



TEST REPORT

No.I20N01435-EMC

for

TCL Communication Ltd.

LTE/UMTS/GSM mobile phone

Model Name: 5002C

With

Hardware Version: 03

Software Version: GZ2LUDL0

FCC ID: 2ACCJH124

Issued Date: 2020-06-22

Designation Number: CN1210

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 SAICT.

Test Laboratory:

SAICT, Shenzhen Academy of Information and Communications Technology

Building G, Shenzhen International Innovation Center, No.1006 Shennan Road, Futian District, Shenzhen,
Guangdong, P. R. China 518026.

Tel:+86(0)755-33322000, Fax:+86(0)755-33322001

Email: yewu@caict.ac.cn. www.saict.ac.cn

**REPORT HISTORY**

Report Number	Revision	Description	Issue Date
I20N01435-EMC	Rev.0	1st edition	2020-06-22

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

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1. Summary of Test Report

1.1. Test Items

Description	LTE/UMTS/GSM mobile phone
Model Name	5002C
Applicant's name	TCL Communication Ltd.
Manufacturer's Name	TCL Communication Ltd.

1.2. Test Standards

FCC Part 15, Subpart B 10-1-2019 Edition; ANSI C63.4 2014

1.3. Test Result

Total test 2 items, pass 2 items. Please refer to "6.2 Summary of Measurement Results"

1.4. Testing Location

Address: Building G, Shenzhen International Innovation Center, No.1006 Shennan Road, Futian District, Shenzhen, Guangdong, P. R. China

1.5. Project data

Testing Start Date: 2020-05-28

Testing End Date: 2020-06-17

1.6. Signature

Liang Yong
(Prepared this test report)

Zhang Yunzhuan
(Reviewed this test report)

Cao Junfei
(Approved this test report)



2. ClientInformation

2.1. Applicant 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: Gong Zhizhou
E-mail: zhizhou.gong@tcl.com
Tel: 0086-755-36611722
Fax: 0086-755-36612000-81722

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: Gong Zhizhou
E-mail: zhizhou.gong@tcl.com
Tel: 0086-755-36611722
Fax: 0086-755-36612000-81722

3. Equipment UnderTest (EUT) and Ancillary Equipment (AE)

3.1. About EUT

Description	LTE/UMTS/GSM mobile phone
Model Name	5002C
FCC ID	2ACCJH124
Antenna Type	Internal Antenna
Condition of EUT as received	No obvious damage in appearance

This device contains the receivers which tune and operate between 30MHz-960MHz in the following bands:

GSM850MHz, WCDMA Band 5, LTE Band 5,LTE Band 12, LTE Band 14.

Note: Photographs of EUT are shown in ANNEX A of this test report. Components list, please refer to documents of the manufacturer; it is also included in the original test record of Shenzhen Academy of Information and Communications Technology.

3.2. Internal Identification of EUT

EUT ID*	SN or IMEI	HW Version	SW Version	Receive Date
UT01aa	015732000001041	03	GZ2LUDL0	2020-06-03

*EUT ID: is used to identify the test sample in the lab internally.

3.3. Internal Identification of AE

AE ID*	Description
AE1	Battery
AE2	Charger
AE3	Cable

AE1

Model	CAB2880001C1
Manufacturer	BYD
Capacitance	2880mAh
Nominal Voltage	3.85V

AE2-1

Model	CBA0058AGHC5
Manufacturer	PUAN

AE3-1

Model	CDA312200CC2
Manufacturer	shenghua

*AE ID is used to identify the test sample in the lab internally.

AE: ancillary equipment

3.4. EUT set-ups

EUT set-up No.	Combination of EUT and AE	Remarks
Set.1	UT01aa +AE1+AE2-1+AE3-1	

3.5. General Description

The Equipment Under Test (EUT) is a model of LTE/UMTS/GSM mobile phone with internal antenna.

It supports GSM 850/1900MHz, WCDMA Bands 2/4/5/, and LTE Bands 2/4/5/12/14/30/66.

It has Camera, Video Player, FM Receiver, USB Data Transfer,GNSS,Bluetooth and Wi-Fi functions.

It consists of normal options: Battery, Charger and Data Cable.

Manual and specifications of the EUT were provided to fulfill the test.

Samples (EUT+AE) undergoing test were selected by the Client. Relevant information is provided by the Client.

Note1: LTE/UMTS/GSM mobile phone 5002C manufactured by TCL Communication Ltd.is a variant model based on 5002R for conformance test. According to client's description, the model 5002C is identical with 5002R except for the camera.

Note 2: According to the declaration of differences by manufacturer, the following tests need to be performed at the worst mode from the report of the initial model:

No.	Test item	Test Mode
1	Radiated Emission	Camera Mode
2	Conducted Emission	Camera Mode

Other results are cited from the initial report.

The report number for initial model is I20N01075-EMC

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	10-1-2019 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 did not exceed following limits along the EMC testing:

9.10m×6.10m×5.60m (L×W×H)

Temperature	Min. = 15 °C, Max. = 35°C
Relative humidity	Min. = 20 %, Max. = 75 %
Shielding effectiveness	0.014MHz-1MHz,>60dB; 1MHz-18000MHz,>90dB
Electrical insulation	>2MΩ
Ground system resistance	<4Ω
Normalised site attenuation (NSA)	<±4 dB, 3 m distance, from 30 to 1000 MHz

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

Temperature	Min. = 15 °C, Max. = 30 °C
Relative humidity	Min. =20 %, Max. = 75 %
Shielding effectiveness	0.014MHz-1MHz,>60dB; 1MHz-10000MHz,>90dB
Electrical insulation	>2MΩ
Ground system resistance	<4Ω

Fully-anechoic chamber did not exceed following limits along the EMC testing:

9.10m×6.10m×5.60m (L×W×H)

Temperature	Min. = 15 °C, Max. = 35°C
Relative humidity	Min. = 20 %, Max. = 75 %
Shielding effectiveness	0.014MHz-1MHz,>60dB; 1MHz-18000MHz,>90dB
Electrical insulation	>2MΩ
Ground system resistance	<4Ω
Voltage Standing Wave Ratio (VSWR)	≤ 6 dB, from 1 to 18GHz, 3 m distance
Uniformity of field strength	Between 0 and 6 dB, from 80 to 6000 MHz

6. SUMMARY OF TEST RESULTS

6.1. Testing Environment

Normal Temperature: 15~35℃
Relative Humidity: 20~75%
Atmospheric pressure 86~106kPa

6.2. Summary of Measurement Results

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

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

6.3. Statement

6.3.1 Statements of conformity

This report takes measured values as criterion of test conclusion. The test conclusion meets the limit requirements.

7. Measurement uncertainty

Test item	Frequency ranges	Measurement uncertainty
Radiated Emission	30MHz-1GHz	4.90dB(k=2)
	1GHz-18GHz	4.60dB(k=2)
	18GHz-40GHz	4.10dB(k=2)
Conducted Emission	150kHz-30MHz	3.00dB(k=2)

8. Test Facilities Utilized

NO.	NAME	TYPE	SERIES NUMBER	PRODUCER	CALDUE DATE	CAL PERIOD
1.	Test Receiver	ESR7	101676	R&S	2020.11.27	1 year
2.	Test Receiver	ESCI	100701	R&S	2020.08.10	1 year
3.	Spectrum Analyzer	FSV40	101192	R&S	2021.01.14	1 year
4.	BiLog Antenna	3142E	00224831	ETS-Lindgren	2021.05.17	3 years
5.	LISN	ENV216	102067	R&S	2020.07.17	1 year
6.	Horn Antenna	3117	00066577	ETS-Lindgren	2022.04.02	3 years
7.	Chamber	FACT3-2.0	1285	ETS-Lindgren	2021.07.19	2 years
8.	Software	EMC32	V10.01.00	R&S	/	/
9.	PC	ThinkPad T480	PF-13LW0C	Lenovo	/	/
10.	Printer	P1008	VNF6C12491	HP	/	/
11.	Mouse	MOEUUOA	44NY517	Lenovo	/	/

ANNEX A: MEASUREMENT RESULTS

A.1 Radiated Emission (§15.109(a))

Reference

FCC: CFR Part 15.109(a)

A.1.1 Method of measurement

The field strength of radiated emissions from the unintentional radiator (Data transfer mode of EUT and charging mode of EUT) at a distance 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 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:

Camera Mode: At the beginning of measurement, the battery is completely discharged. The battery and charger are installed so that the EUT works well and keeping on taking photos.

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.

A.1.3 Measurement Limit

Limit from CFR Part 15.109(a)

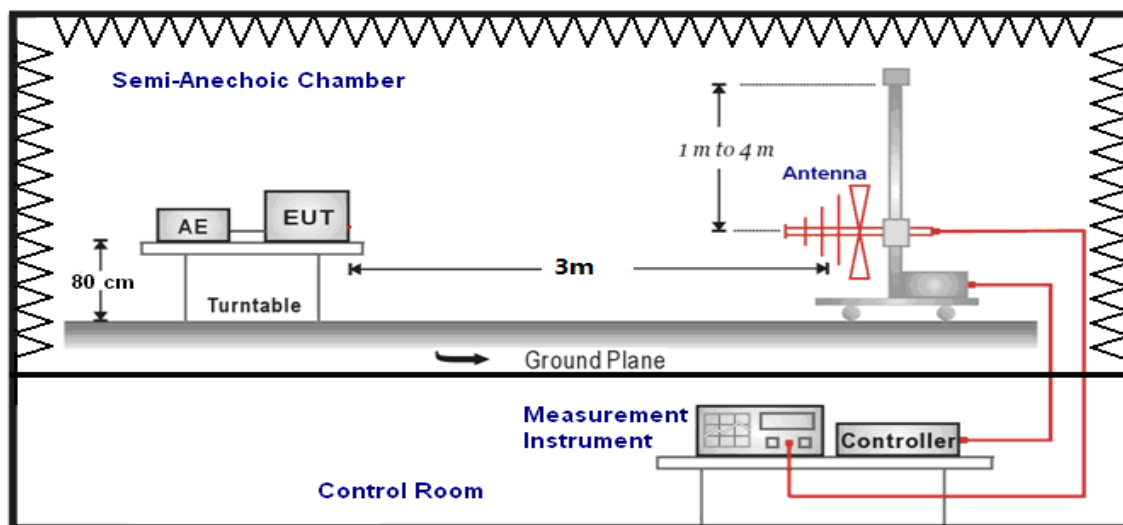
Frequency range (MHz)	Field strength limit (μV/m)		
	Quasi-peak	Average	Peak
30-88	100		
88-216	150		
216-960	200		
960-1000	500		
>1000		500	5000

*Note: The original limit is defined at 10m test distance. This limit is calculated according to CISPR requirements.

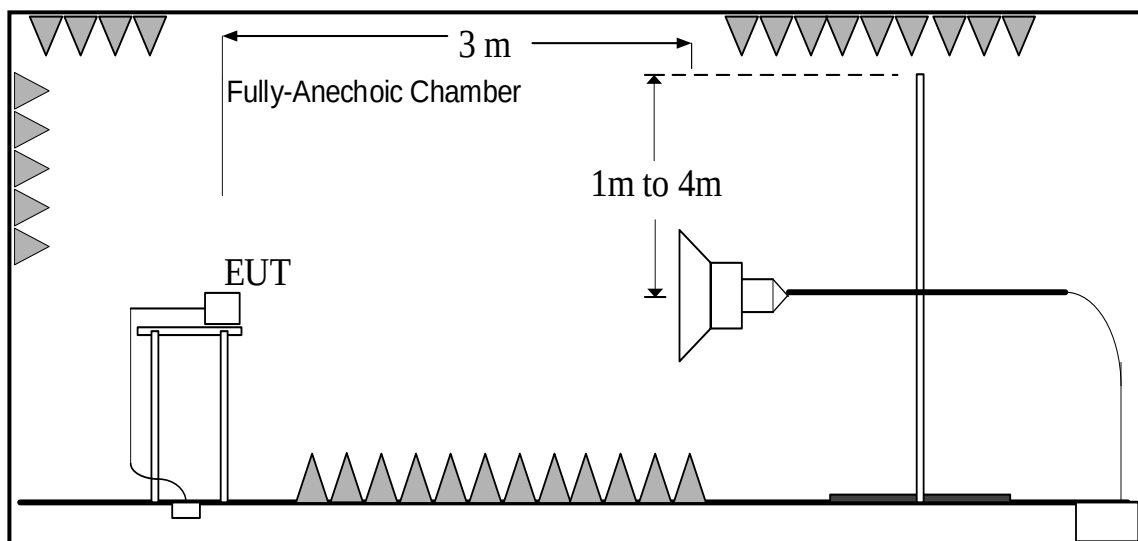
A.1.4 Test Condition

Frequency of emission (MHz)	RBW/VBW	Sweep Time(s)
30-1000	120kHz (IF bandwidth)	5
Above 1000	1MHz/3MHz	15

A.1.5 Test set-up: 30MHz-1GHz



1GHz-18GHz



A.1.6 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.

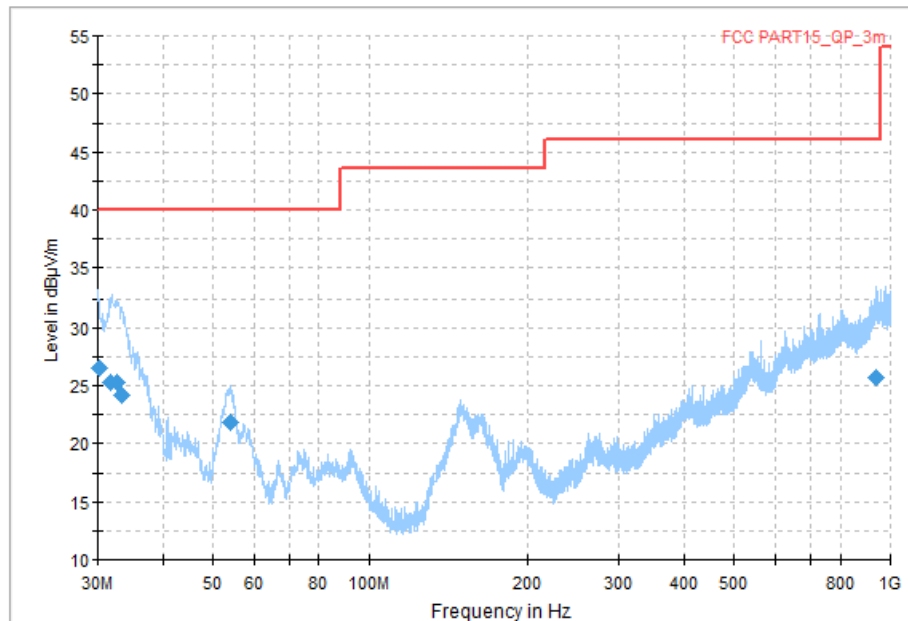
Result: Quasi-Peak(dBμV/m) / Average(dBμV/m)/Peak(dBμV/m)

Note: the result contains vertical part and Horizontal part

Camera Mode

Frequency range (MHz)	Quasi-Peak Limit (dBμV/m)	Result (dBμV/m)	Conclusion
		Set.1	
30-88	40	See Figure A.1	P
88-216	44		
216-960	46		
960-1000	54		

Frequency range (MHz)	Average Limit (dBμV/m)	Peak Limit (dBμV/m)	Result (dBμV/m)	Conclusion
			Set.1	
1000 to 18000	54	74	See Figure A.2	P



Radiated Emission (Set.1, Camera Mode , 30MHz to 1GHz)

Final_Result

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	ARpl (dB/m)	P _{Mea} (dBμV)
30.121250	26.52	40.00	13.48	V	-13.8	40.32
31.818750	25.29	40.00	14.71	V	-14.3	39.59
32.606875	25.34	40.00	14.66	V	-14.6	39.94
33.395000	24.15	40.00	15.85	V	-14.9	39.05
54.007500	21.85	40.00	18.15	V	-22.1	43.95
937.192500	25.65	46.02	20.37	V	1.1	24.55

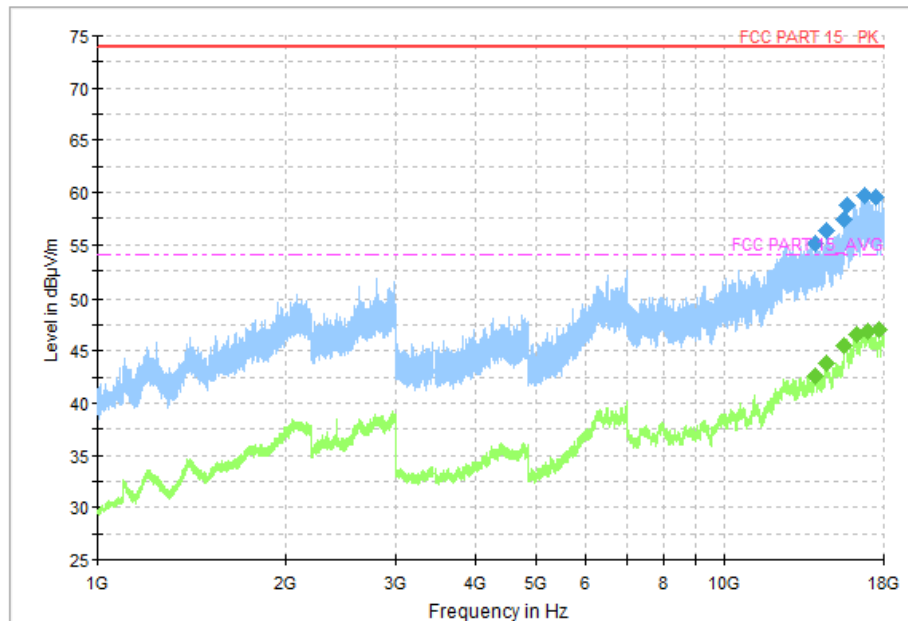


Figure A.1 Radiated Emission (Set.1, Camera Mode, 1GHz to 18GHz)

Final_Results_PK

Frequency(MHz)	Peak (dBμV/m)	Limit (dBμV/m)	Margin(dB)	Polarity	ARpl (dB/m)	P _{Mea} (dBμV)
13972.750000	55.10	74	18.90	V	17.1	38.00
14541.000000	56.37	74	17.63	H	17.9	38.47
15561.500000	57.41	74	16.59	H	19.5	37.91
15705.250000	58.83	74	15.17	V	20.1	38.73
16737.000000	59.71	74	14.29	V	21.4	38.31
17461.500000	59.63	74	14.37	V	22.4	37.23

Final_Results_AVG

Frequency(MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin(dB)	Polarity	ARpl (dB/m)	P _{Mea} (dBμV)
14015.000000	42.64	54	11.36	V	16.9	25.74
14562.000000	43.77	54	10.23	H	17.9	25.87
15566.750000	45.43	54	8.57	V	19.5	25.93
16283.000000	46.61	54	7.39	V	20.8	25.81
16997.500000	46.89	54	7.11	H	22.9	23.99
17700.250000	46.95	54	7.05	V	23.2	23.75

B.2 Conducted Emission (§15.107(a))**Reference**

FCC: CFR Part 15.107(a)

B.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 150kHz to 30MHz shall not exceed the limits. Tested in accordance with the procedures of ANSI C63.4 -2014, section 7.3.

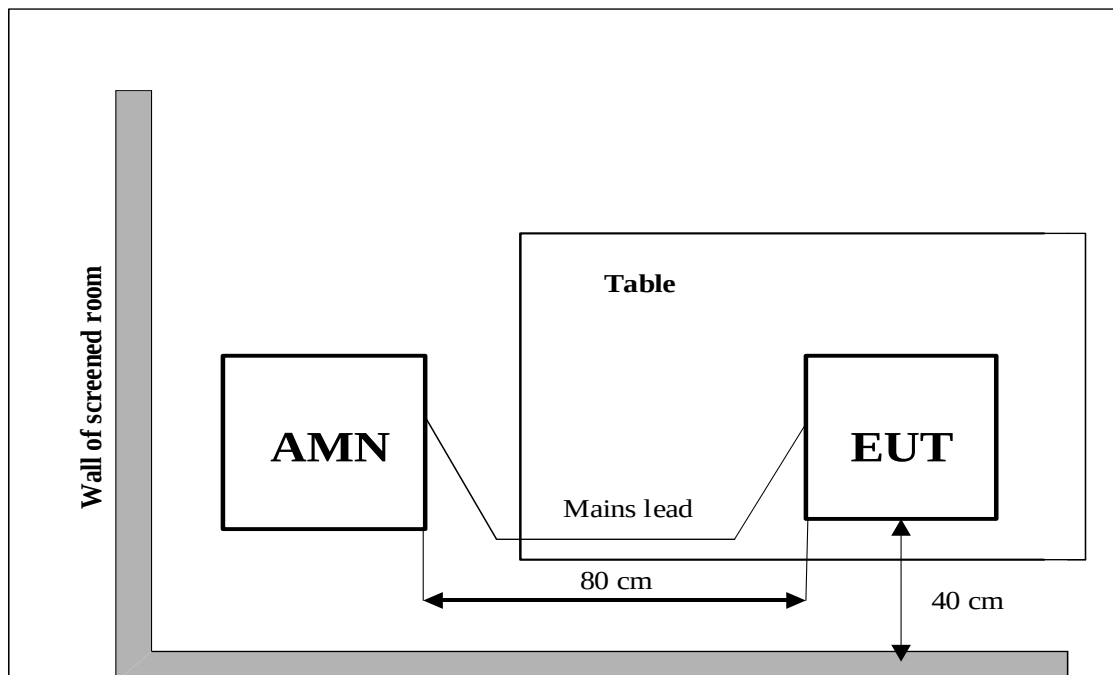
B.2.2 EUT Operating Mode:

Camera Mode: At the beginning of measurement, the battery is completely discharged. The battery and charger are installed so that the EUT works well and keeping on taking photos.

B.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		

B.2.4 Test set-up:



B.2.5 Test Condition in charging mode

Voltage (V)	Frequency (Hz)
120	60
240	60

RBW	Sweep Time(s)
9kHz	1

B.2.6 Measurement Results

QuasiPeak(dBμV) /Average(dBμV) =PMea+Corr

Where

Corr: PathLoss + Voltage Division Factor

PMea: Measurement result on receiver.

Camera Mode

AC Input Port/ Voltage: 120V/60Hz

Frequency range (MHz)	Quasi-peak Limit (dBμV)	Average Limit (dBμV)	Result (dBμV)	Conclusion
			Set.1	
0.15 to 0.5	66 to 56	56 to 46	See Figure B.1	P
0.5 to 5	56	46		
5 to 30	60	50		
NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.				

Camera Mode

AC Input Port/ Voltage: 240V/60Hz

Frequency range (MHz)	Quasi-peak Limit (dB μ V)	Average Limit (dB μ V)	Result (dB μ V)	Conclusion
			Set.1	
0.15 to 0.5	66 to 56	56 to 46	See Figure B.2	P
0.5 to 5	56	46		
5 to 30	60	50		

NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

AC Input Port/ Voltage: 120V/60Hz

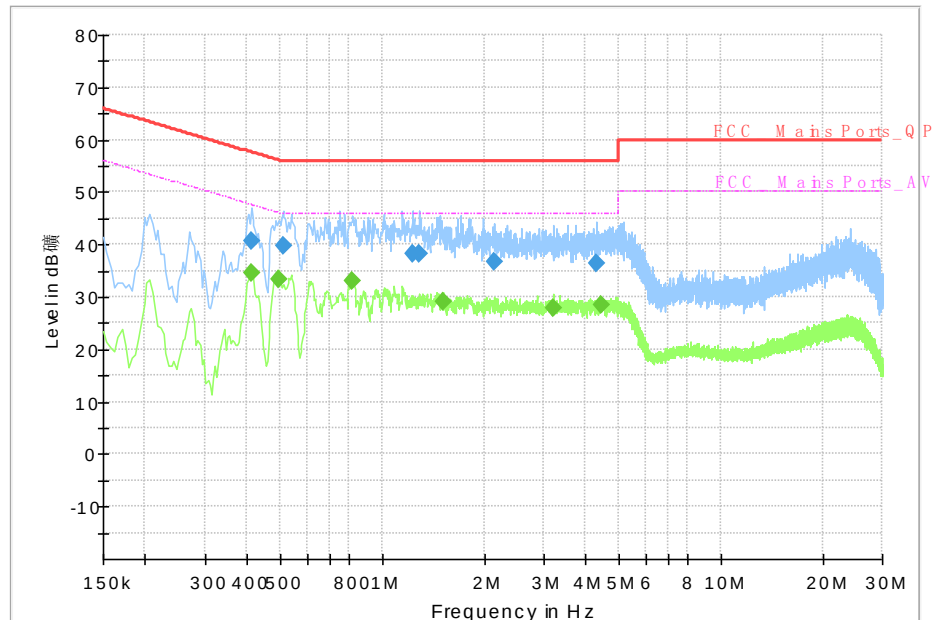


Figure B.1 Conducted Emission(Set.1, Camera Mode)

Final_Result_QPK

Frequency (MHz)	QuasiPeak (dBμV)	Limit (dBμV)	Margin (dB)	Line	Corr. (dB)	P _{Mea} (dBμV)
0.410000	40.76	57.65	16.89	N	9.7	31.06
0.510000	39.71	56.00	16.29	N	9.7	30.01
1.234000	38.27	56.00	17.73	N	9.7	28.57
1.286000	38.28	56.00	17.72	N	9.7	28.58
2.142000	36.58	56.00	19.42	N	9.7	26.88
4.302000	36.46	56.00	19.54	N	9.7	26.76

Final_Result_AVG

Frequency (MHz)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Line	Corr. (dB)	P _{Mea} (dBμV)
0.410000	34.63	47.65	13.02	N	9.7	24.93
0.494000	33.38	46.10	12.72	N	9.7	23.68
0.814000	33.13	46.00	12.87	N	9.7	23.43
1.518000	29.08	46.00	16.92	N	9.7	19.38
3.222000	27.75	46.00	18.25	N	9.7	18.05
4.430000	28.41	46.00	17.59	N	9.7	18.71

AC Input Port/ Voltage: 240V/60Hz

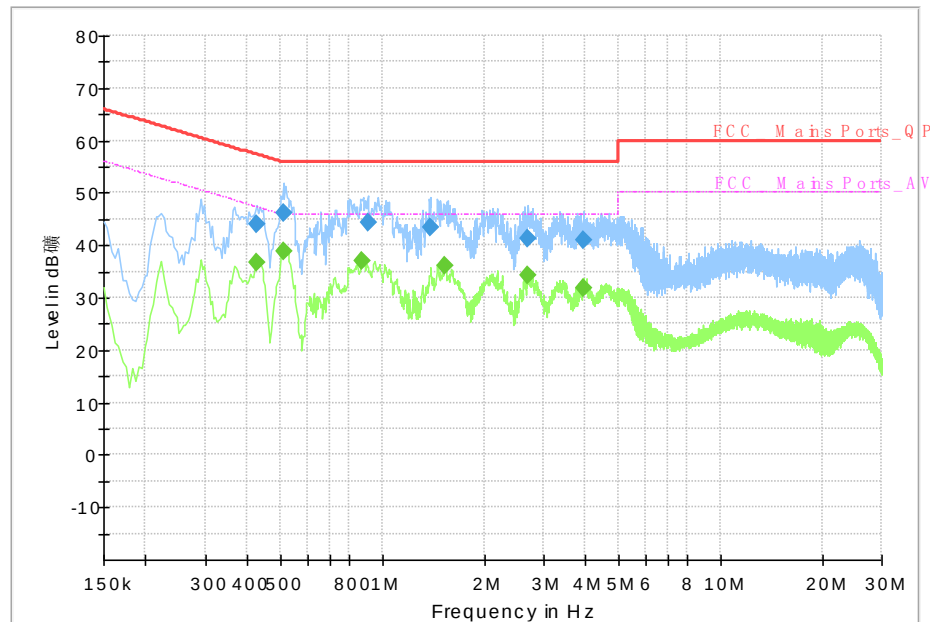


Figure B.2 Conducted Emission(Set.1, Camera Mode)

Final_Result_QPK

Frequency (MHz)	QuasiPeak (dBμV)	Limit (dBμV)	Margin (dB)	Line	Corr. (dB)	P _{Mea} (dBμV)
0.426000	44.08	57.33	13.26	N	9.7	34.38
0.510000	46.15	56.00	9.85	N	9.7	36.45
0.906000	44.33	56.00	11.67	N	9.7	34.63
1.386000	43.37	56.00	12.63	N	9.7	33.67
2.706000	41.27	56.00	14.73	N	9.7	31.57
3.938000	40.83	56.00	15.17	N	9.7	31.13

Final_Result_AVG

Frequency (MHz)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Line	Corr. (dB)	P _{Mea} (dBμV)
0.426000	36.67	47.33	10.66	N	9.7	26.97
0.510000	38.82	46.00	7.18	N	9.7	29.12
0.874000	37.13	46.00	8.87	N	9.7	27.43
1.530000	36.17	46.00	9.83	N	9.7	26.47
2.698000	34.12	46.00	11.88	N	9.7	24.42
3.946000	31.79	46.00	14.21	N	9.7	22.09

END OF REPORT