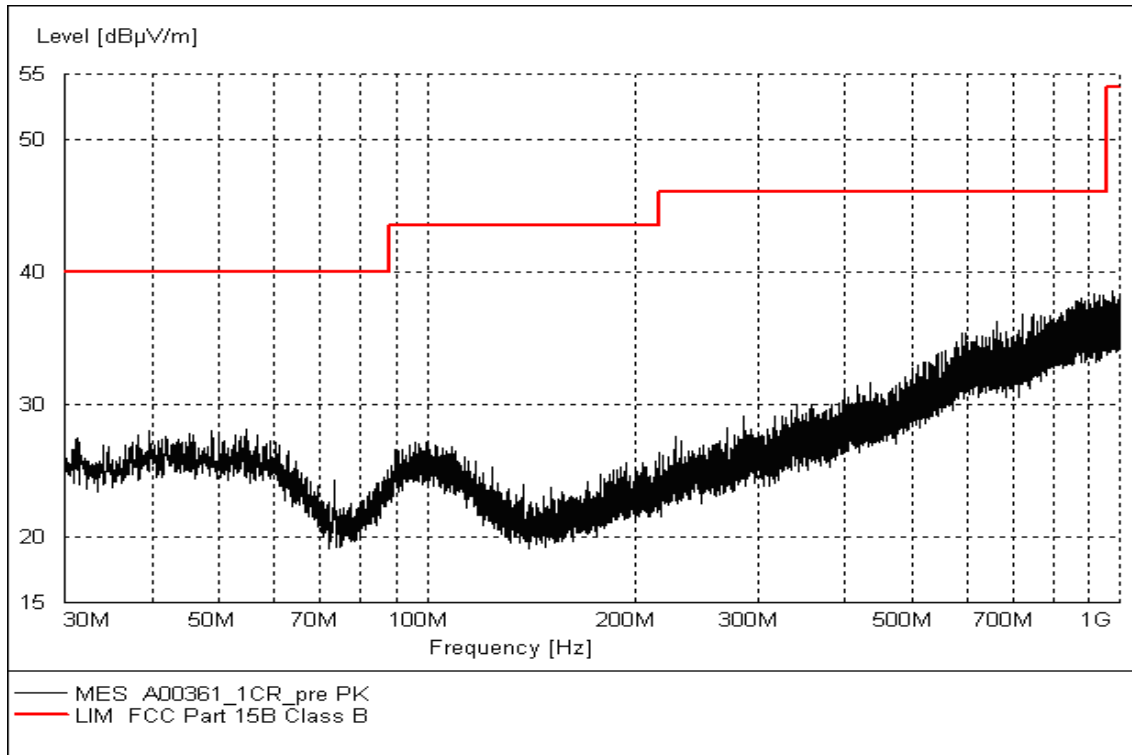


Figure A.1 Radiated Emission from 30MHz to 1GHz

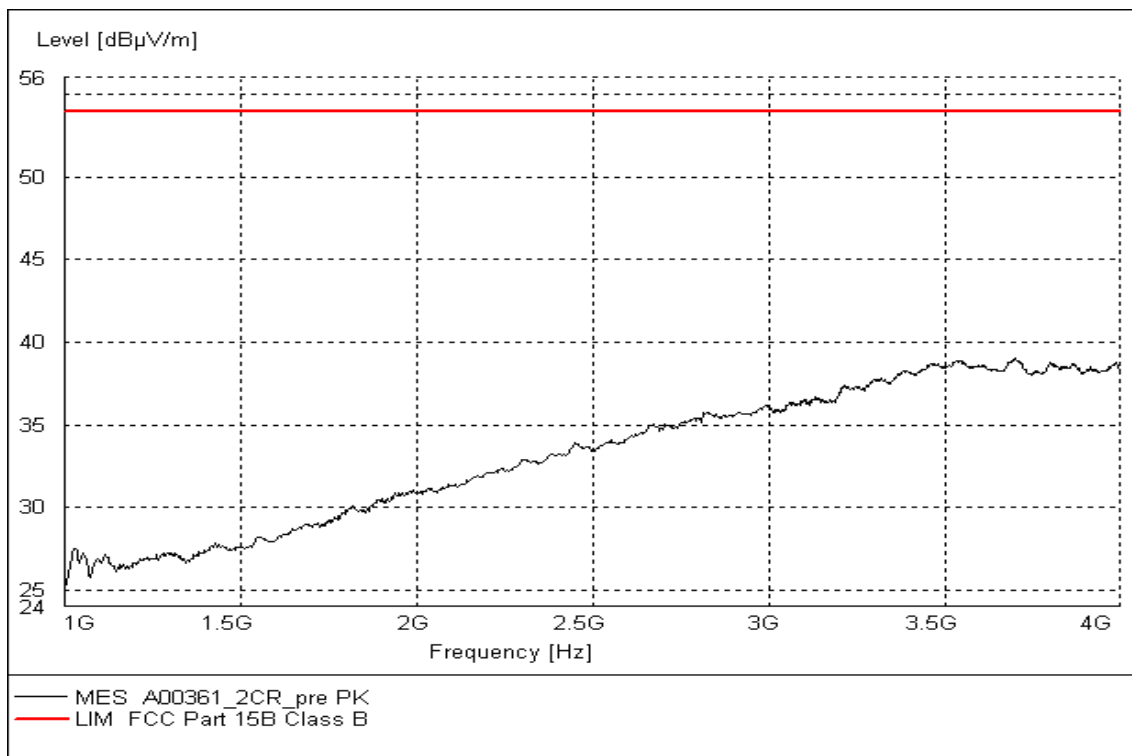


Figure A.2 Radiated Emission from 1GHz to 4GHz

USB Mode

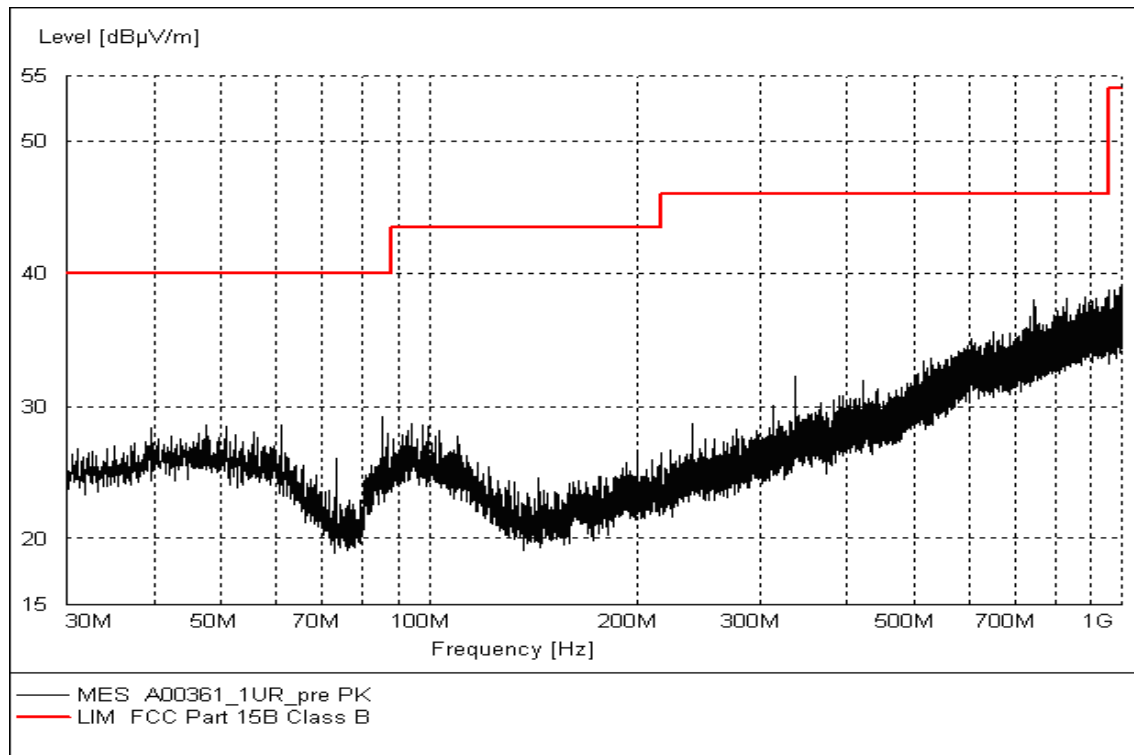


Figure A.3 Radiated Emission from 30MHz to 1GHz

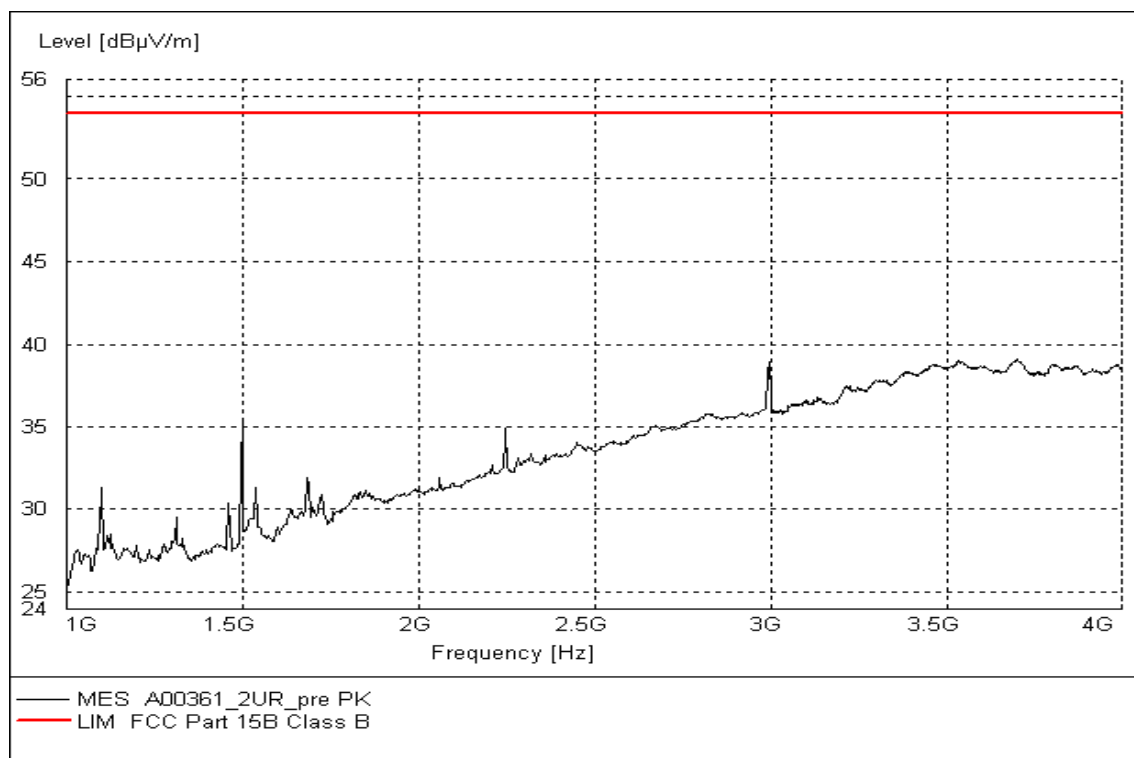


Figure A.4 Radiated Emission from 1GHz to 4GHz

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 (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

A.2.4 Measurement Results

Charging Mode

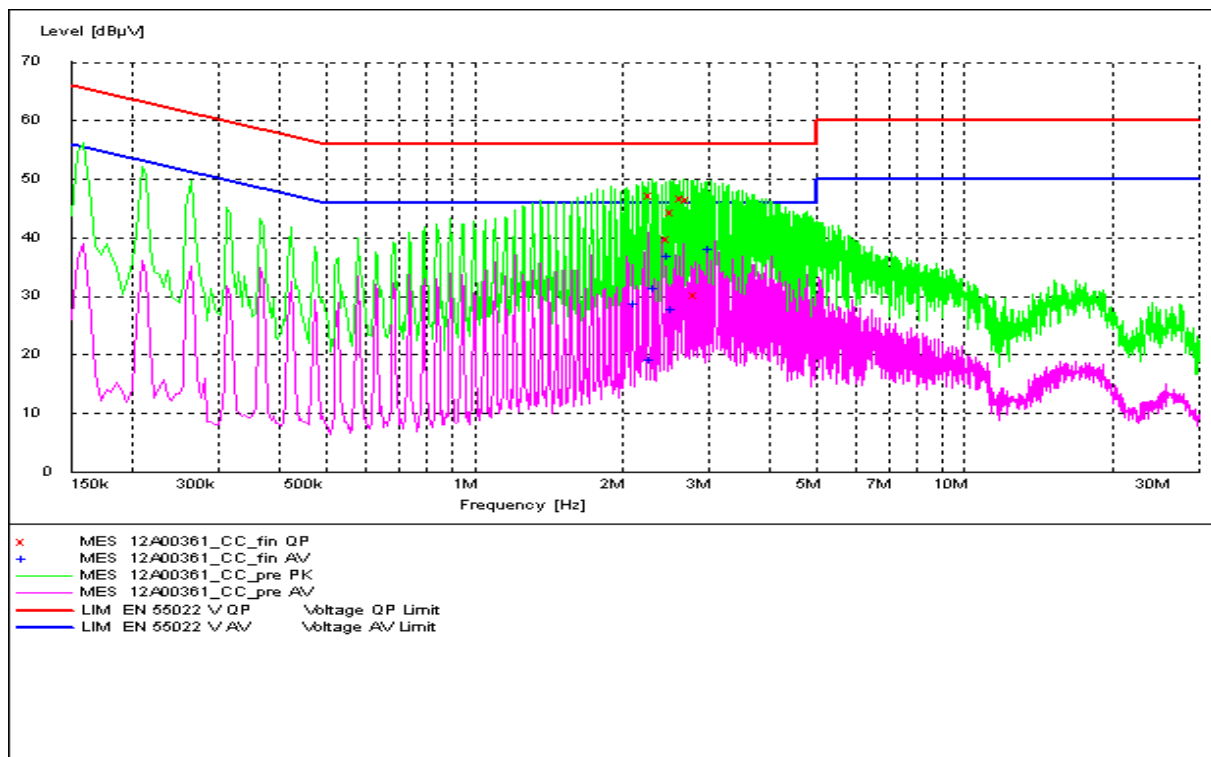


Figure A.5 Conducted Emission

MEASUREMENT RESULT: "12A00361_CC_fin QP"

Frequency	Level	Transd	Limit	Margin	Line	PE
MHz	dBμV	dB	dBμV	dB	/	/
2.309436	47.20	10.1	56	8.8	L1	GND
2.506586	39.80	10.1	56	16.2	L1	GND
2.557171	44.10	10.1	56	11.9	L1	GND
2.672081	46.70	10.1	56	9.3	N	GND
2.726006	46.50	10.1	56	9.5	N	GND
2.837143	30.00	10.1	56	26.0	L1	GND

MEASUREMENT RESULT: "12A00361_CC_fin AV"

Frequency	Level	Transd	Limit	Margin	Line	PE
MHz	dBμV	dB	dBμV	dB	/	/
2.140585	28.70	10.1	46	17.3	L1	GND
2.309436	19.10	10.1	46	26.9	L1	GND
2.356043	31.40	10.1	46	14.6	L1	GND
2.506586	36.80	10.1	46	9.2	L1	GND
2.557171	27.80	10.1	46	18.2	L1	GND
3.042647	38.10	10.1	46	7.9	L1	GND

USB Mode

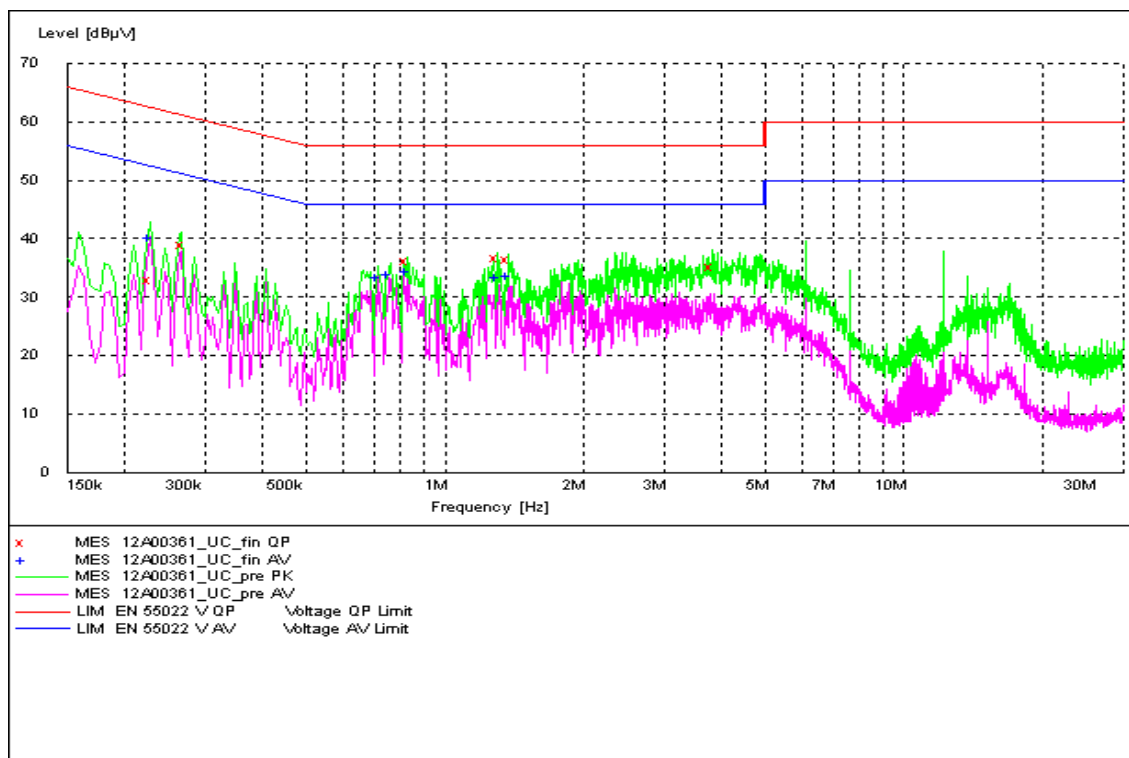


Figure A.6 Conducted Emission

MEASUREMENT RESULT: "12A00361_UC_fin QP"

Frequency	Level	Transd	Limit	Margin	Line	PE
MHz	dBμV	dB	dBμV	dB	/	/
0.226500	32.80	10.1	63	29.8	L1	GND
0.267000	38.90	10.1	61	22.3	N	GND
0.829500	36.10	10.1	56	19.9	N	GND
1.302000	36.60	10.1	56	19.4	N	GND
1.378500	36.40	10.1	56	19.6	N	GND
3.805716	35.20	10.2	56	20.8	L1	GND

MEASUREMENT RESULT: "12A00361_UC_fin AV"

Frequency	Level	Transd	Limit	Margin	Line	PE
MHz	dBμV	dB	dBμV	dB	/	/
0.226500	40.20	10.1	53	12.3	N	GND
0.717000	33.50	10.1	46	12.5	N	GND
0.753000	33.80	10.1	46	12.2	N	GND
0.829500	34.40	10.1	46	11.6	N	GND
1.302000	33.40	10.1	46	12.6	N	GND
1.378500	33.60	10.1	46	12.4	N	GND

END OF REPORT