



FCC PART 15B TEST REPORT

No. I22Z61733-EMC01

for

BLU Products,Inc.

Smart Phone

Model Name: STUDIO MINI 2023

FCC ID: YHLBLUSTMN22

with

Hardware Version: V1.0

Software Version: BLU_ST1020T_V12.0.01.39_ASW_20221109_0005

Issued Date: 2022-11-09

Note:

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REPORT HISTORY

Report Number	Revision	Description	Issue Date
I22Z61733-EMC01	Rev.0	1 st edition	2022-11-09

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

CONTENTS

1. TEST LABORATORY	4
1.1. TESTING LOCATION	4
1.2. TESTING ENVIRONMENT	4
1.3. PROJECT DATA	4
1.4. SIGNATURE	4
2. CLIENT INFORMATION	5
2.1. APPLICANT INFORMATION.....	5
2.2. MANUFACTURER INFORMATION.....	5
3. EQUIPMENT UNDER TEST (EUT) AND ANCILLARY EQUIPMENT (AE)	6
3.1. ABOUT EUT	6
3.2. INTERNAL IDENTIFICATION OF EUT USED DURING THE TEST	6
3.3. INTERNAL IDENTIFICATION OF AE USED DURING THE TEST.....	6
3.4. EUT SET-UPS	7
4. REFERENCE DOCUMENTS.....	8
4.1. REFERENCE DOCUMENTS FOR TESTING.....	8
5. LABORATORY ENVIRONMENT.....	9
6. SUMMARY OF TEST RESULTS.....	10
7. TEST EQUIPMENTS UTILIZED	11
ANNEX A: MEASUREMENT RESULTS	12

1. Test Laboratory

1.1. Testing Location

Location 1: CTTL (BDA)

Address: No.18A, Kangding Street, Beijing Economic-Technology
Development Area, Beijing, P. R. China 100176

1.2. Testing Environment

Normal Temperature: 15-35°C

Relative Humidity: 20-75%

1.3. Project data

Testing Start Date: 2022-10-24

Testing End Date: 2022-11-02

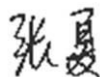
1.4. Signature



Wang Xue
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Zhang Ying
(Reviewed this test report)



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2. Client Information

2.1. Applicant Information

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2.2. Manufacturer Information

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

3.1. About EUT

Description	Smart Phone
Model Name	STUDIO MINI 2023
FCC ID:	YHLBLUSTMN22

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	353587400015870	V1.0	BLU_ST1020T_V12.0.01.39_ASW _20221109_0005
EUT2	353587400011952	V1.0	BLU_ST1020T_V12.0.01.39_ASW _20221109_0005

*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	USB Cable	/	/
AE3	USB Cable	/	/
AE4	Charger1	/	/
AE5	Charger2	/	/

AE1

Model	C716204250T
Manufacturer	Guangdong Fenghua New Energy Co.,Ltd.
Capacity	2500mAh
Nominal Voltage	3.85V

AE2

Model	T365-005B
Manufacturer	Shenzhen Yihuaxing Electronics Co. Ltd.

AE3

Model	336211
Manufacturer	SUNTOPS (SHENZHEN) ELECTRONICS CO., LTD.

AE4

Model	TN-050120U9
Manufacturer	Chongqing Lianmao Electronics Co., Ltd.

AE5

Model	TN-050120U8
Manufacturer	Guangdong Beicom Electronics Co., Ltd.

3.4. EUT set-ups

EUT set-up No.	Combination of EUT and AE	Remarks
Set.1	EUT1/2 + AE1 + AE2/3 + AE4	Charger1 +REAR Camera+GSM 850 idle
Set.1	EUT1/2 + AE1 + AE2/3 + AE5	Charger2+MP4+WCDMA 850 idle
Set.3	EUT1/2 + AE1 + AE2/3	USB+ front camera+LTE B5 idle

Note:

Equipment Under Test (EUT) is a model of Smart Phone with integrated antenna.

It supports

GSM Band GSM850/PCS1900

UMTS Band FDD Band II(W1900) /FDD Band IV(W1700)/FDD Band V(W850)

LTE Band FDD 2/4/5/12/25/26/66/71, TDD41

It has MP3, Camera, USB memory, Bluetooth 5.0, Wi-Fi (802.11b/g/n 20MHz bandwidth) ,GPS functions.

The device contains receivers which tune and operate between 30MHz-960MHz in the following bands: GSM850, WCDMA850, LTE Band 5/12/26/71. 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(BDA)
2	Conducted Emission	15.107(a)	B.2	P	CTTL(BDA)

7. Test Equipments Utilized

NO.	Description	TYPE	SERIES NUMBER	MANUFACTURE	CAL DUE DATE	CALIBRATI ON INTERVAL
1	Test Receiver	ESU26	100376	R&S	2023-09-22	1 Year
2	LISN	ENV216	101459	R&S	2023-03-16	1 year
3	Universal Radio Communication Tester	CMW500	159408	R&S	2023-03-01	1 year
4	Universal Radio Communication Tester	CMW500	167943	R&S	2023-04-13	1 year
5	Test Receiver	ESCI	100766	R&S	2023-03-02	1 Year
6	EMI Antenna	VULB 9163	01176	SCHWARZBECK	2022-11-15	1 year
7	EMI Antenna	3115	00167252	ETS-Lindgren	2022-12-26	1 year
8	Software	EMC32	/	R&S	/	/

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 ($\mu\text{V/m}$)		
	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/3MHz	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:

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

Where

G_A : Antenna factor of receive antenna

G_{PL} : Path Loss

P_{Mea} : Measurement result on receiver.

Measurement uncertainty (30MHz-1GHz): $U = 5.73 \text{ dB}$, $k=2$.

Measurement uncertainty ($\geq 1\text{GHz}$): $U = 5.58 \text{ dB}$, $k=2$.

Measurement results for Set.1:

Charing Mode/Average detector

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)
17499.500	38.82	-26.7	40.8	24.76	54.0	15.2	H
16928.000	38.78	-27.2	41.3	24.62	54.0	15.2	V
17501.500	38.74	-26.7	40.8	24.67	54.0	15.3	V
17504.500	38.72	-26.7	40.8	24.66	54.0	15.3	V
17507.000	38.72	-26.7	40.8	24.66	54.0	15.3	V
17483.000	38.72	-26.7	40.8	24.66	54.0	15.3	V

Charging Mode/Peak detector

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)
16642.500	51.5	-27.5	41.1	37.92	74.0	22.5	V
16810.000	51.5	-27.3	41.3	37.46	74.0	22.5	V
16944.000	51.1	-27.1	41.3	37.00	74.0	22.9	V
17550.500	51.1	-26.7	40.7	37.08	74.0	22.9	H
17041.500	51.1	-27.0	41.0	37.08	74.0	22.9	H
17992.500	51.0	-26.1	40.2	36.91	74.0	23.0	H

Measurement results for Set.2:
Charing Mode/Average detector

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)
17508.500	38.51	-26.7	40.8	24.46	54.0	15.5	V
17035.000	38.45	-27.0	41.0	24.46	54.0	15.5	V
17521.500	38.44	-26.7	40.8	24.41	54.0	15.6	V
17500.500	38.40	-26.7	40.8	24.33	54.0	15.6	V
17497.000	38.39	-26.7	40.8	24.32	54.0	15.6	H
17509.000	38.37	-26.7	40.8	24.32	54.0	15.6	H

Charging Mode/Peak detector

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)
16858.000	51.1	-27.2	41.4	36.96	74.0	22.9	V
16866.000	50.9	-27.2	41.4	36.80	74.0	23.1	H
17821.500	50.8	-26.4	40.3	36.98	74.0	23.2	V
17348.500	50.7	-26.8	40.8	36.70	74.0	23.3	V
16795.000	50.6	-27.3	41.3	36.64	74.0	23.4	H
17045.000	50.5	-27.0	41.0	36.55	74.0	23.5	H

Measurement results for Set.3:
USB Mode/Average detector

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)
16815.500	38.58	-27.3	41.3	24.55	54.0	15.4	V
17521.000	38.52	-26.7	40.8	24.49	54.0	15.5	V
17128.500	38.49	-26.9	40.9	24.50	54.0	15.5	V
17517.000	38.46	-26.7	40.8	24.42	54.0	15.5	H
16922.500	38.45	-27.2	41.3	24.28	54.0	15.6	H
17495.000	38.45	-26.7	40.8	24.38	54.0	15.6	H

USB Mode/Peak detector

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)
17493.000	51.6	-26.7	40.8	37.56	74.0	22.4	H
16000.500	51.6	-27.8	40.3	39.02	74.0	22.4	H
16946.000	51.4	-27.1	41.3	37.24	74.0	22.6	H
15939.500	51.3	-27.7	40.3	38.75	74.0	22.7	H
15958.000	51.3	-27.7	40.3	38.67	74.0	22.7	V
17706.000	51.2	-26.6	40.4	37.38	74.0	22.8	V

Measurement results for Set.1:

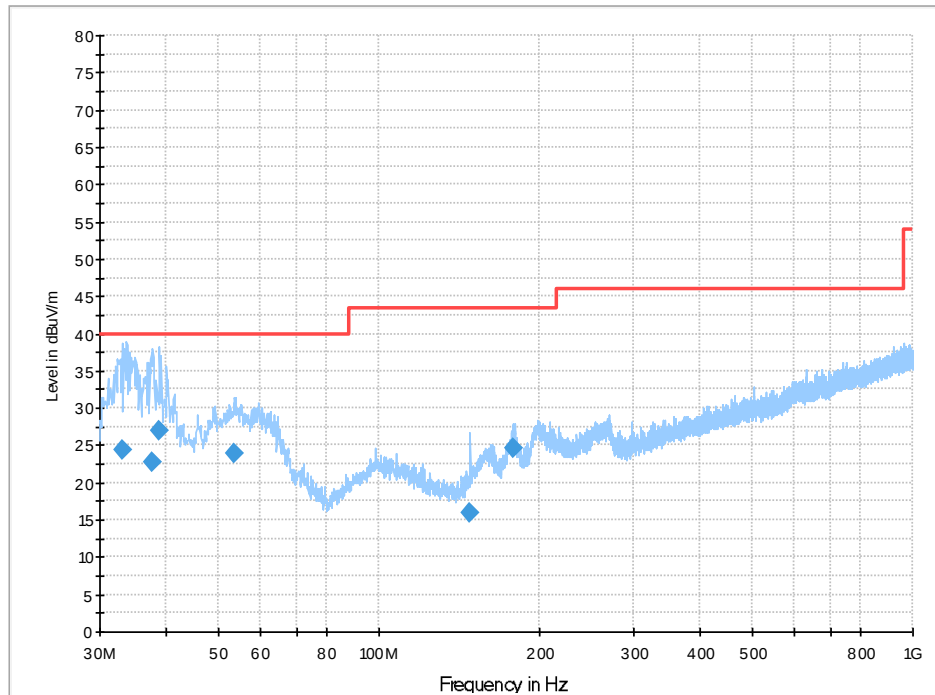


Fig A.1 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
33.104000	24.3	40.0	15.7	113.0	V	135.0
37.663000	22.7	40.0	17.3	100.0	V	45.0
38.730000	27.0	40.0	13.0	100.0	V	82.0
53.668000	24.0	40.0	16.0	113.0	V	51.0
148.437000	15.9	43.5	27.6	100.0	V	45.0
178.701000	24.6	43.5	18.9	113.0	H	225.0

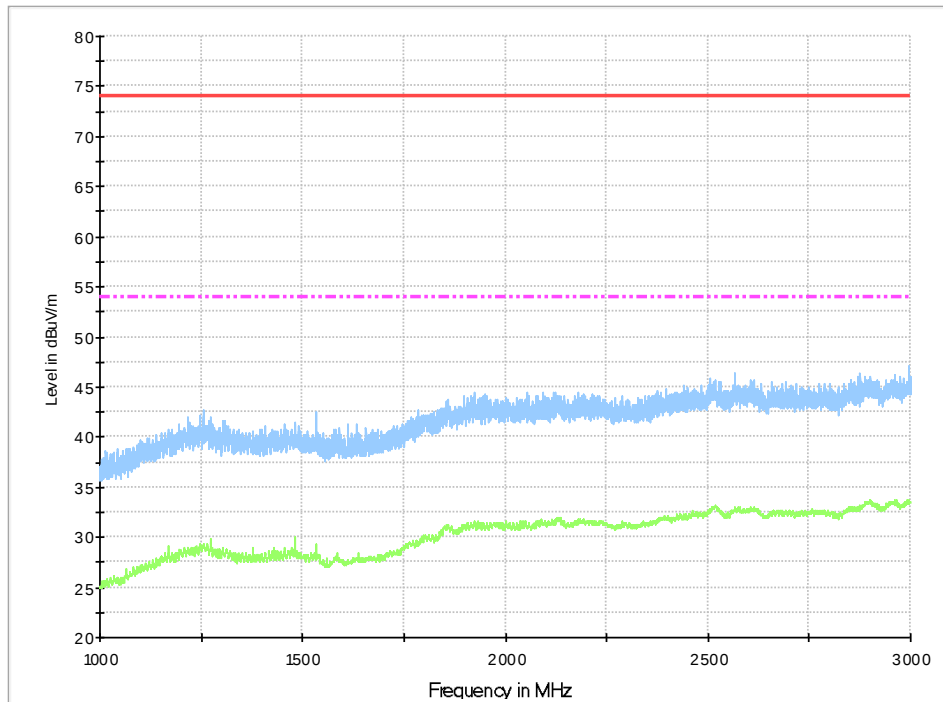


Fig A.2 Radiated Emission from 1GHz to 3GHz

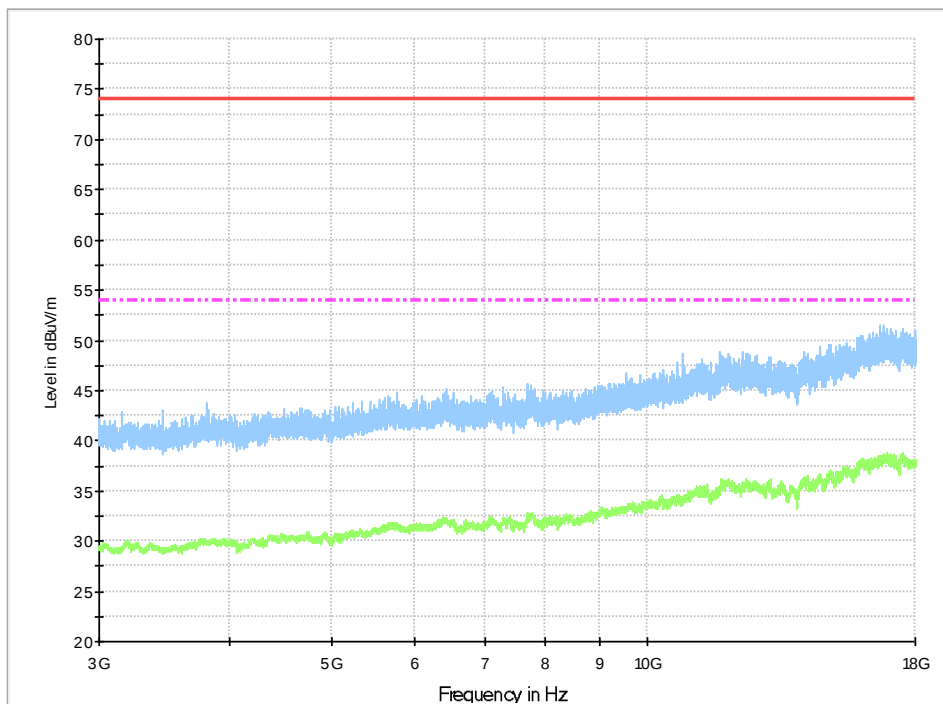


Fig A.3 Radiated Emission from 3GHz to 18GHz

Measurement results for Set.2:

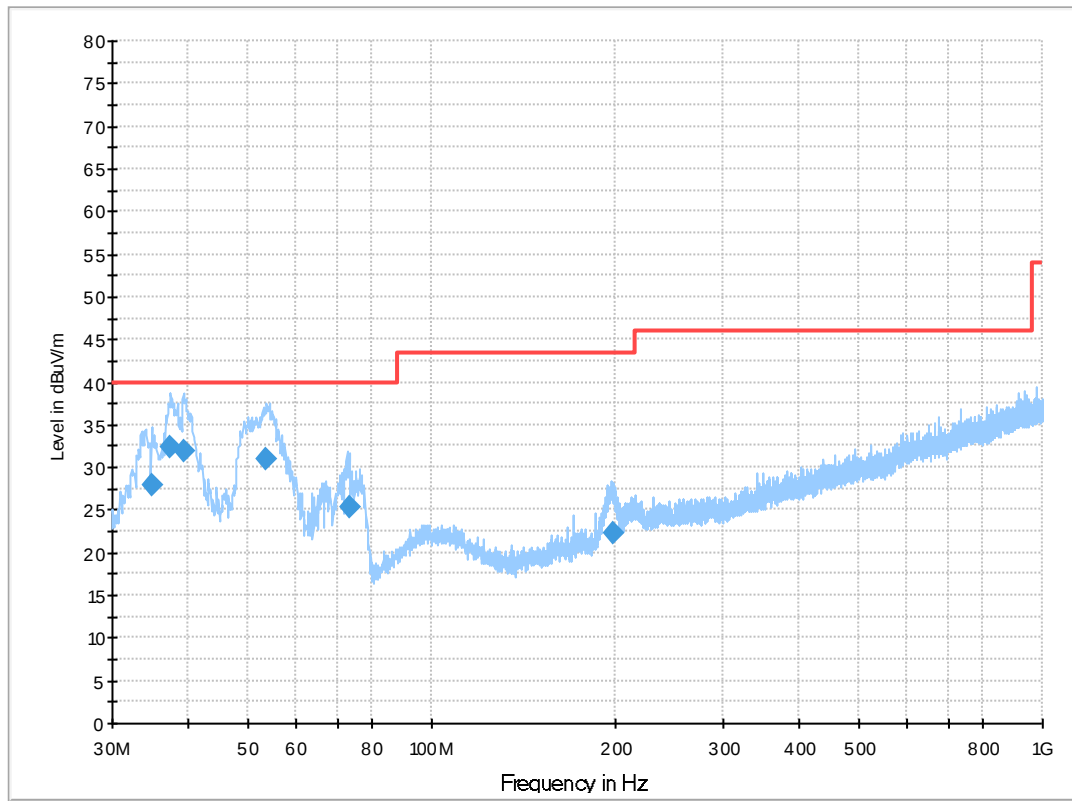


Fig A.4 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
34.753000	27.9	40.0	12.1	100.0	V	-14.0
37.275000	32.4	40.0	7.6	100.0	V	135.0
39.215000	32.0	40.0	8.0	100.0	V	45.0
53.668000	31.0	40.0	9.0	100.0	V	45.0
73.359000	25.2	40.0	14.8	100.0	V	281.0
197.810000	22.3	43.5	21.2	100.0	V	-27.0

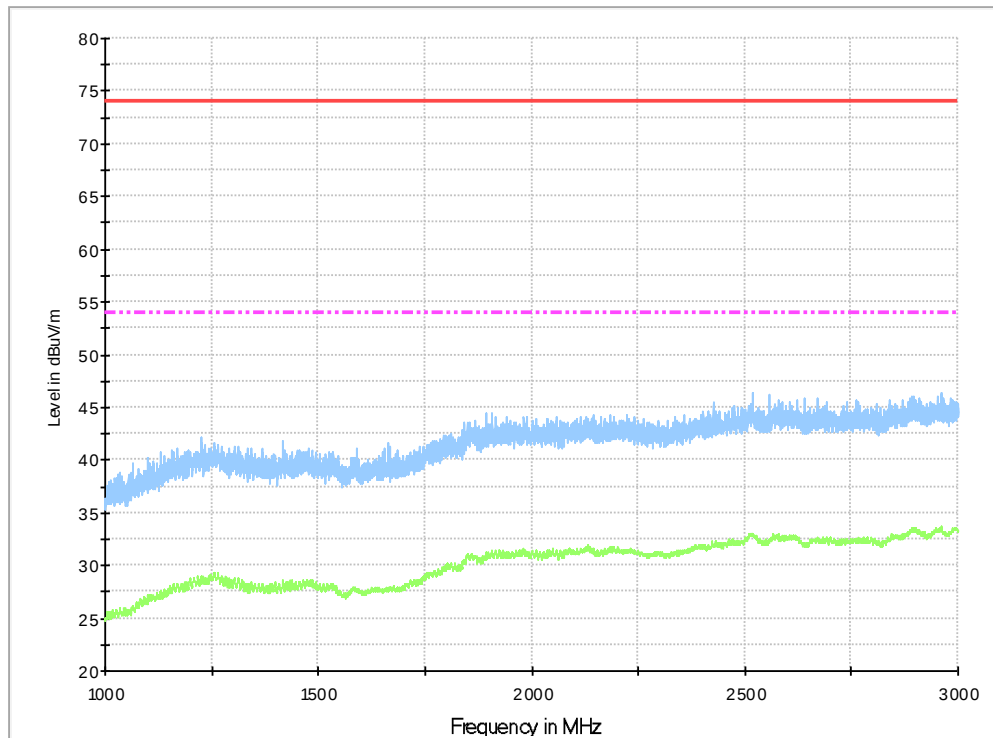


Fig A.5 Radiated Emission from 1GHz to 3GHz

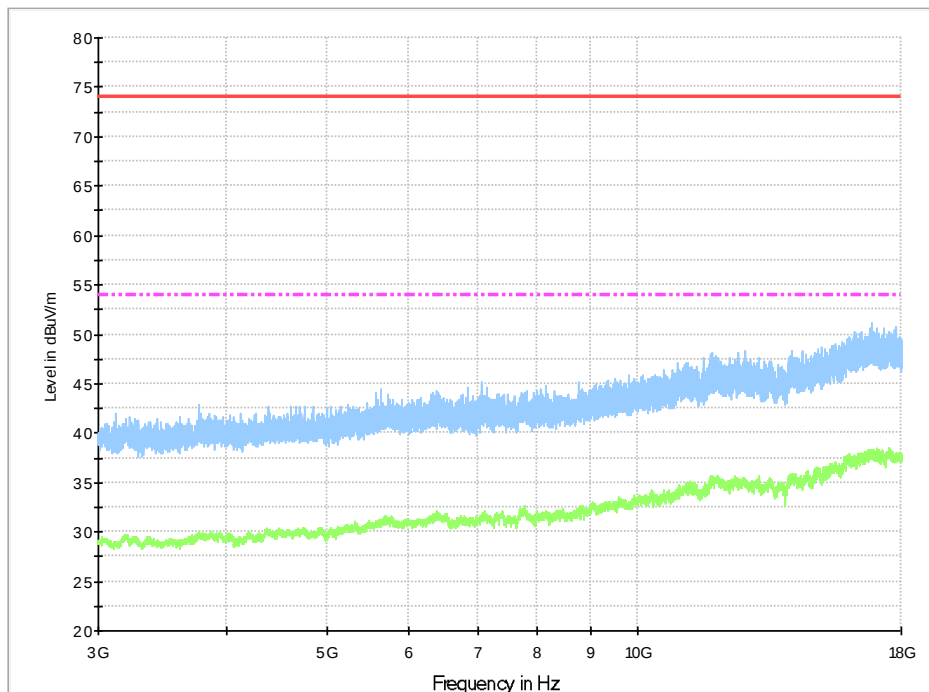


Fig A.6 Radiated Emission from 3GHz to 18GHz

Measurement results for Set.3:

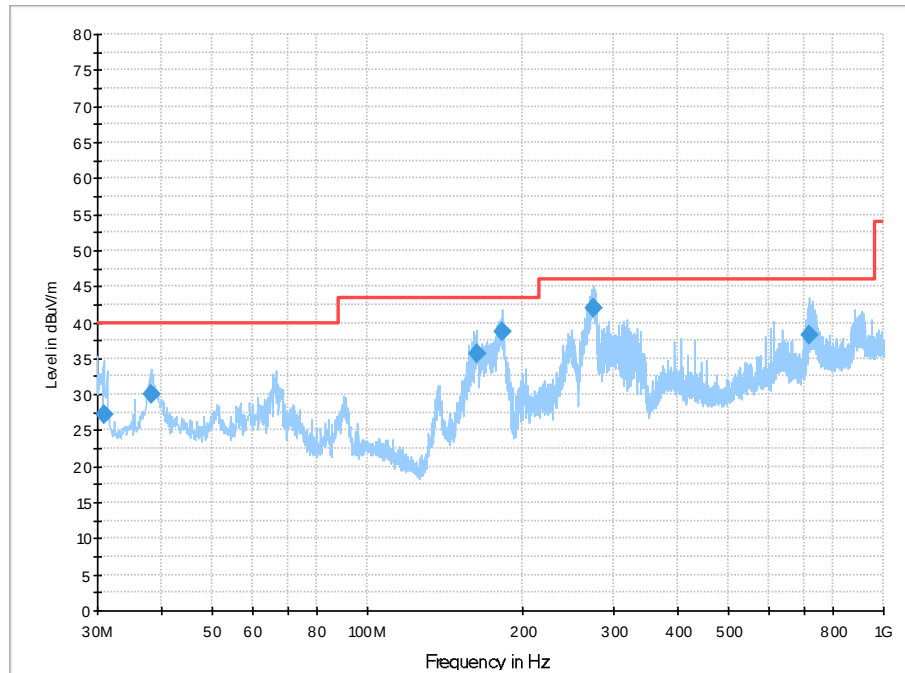


Fig A.7 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
30.873000	27.2	12.8	40.0	100.0	V	205.0
38.051000	30.0	10.0	40.0	100.0	V	180.0
163.181000	35.7	7.8	43.5	125.0	H	153.0
183.066000	38.8	4.7	43.5	100.0	H	135.0
273.179000	42.0	4.0	46.0	100.0	H	115.0
717.924000	38.3	7.7	46.0	125.0	H	90.0

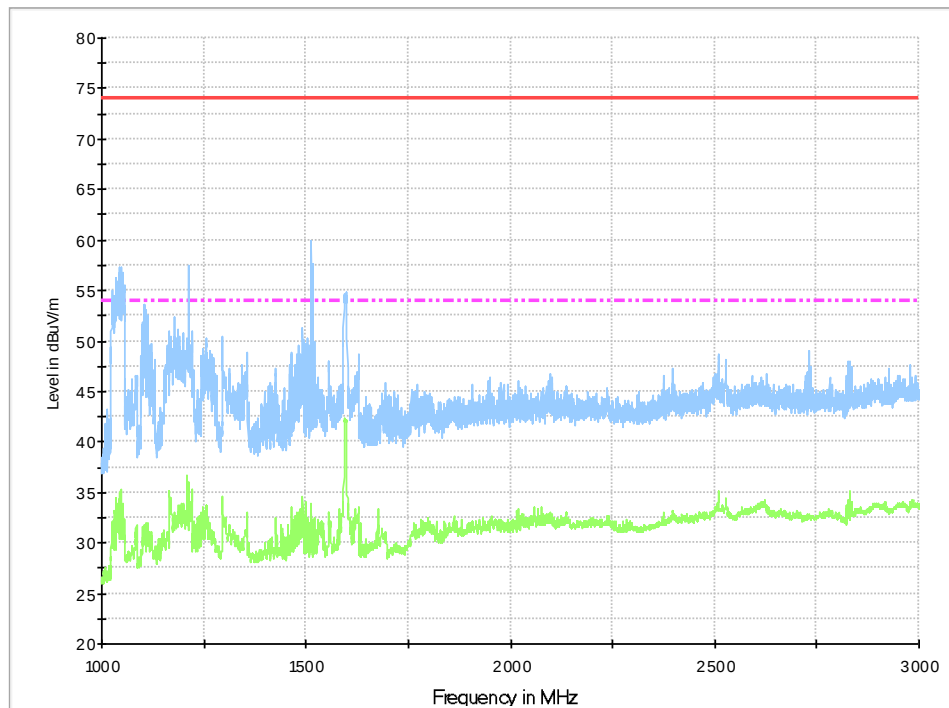


Fig A.8 Radiated Emission from 1GHz to 3GHz

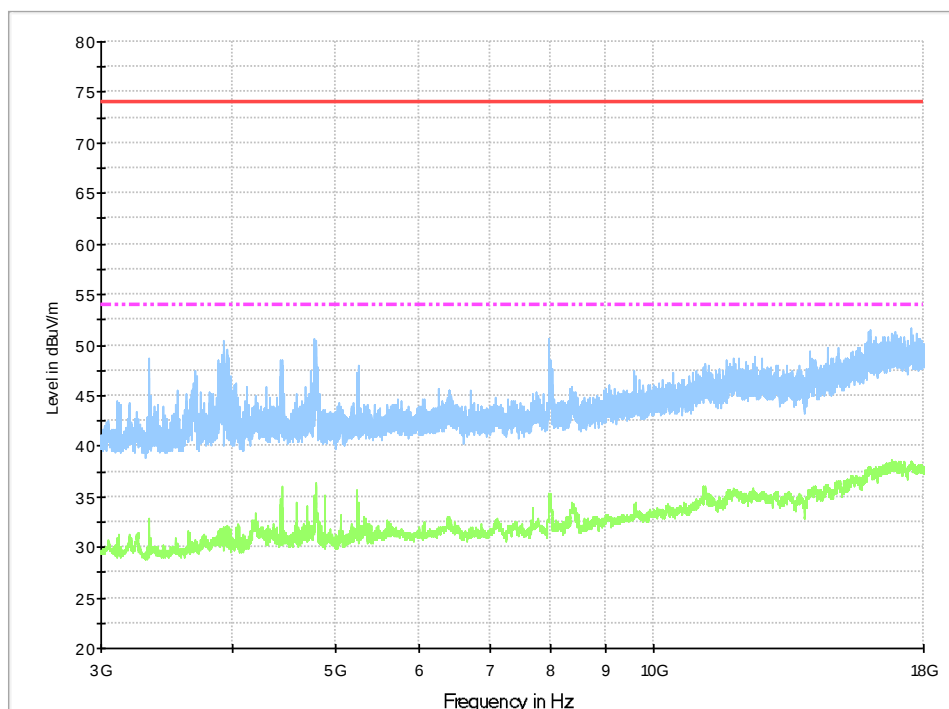


Fig A.9 Radiated Emission from 3GHz to 18GHz

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: $U = 3.1 \text{ dB}$, $k=2$.

Charging Mode, Set.1:

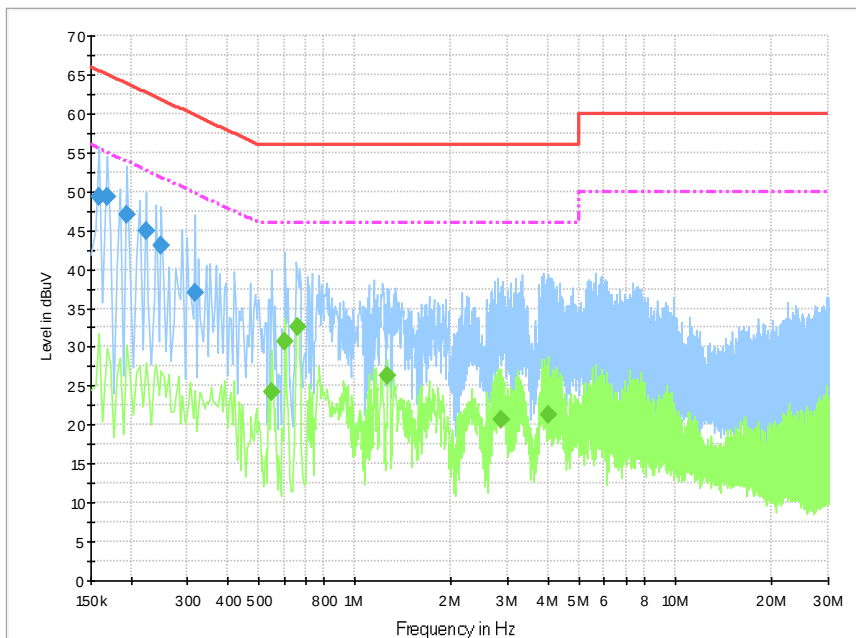


Fig A.10 Conducted Emission from 150kHz to 30MHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.159000	49.3	3000.0	9.000	On	L1	19.9	16.2	65.5	
0.168000	49.3	3000.0	9.000	On	L1	19.9	15.7	65.1	
0.195000	47.1	3000.0	9.000	On	L1	19.7	16.8	63.8	
0.222000	44.9	3000.0	9.000	On	L1	19.8	17.9	62.7	
0.249000	43.0	3000.0	9.000	On	L1	19.8	18.8	61.8	
0.316500	36.9	3000.0	9.000	On	L1	19.8	22.9	59.8	

Final Result 2

Frequency (MHz)	Average (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.550500	24.1	3000.0	9.000	On	L1	19.8	21.9	46.0	
0.604500	30.7	3000.0	9.000	On	L1	19.7	15.3	46.0	
0.663000	32.7	3000.0	9.000	On	L1	19.8	13.3	46.0	
1.266000	26.4	3000.0	9.000	On	L1	19.6	19.6	46.0	
2.854500	20.6	3000.0	9.000	On	N	19.6	25.4	46.0	
4.002000	21.3	3000.0	9.000	On	N	19.6	24.7	46.0	

Charging Mode, Set.2:

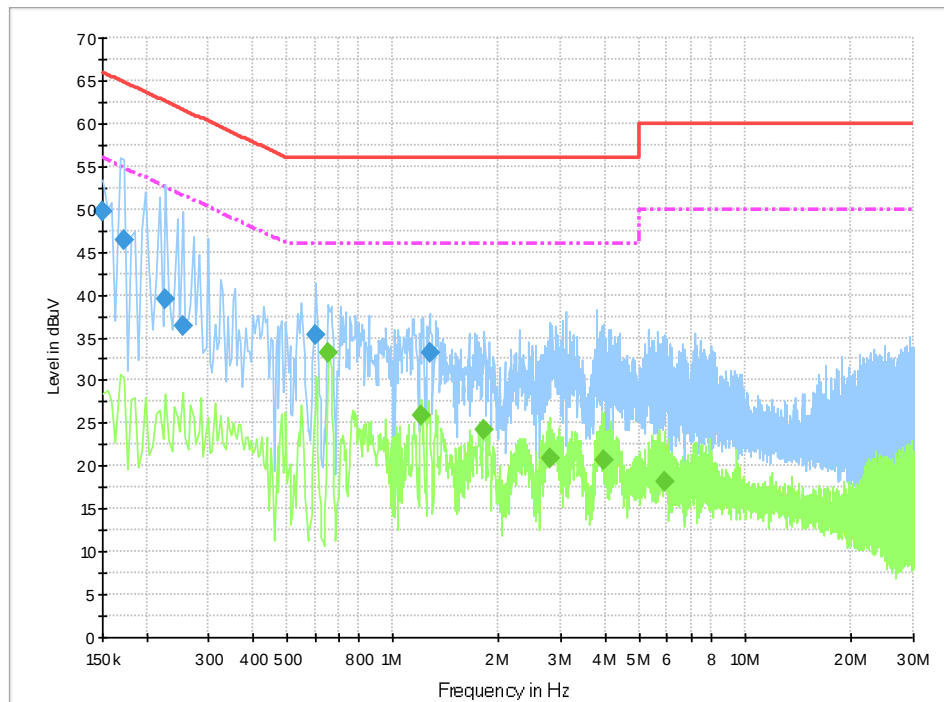


Fig A.11 Conducted Emission from 150kHz to 30MHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.150000	49.7	3000.0	9.000	On	L1	20.0	16.3	66.0	
0.172500	46.4	3000.0	9.000	On	L1	19.9	18.4	64.8	
0.226500	39.6	3000.0	9.000	On	L1	19.8	23.0	62.6	
0.253500	36.4	3000.0	9.000	On	L1	19.8	25.2	61.6	
0.604500	35.2	3000.0	9.000	On	L1	19.7	20.8	56.0	
1.270500	33.2	3000.0	9.000	On	L1	19.6	22.8	56.0	

Final Result 2

Frequency (MHz)	Average (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.658500	33.2	3000.0	9.000	On	L1	19.8	12.8	46.0	
1.207500	25.9	3000.0	9.000	On	L1	19.6	20.1	46.0	
1.815000	24.3	3000.0	9.000	On	L1	19.6	21.7	46.0	
2.791500	20.9	3000.0	9.000	On	N	19.6	25.1	46.0	
3.975000	20.7	3000.0	9.000	On	L1	19.6	25.3	46.0	
5.878500	18.2	3000.0	9.000	On	L1	19.7	31.8	50.0	

USB Mode, Set.3:

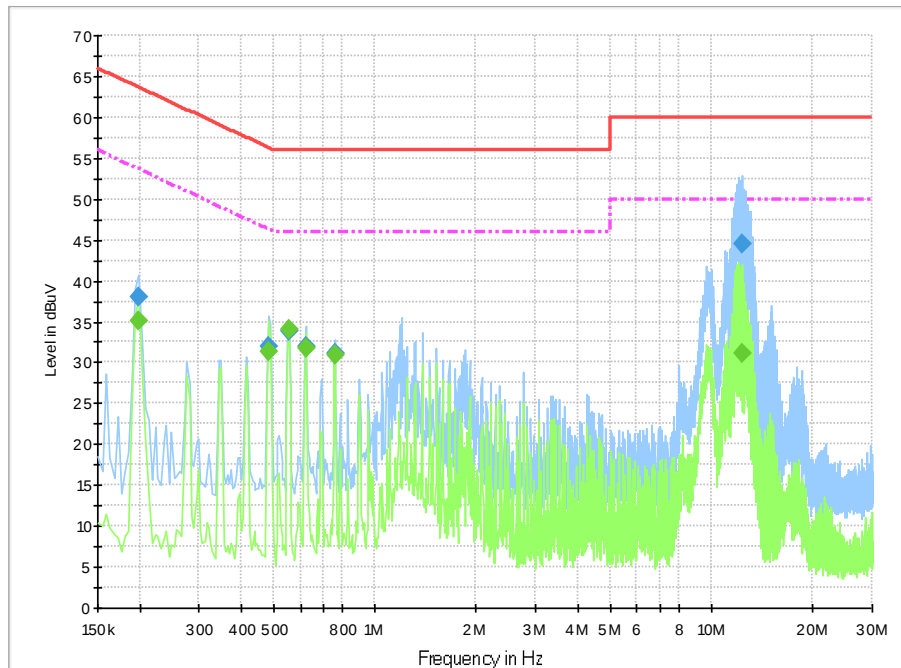


Fig A.12 Conducted Emission from 150kHz to 30MHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.199500	38.0	3000.0	9.000	On	L1	19.7	25.7	63.6	
0.483000	31.9	3000.0	9.000	On	N	19.8	24.4	56.3	
0.555000	33.9	3000.0	9.000	On	N	19.8	22.1	56.0	
0.622500	32.1	3000.0	9.000	On	L1	19.7	24.0	56.0	
0.762000	31.1	3000.0	9.000	On	N	19.7	24.9	56.0	
12.273000	44.6	3000.0	9.000	On	L1	19.8	15.4	60.0	

Final Result 2

Frequency (MHz)	Average (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.199500	35.1	3000.0	9.000	On	N	19.7	18.6	53.6	
0.483000	31.4	3000.0	9.000	On	N	19.8	14.9	46.3	
0.555000	34.1	3000.0	9.000	On	N	19.8	11.9	46.0	
0.622500	31.8	3000.0	9.000	On	N	19.7	14.2	46.0	
0.762000	31.0	3000.0	9.000	On	N	19.7	15.0	46.0	
12.273000	31.1	3000.0	9.000	On	N	19.8	18.9	50.0	

END OF REPORT