



13

TEST REPORT

No.I23N00229-EMC

for

Guilin Zhishen Information Technology Co., Ltd.

CRANE-M 3S

Model Name: CR127

With

Hardware Version: V1.0

Software Version: V1.54

FCC ID:2AIHFZYCR127

Issued Date: 2023-04-13

Designation Number: CN1210

Note:

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REPORT HISTORY

Report Number	Revision	Description	Issue Date
I23N00229-EMC	Rev.0	1st edition	2023-04-13

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	CRANE-M 3S
Model Name	CR127
Code Name	CR127
Applicant's name	Guilin Zhishen Information Technology Co., Ltd.
Manufacturer's Name	Guilin Zhishen Information Technology Co., Ltd.

1.2. Test Standards

FCC Part 15, Subpart B (10-1-2021 Edition); ANSI C63.4-2014.

1.3. Test Result

Total test 2 items, pass 2 items. Please refer to "6.2 Test Results".

1.4. Testing Location

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

1.5. Project data

Testing Start Date: 2023-03-15

Testing End Date: 2023-03-20

1.6. Signature

Liu Xiangzhou

(Prepared this test report)

Liang Yong

(Reviewed this test report)

Cao Junfei

(Approved this test report)



2. CLIENT INFORMATION

2.1. Applicant Information

Company Name: Guilin Zhishen Information Technology Co., Ltd.
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Guangxi, China.
Contact: Zou Jian
Email: zouj@zhiyun-tech.com
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2.2. Manufacturer Information

Company Name: Guilin Zhishen Information Technology Co., Ltd.
Address: 09 Huangtong Road, Tieshan Industrial Zone, Qixing District, Guilin,
Guangxi, China.
Contact: Zou Jian
Email: zouj@zhiyun-tech.com
Tel: 1306932837
Fax: /



3. EQUIPMENT UNDER TEST (EUT) AND ANCILLARY EQUIPMENT

(AE)

3.1. About EUT

Description	CRANE-M 3S
Model Name	CR127
FCC ID	2AIHFZYCR127
Condition of EUT as received	No obvious damage in appearance

Note: 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
UT02aa	/	V1.0	V1.54	2023-02-24

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

3.3. Internal Identification of AE

AE ID*	Description
AE1	Polymer Li-ion Battery
AE2	Charger
AE3	Power Cable
AE4	USB Cable
AE5	Audio Cable
AE6	Camera

AE1

Model	CR106-1100mAh
Manufacturer	Dongguan Howell Energy Co., Ltd.
Capacity	1100mAh
Nominal Voltage	11.1V

AE2

Model	/
Manufacturer	/

AE3

Model	XL01077
Manufacturer	Guilin Zhishen Information Technology Co.,Ltd.

AE4-1

Model	LN-UCUC-D07
Manufacturer	Guilin Zhishen Information Technology Co.,Ltd.

AE4-2

Model	LN-MBUC-B02
Manufacturer	Guilin Zhishen Information Technology Co.,Ltd.

AE4-3



Model LN-UCUS-C02
Manufacturer Guilin Zhishen Information Technology Co.,Ltd.

AE5

Model /
Manufacturer /

AE6

Model /
Manufacturer /

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

AE: Ancillary equipment

AE2/AE6: Just for test.



3.4. EUT Set-ups

EUT set-up No.	Combination of EUT and AE	Remarks
Set.1	EUT+AE1+AE2+AE3+AE4-3+AE5+AE6	



3.5. General Description

The Equipment Under Test (EUT) is a model of CRANE-M 3S with internal antenna.

It has Bluetooth functions.

Since subscribers often use EUT during charging, EUT is to be tested in accordance with “Fixed use” besides in accordance with “Portable use”.

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.



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	(10-1-2021 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

Anechoic chamber (FACT3-2.0) 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> 60 dB; 1MHz-18000MHz>90 dB
Electrical insulation	> 2MΩ
Ground system resistance	< 4Ω
Normalised site attenuation (NSA)	< ± 4 dB, 3 m distance, from 30 to 1000 MHz
Voltage Standing Wave Ratio (VSWR)	≤ 6 dB, from 1 to 18 GHz, 3 m distance
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> 60 dB; 1MHz-18000MHz>90 dB
Electrical insulation	> 2MΩ
Ground system resistance	< 4Ω



6. SUMMARY OF TEST RESULTS

6.1. Testing Environment

Normal Temperature: 15~35°C
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)/ Section 6.2	A.1	P
2	Conducted Emission	15.107(a)/ Section 6.1	A.2	P

Note: As FCC Part 15, Subpart B, conducted Emission is not required for equipment which is powered by DC source.

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	4.86dB(k=2)
	1GHz-18GHz	4.82dB(k=2)
	18GHz-40GHz	2.90dB(k=2)

8. MEASURING APPARATUS UTILIZED

No.	Name	Model	Serial Number	Manufacturer	Calibration Due date	Calibration Period
1.	Test Receiver	ESR7	101676	R&S	2023.11.23	1 year
2.	Spectrum Analyzer	FSV40	101192	R&S	2024.01.11	1 year
3.	BiLog Antenna	3142E	0224831	ETS-Lindgren	2024.05.27	3 years
4.	Horn Antenna	3117	00066577	ETS-Lindgren	2025.04.17	3 years
5.	Anechoic chamber	FACT3-2.0	1285	ETS-Lindgren	2023.05.29	2 years
6.	Test Receiver	ESCI	100702	R&S	2024.01.11	1 year
7.	LISN	ENV216	102067	R&S	2023.09.06	1 year
8.	Software	EMC32	V10.50.40	R&S	/	/
9.	Horn Antenna	QSH-SL-18-26-S-20	17013	Q-par	2026.01.30	3 years
10.	Horn Antenna	QSH-SL-8-26-40-K-20	17014	Q-par	2026.01.30	3 years



ANNEX A: MEASUREMENT RESULTS

A.1 Radiated Emission (§15.109(a))

Reference

FCC: Part 15.109(a)

A.1.1 Method of measurement

The field strength of radiated emissions from the unintentional radiator at a distance of 3 meters or 1 meter 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. Below 18GHz the measurement antenna was placed at a distance of 3 meters from the EUT. Above 18GHz the measurement antenna was placed at a distance of 1 meters from the EUT. (According to Part 15.31(f)(1), 1m limit is calculated by extrapolation factor of 20 dB/decade) 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:

Normal Working: EUT is powered on, plugged into the USB cable and Audio cable establish a connection with camera, and plugged into the power supply to start charging.

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 Part 15.109(a)

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

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

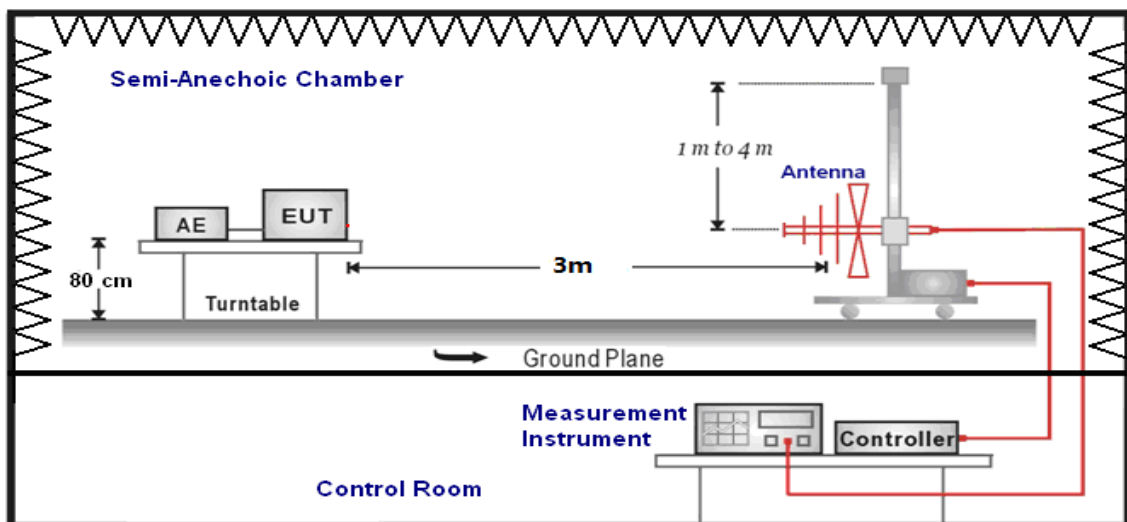
A.1.4 Test Condition

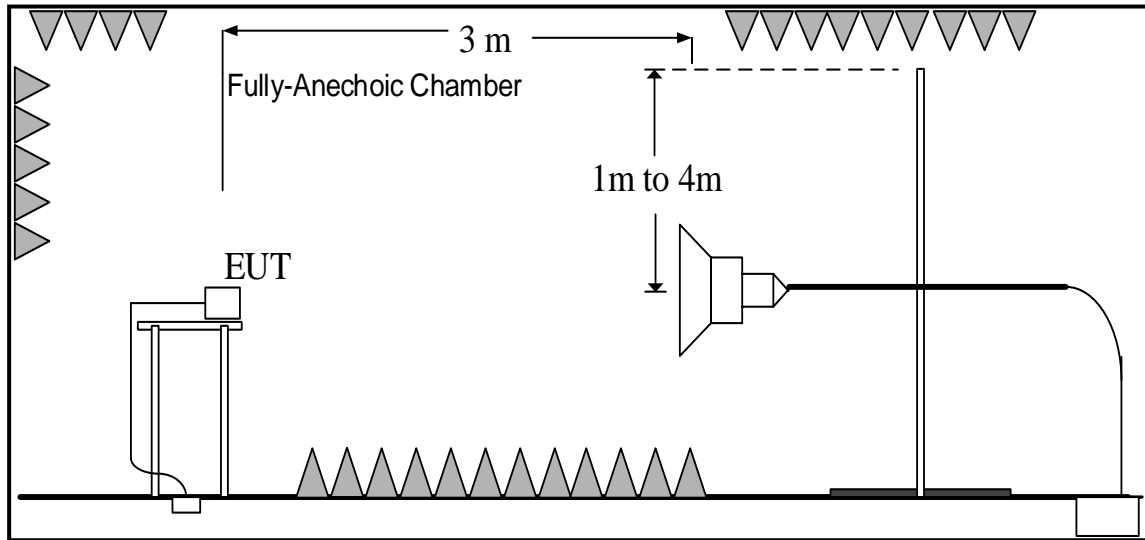
Frequency of emission (MHz)	RBW/VBW	Sweep Time(s)
30-1000	120kHz (IF bandwidth)	5
Above 1000	1MHz/3MHz	15

A.1.5 Test power supply

Power	Voltage (V)
DC	13.6

A.1.6 Test set-up: 30MHz-1GHz



1GHz-40GHz

A.1.7 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:

$$\text{Result} = P_{\text{Mea}} + A_{Rpl} = P_{\text{Mea}} + G_A + G_{PL}$$

Where

G_A : Antenna factor of receive antenna

G_{PL} : Path Loss

P_{Mea} : Measurement result on receiver.

Result: Quasi-Peak (dB μ V/m) / Average (dB μ V/m) / Peak (dB μ V/m)

Note: the result contains vertical part and Horizontal part

Normal Working

Frequency range (MHz)	Quasi-Peak Limit (dB μ V/m)	Result (dB μ V/m)	Conclusion
		UT02aa/Set.1	
30-88	40.00	See Figure A.1.1.	P
88-216	43.52		
216-960	46.02		
960-1000	54.00		

Frequency range (MHz)	Average Limit (dB μ V/m)	Peak Limit (dB μ V/m)	Result (dB μ V/m)	Conclusion
			UT02aa/Set.1	
1000 to 18000	54.00	74.00	See Figure A.1.2.	P
18000 to 26500	63.54	83.54	See Figure A.1.3.	

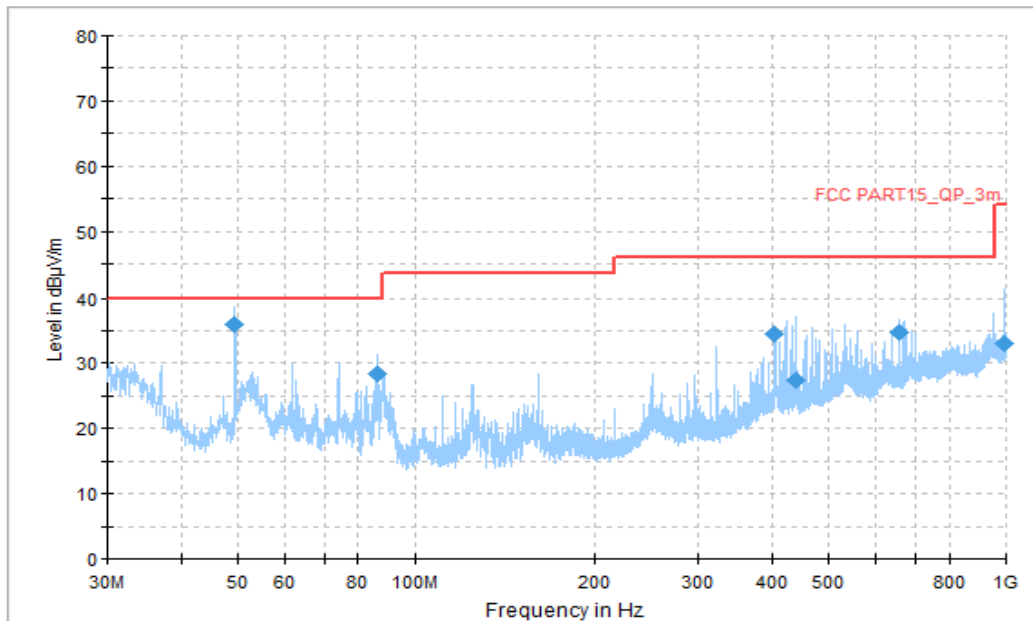


Figure A.1.1. Radiated Emission (Normal Working, 30MHz to 1GHz)

Final_Results

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	ARpl (dB/m)	P _{Mea} (dBµV)
49.400000	35.95	40.00	4.05	V	-20	55.95
86.421667	28.32	40.00	11.68	V	-21	49.32
404.689444	34.49	46.02	11.53	V	-7	41.49
440.956667	27.47	46.02	18.55	V	-7	34.47
657.105000	34.64	46.02	11.38	H	-2	36.64
990.030556	33.14	53.98	20.84	V	2	31.14

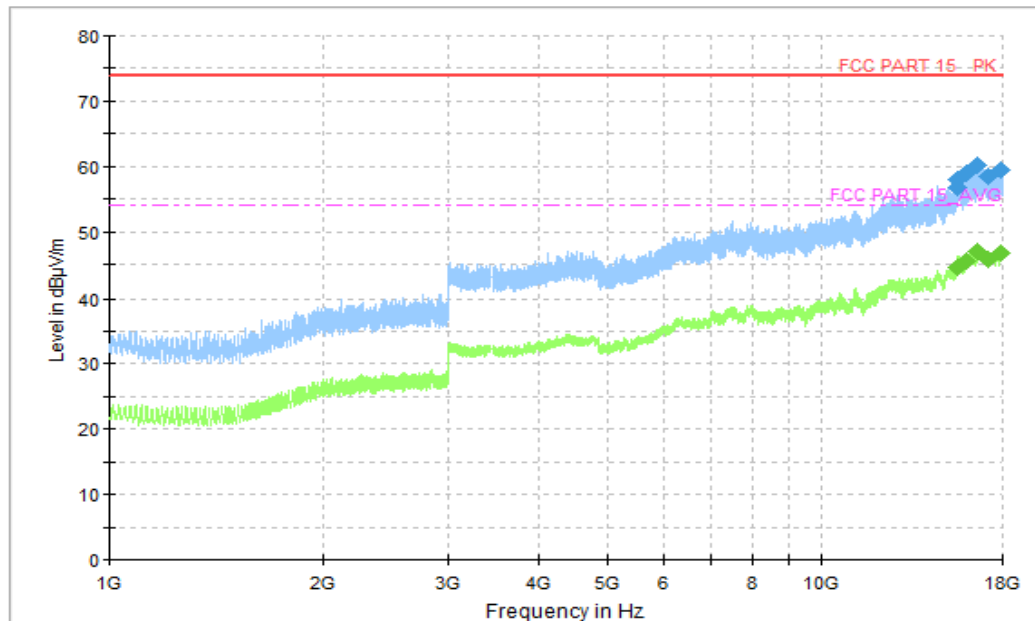


Figure A.1.2. Radiated Emission (Normal Working, 1GHz to 18GHz)

Final_Results_PK

Frequency(MHz)	Peak (dBµV/m)	Limit (dBµV/m)	Margin(dB)	Polarity	ARpl (dB/m)	P _{Mea} (dBµV)
15546.500000	56.83	74.00	17.17	H	19	37.83
15553.250000	58.05	74.00	15.95	V	19	39.05
16029.500000	58.84	74.00	15.16	H	20	38.84
16587.250000	60.19	74.00	13.81	V	22	38.19
17142.500000	58.34	74.00	15.66	V	21	37.34
17886.250000	59.50	74.00	14.50	V	24	35.50

Final_Results_AVG

Frequency(MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin(dB)	Polarity	ARpl (dB/m)	P _{Mea} (dBµV)
15546.500000	44.46	54.00	9.54	H	19	25.46
15553.250000	44.45	54.00	9.55	V	19	25.45
16029.500000	45.55	54.00	8.45	H	20	25.55
16587.250000	47.07	54.00	6.93	V	22	25.07
17142.500000	45.71	54.00	8.29	V	21	24.71
17886.250000	46.85	54.00	7.15	V	24	22.85

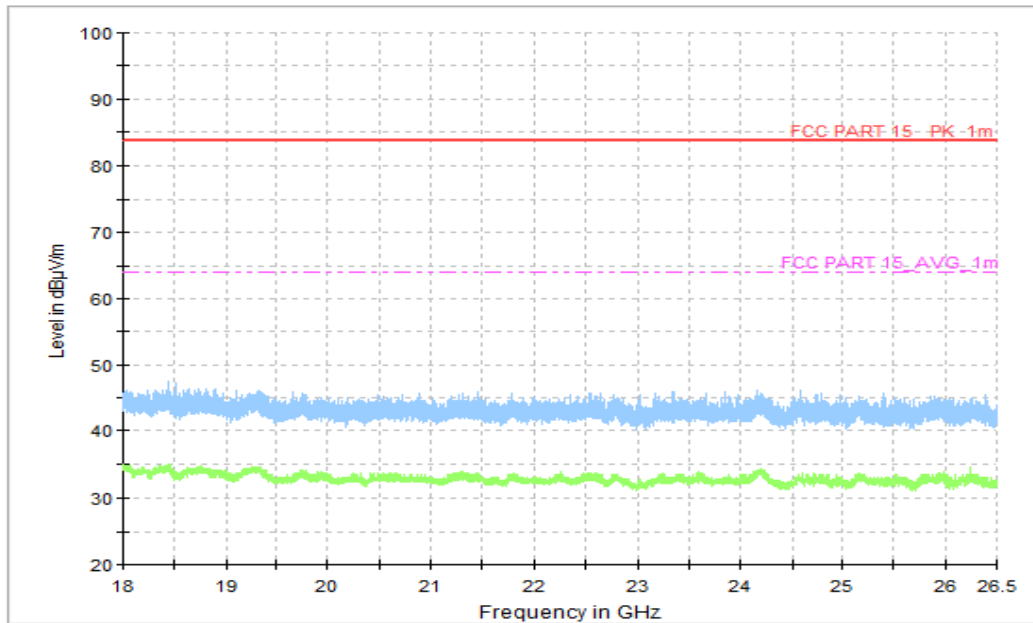


Figure A.1.3. Radiated Emission (Normal Working, 18GHz to 26.5GHz)

A.2 Conducted Emission (§15.107(a))

Reference

FCC: 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 150kHz to 30MHz 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:

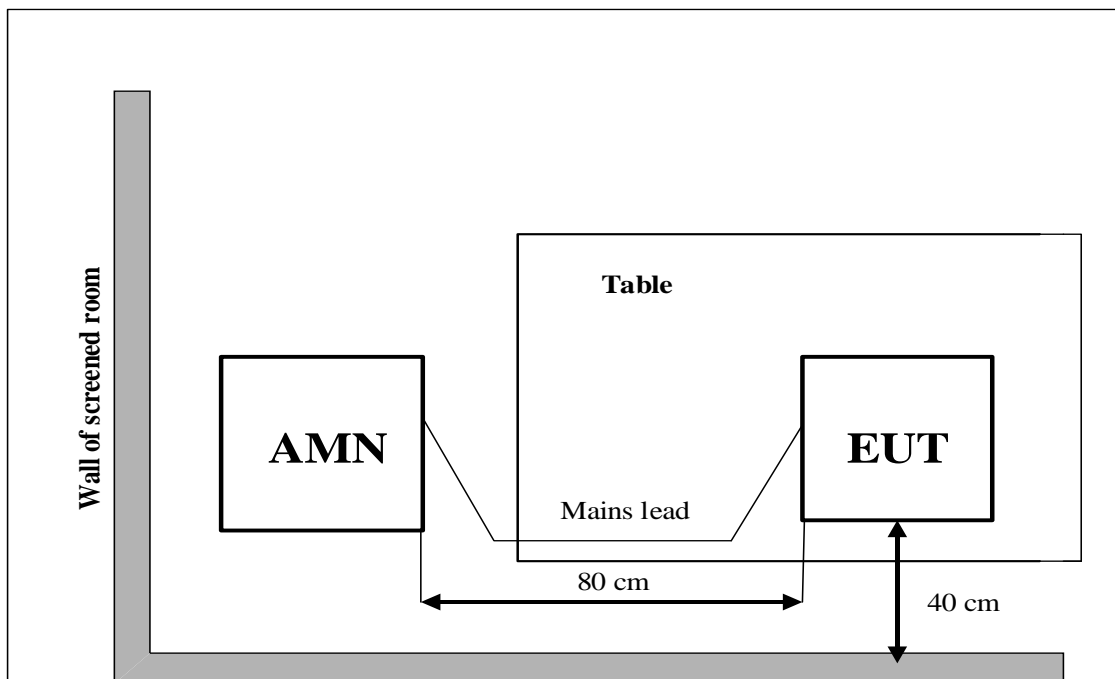
Normal Working: EUT is powered on, plugged into the USB cable and Audio cable establish a connection with camera, and plugged into the power supply to start charging.

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 set-up:



A.2.5 Test Condition in charging mode

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

RBW	Sweep Time(s)
9kHz	1

A.2.6 Measurement Results

QuasiPeak(dB μ V) /Average(dB μ V) =PMea+Corr

Where

Corr: PathLoss + Voltage Division Factor

PMea: Measurement result on receiver.

Normal Working

AC Input Port/ Voltage: 120V/60Hz

Frequency range (MHz)	Quasi-peak Limit (dB μ V)	Average Limit (dB μ V)	Result (dB μ V)	Conclusion
			UT02aa/Set.1	
0.15 to 0.5	66 to 56	56 to 46	See Figure A.2.1.	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.

Normal Working

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
			UT02aa/Set.1	
0.15 to 0.5	66 to 56	56 to 46	See Figure A.2.2.	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

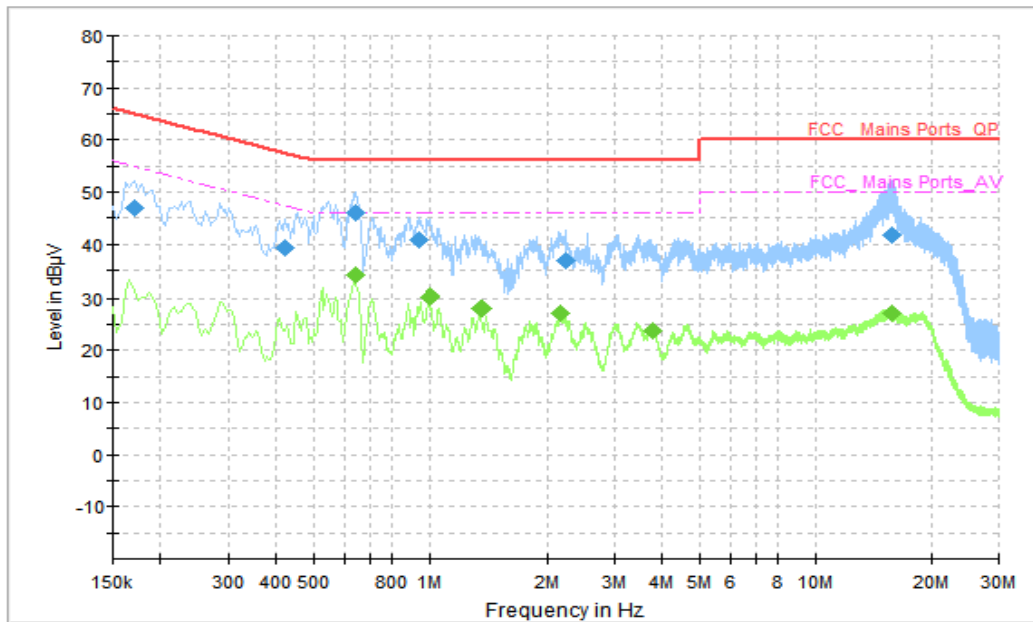


Figure A.2.1. Conducted Emission(Normal Working)

Final_Result_QPK

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)	P _{Mea} (dBµV)
0.170000	47.06	64.96	17.90	N	10	37.06
0.422000	39.29	57.41	18.12	N	10	29.29
0.646000	46.11	56.00	9.89	L1	10	36.11
0.942000	40.73	56.00	15.27	L1	10	30.73
2.238000	36.89	56.00	19.11	L1	10	26.89
15.818000	41.86	60.00	18.14	N	11	30.86

Final_Result_AVG

Frequency (MHz)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)	P _{Mea} (dBµV)
0.642000	34.18	46.00	11.82	L1	10	24.18
0.998000	30.15	46.00	15.85	L1	10	20.15
1.354000	28.04	46.00	17.96	L1	10	18.04
2.174000	27.15	46.00	18.85	L1	10	17.15
3.774000	23.64	46.00	22.36	L1	10	13.64
15.818000	27.17	50.00	22.83	N	11	16.17

AC Input Port/ Voltage: 240V/60Hz

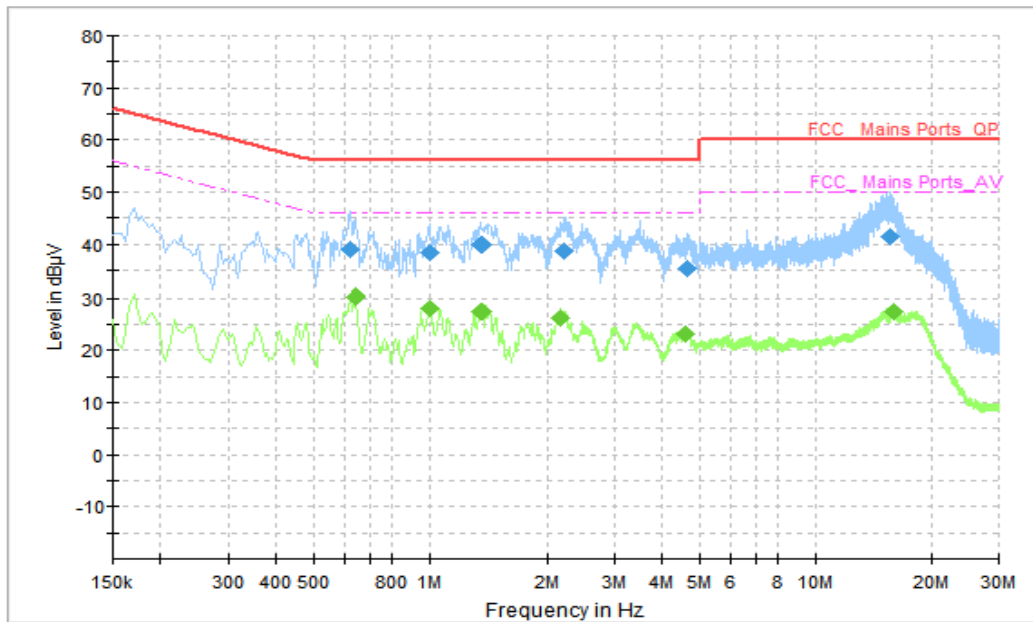


Figure A.2.2. Conducted Emission(Normal Working)

Final_Result_QPK

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)	P _{Mea} (dBµV)
0.622000	39.15	56.00	16.85	L1	10	29.15
1.002000	38.27	56.00	17.73	N	10	28.27
1.354000	39.94	56.00	16.06	L1	10	29.94
2.222000	38.64	56.00	17.36	L1	10	28.64
4.626000	35.49	56.00	20.51	L1	10	25.49
15.634000	41.46	60.00	18.54	N	11	30.46

Final_Result_AVG

Frequency (MHz)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)	P _{Mea} (dBµV)
0.642000	30.17	46.00	15.83	N	10	20.17
1.002000	28.02	46.00	17.98	L1	10	18.02
1.358000	27.55	46.00	18.45	L1	10	17.55
2.170000	26.23	46.00	19.77	L1	10	16.23
4.594000	23.22	46.00	22.78	L1	10	13.22
15.986000	27.32	50.00	22.68	N	11	16.32

***END OF REPORT**