



TEST REPORT

No.B17N00162-EMC

for

Huawei Technologies Co.,Ltd.

Smart Watch

Model Name: LEO-DLXXE

FCC ID: QISLEO-DLXX

with

Hardware Version: EA1LEOUM

Software Version: sawshark-userdebug7.1.1NFF47

Issued Date: 2017-02-27

Test Laboratory:

FCC 2.948 Listed: No.342690

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 CTTL.

Test Laboratory:

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REPORT HISTORY

Report Number	Revision	Description	Issue Date
B17N00162-EMC	Rev.0	1st edition	2017-02-27



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1. Test Laboratory

1.1. Testing Location

Address: TCL International E city No. 1001 Zhongshanyuan Road, Nanshan District, Shenzhen, Guangdong, China
Postal Code: 518048
Telephone: +86(755)33322000
Fax: +86(755)33322001

1.2. Testing Environment

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

1.3. Project data

Testing Start Date: 2017-02-23
Testing End Date: 2017-02-24

1.4. Signature

Du Zhaoxuan

(Prepared this test report)

Zhang Yunzhuan

(Reviewed this test report)

Cao Junfei

Director of the laboratory
(Approved this test report)



2. Client Information

2.1. Applicant Information

Company Name: Huawei Technologies Co.,Ltd.
Address: Administration Building, Headquarters of Huawei Technologies Co.,
Ltd., Bantian, Longgang District Shenzhen China

2.2. Manufacturer Information

Company Name: Huawei Technologies Co.,Ltd.
Address: Administration Building, Headquarters of Huawei Technologies Co.,
Ltd., Bantian, Longgang District Shenzhen China

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

3.1. About EUT

Description	Smart Watch
Model Name	LEO-DLXXE
FCC ID	QISLEO-DLXX

The Equipment Under Test (EUT) are a model of Smart Watch with integrated antenna.

The EUT supports GPRS service and EGPRS service. It has MP3, Bluetooth and WLAN functions.

Remark: The above EUT's information is declared by manufacturer. Please refer to the specifications or user's manual for more detailed information.

Note: According to client's description, The EUT and the computer does not transfer data.

3.2. Internal Identification of EUT

EUT ID*	SN or IMEI
EUT1	5GS0116C06000124

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

3.3. Internal Identification of AE

AE ID*	Description	SN
AE1	Battery	/
AE2	Travel charger	/
AE3	charge dock	/
AE1		
Model	HB512627ECW	
Manufacturer	Huizhou Desay Battery Co., Ltd.	
Capacitance	410mAh	
Nominal Voltage	3.82V	
AE2-1		
Model	HW-050100U01	
Manufacturer	DONGGUAN PHITEK ELECTRONICS CO.,LTD.	
SN	P77901GB321957	
AE2-2		
Model	HW-050100U01	
Manufacturer	SHENZHEN HUNTKEY ELECTRONIC CO.,LTD.	
SN	H779K6G1M37948	
AE2-3		
Model	HW-050100U01	
Manufacturer	HUIZHOU BYD ELECTRONIC CO., LTD.	
SN	B77904G9M00168	



AE3

Model

Leo-Cradle

Manufacturer

Huawei Technologies Co.,Ltd.

*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 + AE2-1+ AE3	Charging mode
Set.2	EUT1+ AE1 + AE2-2+ AE3	Charging mode
Set.3	EUT1+ AE1 + AE2-3+ AE3	Charging mode

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	10-1-2015 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:

Temperature	Min. = 15 °C, Max. = 30 °C
Relative humidity	Min. = 35 %, Max. = 60 %
Shielding effectiveness	0.014MHz-1MHz,>60dB; 1MHz-18000MHz,>90dB
Electrical insulation	> 2MΩ
Ground system resistance	< 4 Ω
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. =35 %, Max. = 60 %
Shielding effectiveness	0.014MHz-1MHz,>60dB; 1MHz-10000MHz,>90dB
Electrical insulation	> 2MΩ
Ground system resistance	< 4 Ω

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

Temperature	Min. = 15 °C, Max. = 30 °C
Relative humidity	Min. = 35 %, Max. = 60 %
Shielding effectiveness	0.014MHz-1MHz,>60dB; 1MHz-18000MHz,>90dB
Electrical insulation	> 2MΩ
Ground system resistance	< 4 Ω
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 3000 MHz



6. SUMMARY OF TEST 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)	A.2	P



7. Test Facilities Utilized

NO.	NAME	TYPE	SERIES NUMBER	PRODUCER	CAL DUE DATE	CAL PERIOD
1.	Test Receiver	ESCI	100701	R&S	2017.08.09	1 year
2.	Test Receiver	ESR7	101675	R&S	2017.07.21	1 year
3.	Spectrum Analyzer	FSP 40	100378	R&S	2017.12.15	1 year
4.	BiLog Antenna	VULB9163	9163 330	Schwarzbeck	2017.04.22	3 years
5.	Horn Antenna	3117	00066585	ETS-Lindgren	2019.03.05	3 Years
6.	LISN	ESH2-Z5	100196	R&S	2018.01.05	1 year
7.	Universal Radio Communication Tester	E5515C	GB44051324	Agilent	2017.05.18	1 year
8.	Chamber	FACT5-2.0	4166	ETS-Lindgren	2018.05.13	3 years

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 (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 - 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:

The MS is operating in the charging mode. During the test MS is connected to a charger in the case of charging mode.

A.1.3 Measurement Limit

Limit from CFR Part 15.109(a)

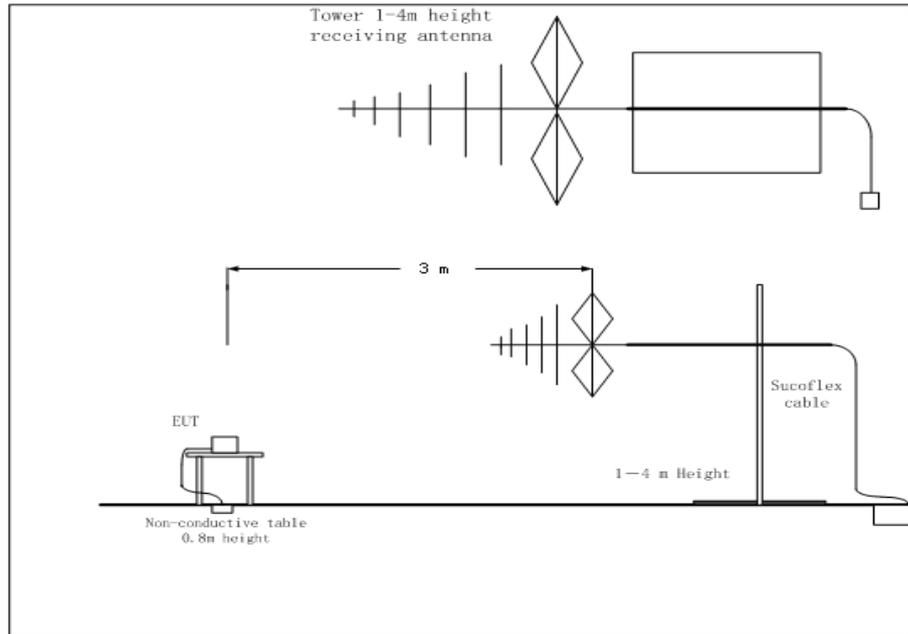
Frequency range (MHz)	Field strength limit ($\mu\text{V}/\text{m}$)		
	Quasi-peak	Average	Peak
30-88	100		
88-216	150		
216-960	200		
960-1000	500		
>1000		500	5000

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

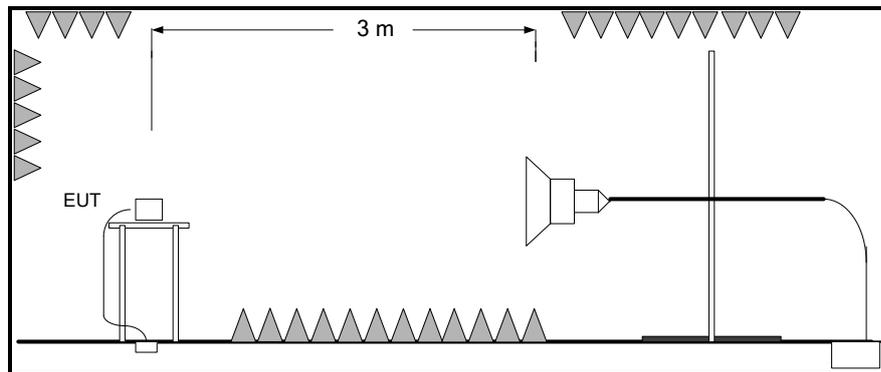
A.1.4 Test Condition

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

**A.1.5 Test 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.

Note: the result contains vertical part and Horizontal part

RE Measurement uncertainty: 30M-1GHz: 5.12dB (k=2);
1GHz-18GHz: 4.48 dB (k=2)

Set.1 Charging mode / Peak detector

Frequency(MHz)	Result(dBuV/m)	Limit (dB μ V/m)	Margin(dB)	Polarity	A_{Rpl} (dB)	P_{Mea} (dB μ V)
16705.000000	50.21	74.00	23.79	V	16.3	33.91
16895.500000	48.77	74.00	25.23	V	16.3	32.47
17031.000000	49.79	74.00	24.21	H	16.2	33.59
17118.000000	49.43	74.00	24.57	V	16.3	33.13
17285.000000	49.39	74.00	24.61	H	16.4	32.99
17442.000000	49.92	74.00	24.08	V	16.7	33.22

Set.1 Charging mode / Average detector

Frequency(MHz)	Result(dBuV/m)	Limit (dB μ V/m)	Margin(dB)	Polarity	A_{Rpl} (dB)	P_{Mea} (dB μ V)
16727.000000	44.87	54.00	9.13	V	16.2	28.67
16895.500000	44.08	54.00	9.92	V	16.3	27.78
17074.000000	44.11	54.00	9.89	H	16.3	27.81
17242.500000	43.80	54.00	10.20	V	16.2	27.6
17433.000000	44.03	54.00	9.97	H	16.6	27.43
17572.000000	44.02	54.00	9.98	V	17.0	27.02

Set.2 Charging mode / Peak detector

Frequency(MHz)	Result(dBuV/m)	Limit (dB μ V/m)	Margin(dB)	Polarity	A _{Rpl} (dB)	P _{Mea} (dB μ V)
16849.500000	49.89	74.00	24.11	H	16.3	33.59
17078.000000	50.21	74.00	23.79	H	16.2	34.01
17154.000000	49.92	74.00	24.08	V	16.4	33.52
17279.500000	49.73	74.00	24.27	V	16.3	33.43
17373.500000	49.57	74.00	24.43	V	16.4	33.17
17586.500000	50.53	74.00	23.47	V	16.8	33.73

Set.2 Charging mode / Average detector

Frequency(MHz)	Result(dBuV/m)	Limit (dB μ V/m)	Margin(dB)	Polarity	A _{Rpl} (dB)	P _{Mea} (dB μ V)
16855.500000	43.86	54.00	10.14	V	16.3	27.56
17078.500000	43.58	54.00	10.42	H	16.2	27.38
17208.500000	44.35	54.00	9.65	V	16.2	28.15
17318.000000	43.91	54.00	10.09	H	16.4	27.51
17372.000000	43.61	54.00	10.39	V	16.4	27.21
17569.500000	43.89	54.00	10.11	V	17.0	26.89

Set.3 Charging mode / Peak detector

Frequency(MHz)	Result(dBuV/m)	Limit (dB μ V/m)	Margin(dB)	Polarity	A _{Rpl} (dB)	P _{Mea} (dB μ V)
15912.000000	49.41	74.00	24.59	V	14.9	34.51
16316.000000	50.06	74.00	23.94	V	15.2	34.86
16522.500000	48.92	74.00	25.08	H	15.8	33.12
16710.500000	49.62	74.00	24.38	H	16.4	33.22
17006.500000	49.32	74.00	24.68	V	16.5	32.82
17151.500000	50.14	74.00	23.86	V	16.4	33.74

Set.3 Charging mode / Average detector

Frequency(MHz)	Result(dBuV/m)	Limit (dB μ V/m)	Margin(dB)	Polarity	A _{Rpl} (dB)	P _{Mea} (dB μ V)
15921.000000	42.92	54.00	11.08	V	14.9	28.02
16303.000000	43.46	54.00	10.54	V	15.3	28.16
16491.500000	43.70	54.00	10.30	V	15.7	28
16754.000000	43.57	54.00	10.43	H	16.1	27.47
16984.000000	43.99	54.00	10.01	V	16.5	27.49
17138.500000	43.53	54.00	10.47	H	16.1	27.43

Charging mode: Set 1

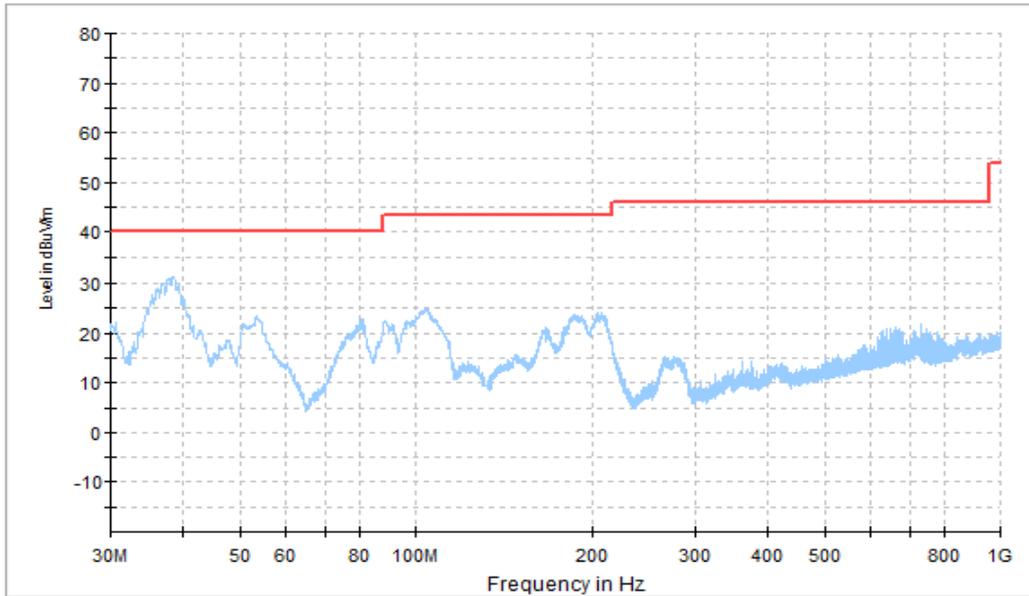


Figure A.1 Radiated Emission from 30MHz to 1GHz

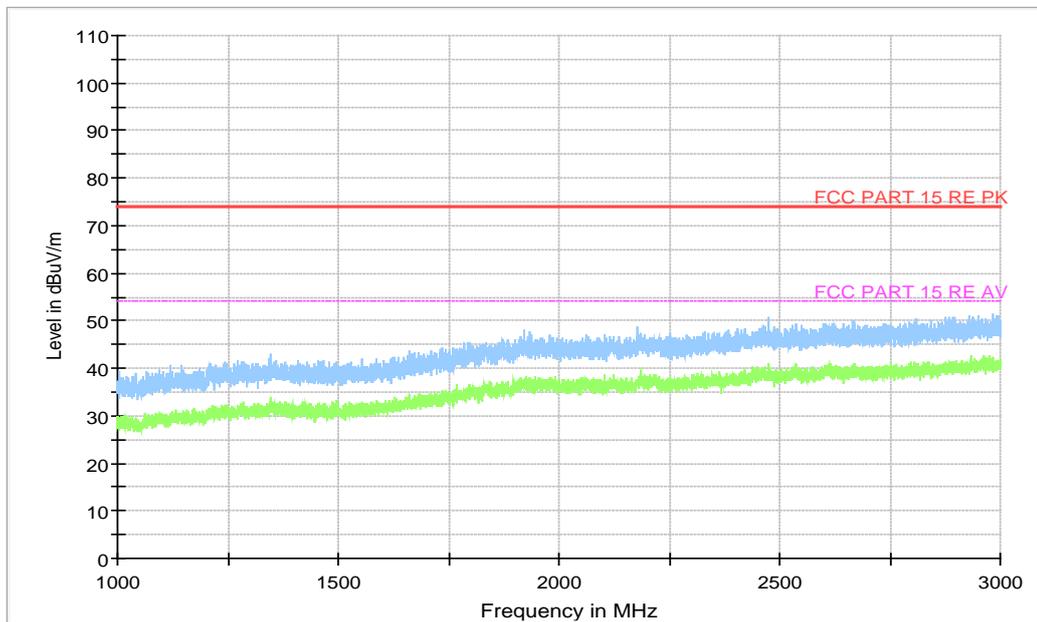


Figure A.2 Radiated Emission from 1GHz to 3GHz

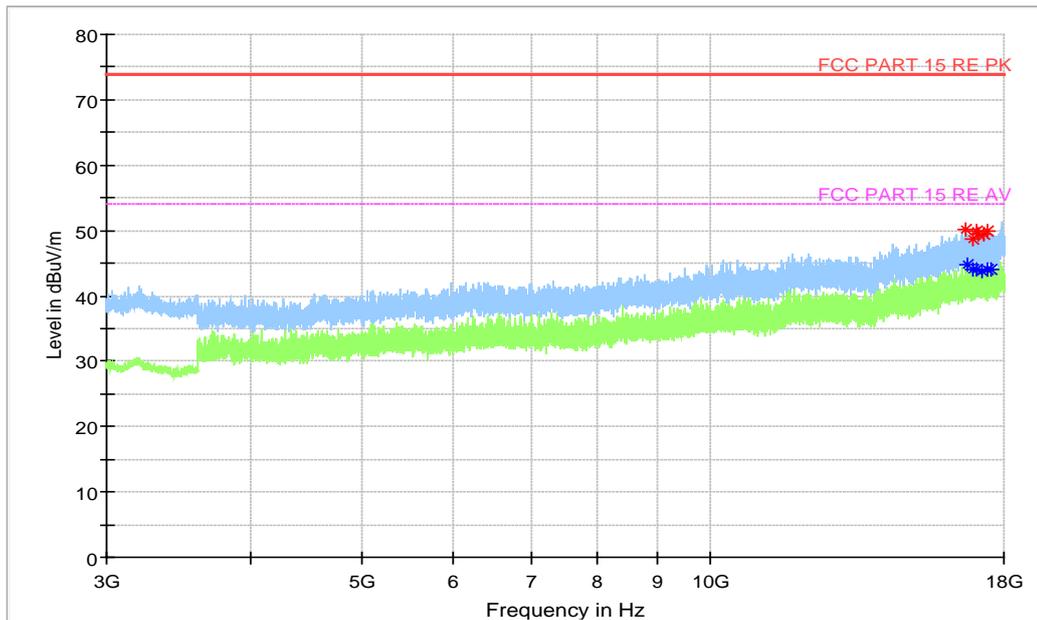


Figure A.3 Radiated Emission from 3GHz to 18GHz

Charging mode: Set 2

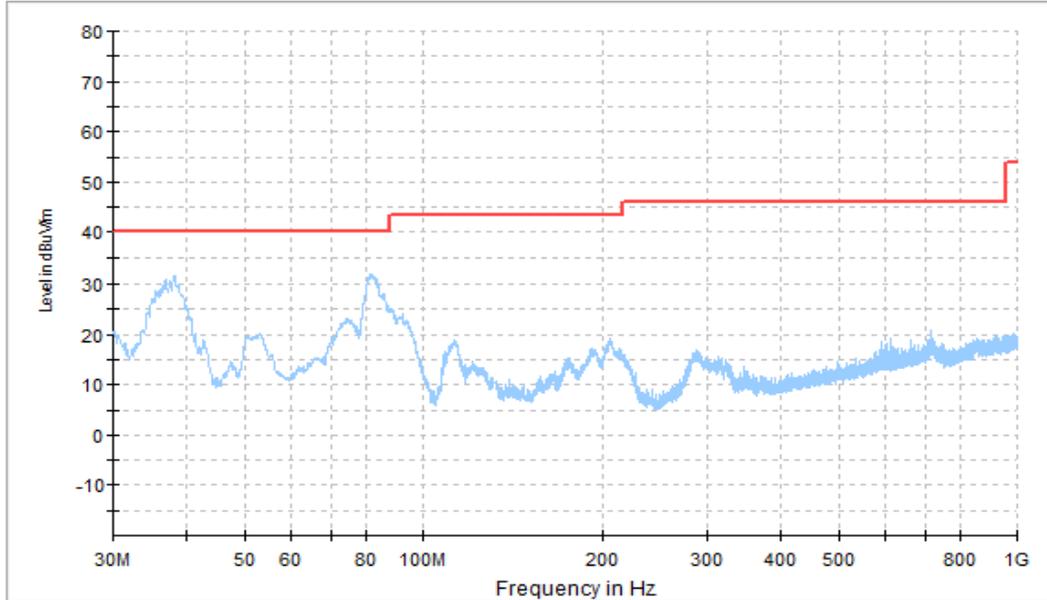


Figure A.4 Radiated Emission from 30MHz to 1GHz

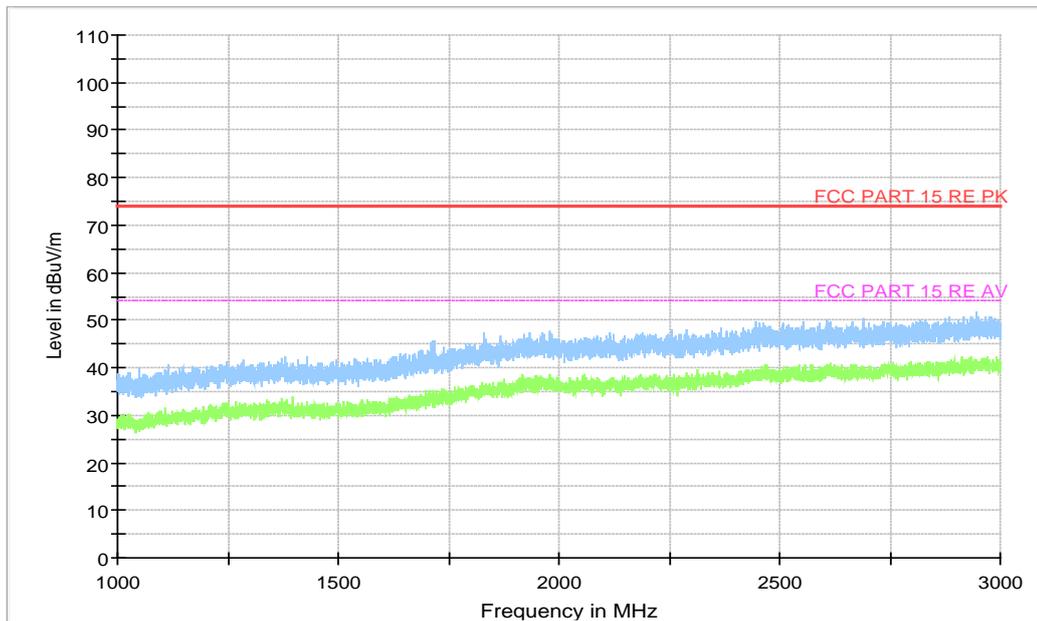


Figure A.5 Radiated Emission from 1GHz to 3GHz

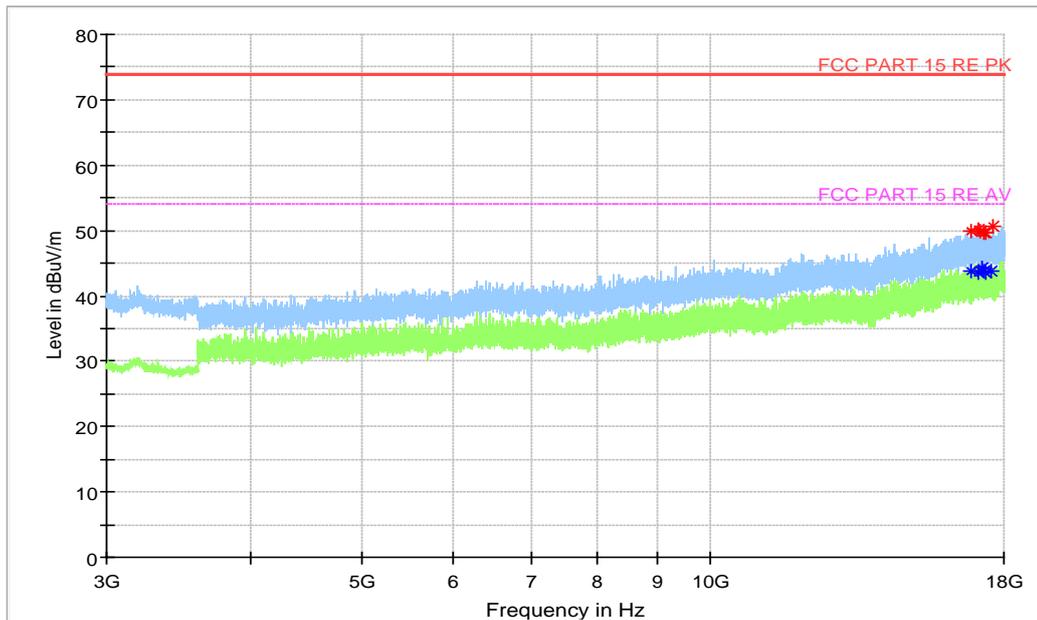


Figure A.6 Radiated Emission from 3GHz to 18GHz

Charging mode: Set 3

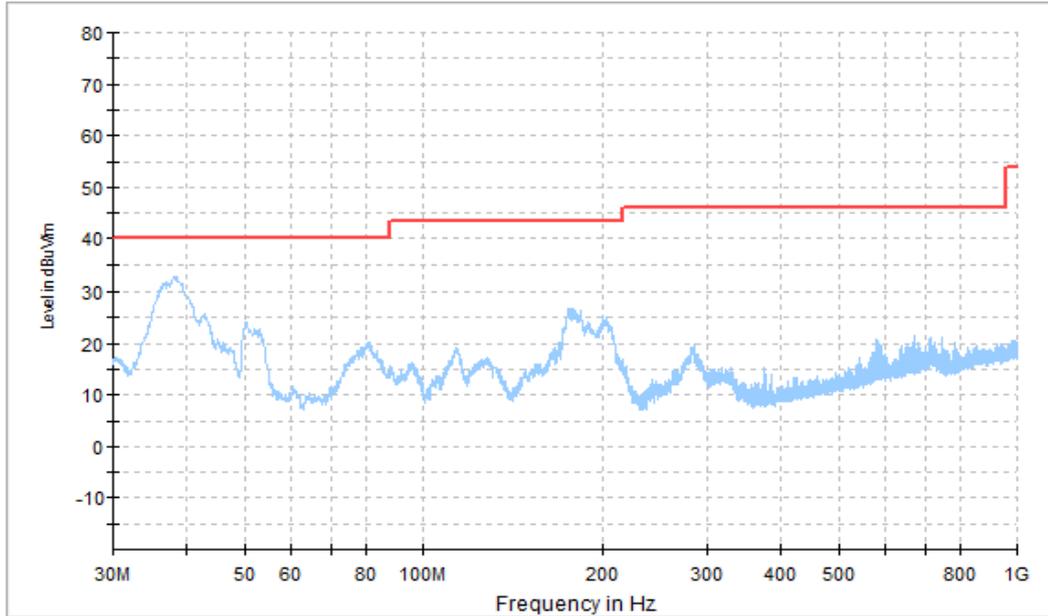


Figure A.7 Radiated Emission from 30MHz to 1GHz

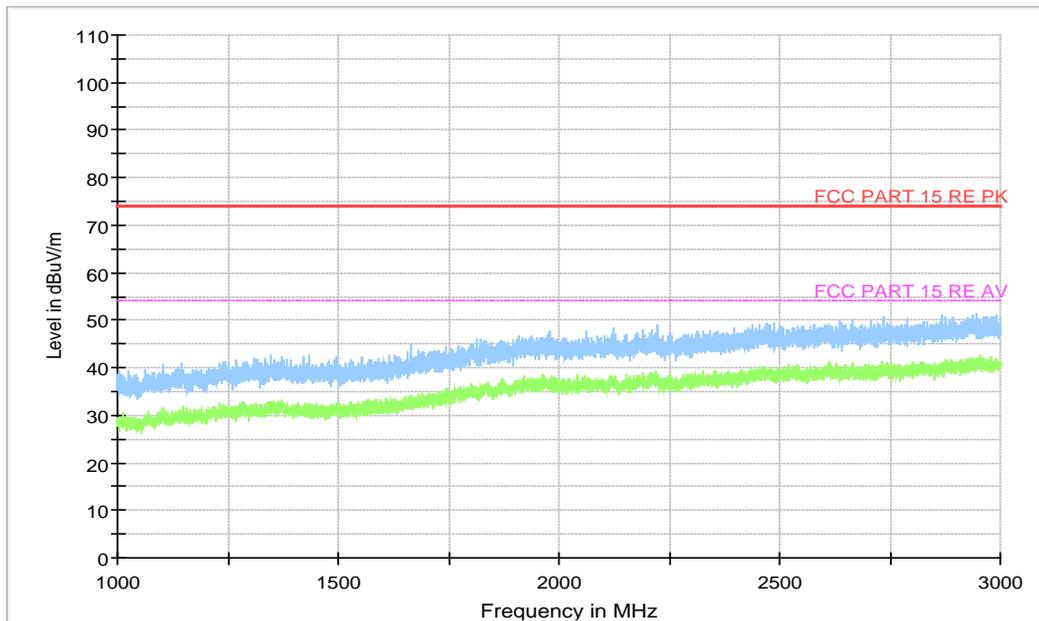


Figure A.8 Radiated Emission from 1GHz to 3GHz

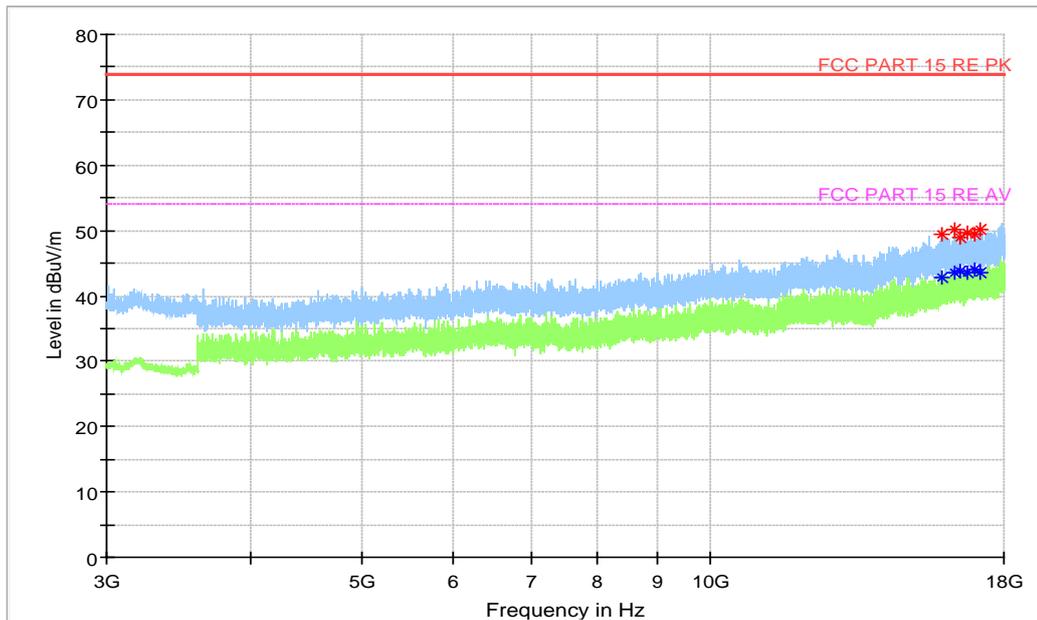


Figure A.9 Radiated Emission from 3GHz to 18GHz

A.2 Conducted Emission (§15.107(a))

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:

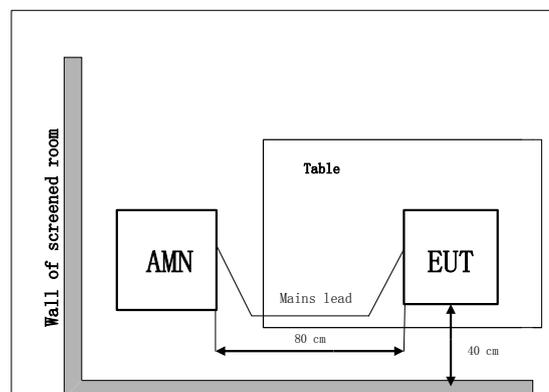
The MS is operating in the charging mode. During the test MS is connected to a charger in the case of charging mode.

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 set-up:



A.2.5 Test Condition in charging mode

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

RBW	Sweep Time(s)
9kHz	1

CE Measurement uncertainty: 3.06 dB (k=2)

A.2.6 Measurement Results
Charging mode:Set.1
Voltage:120V

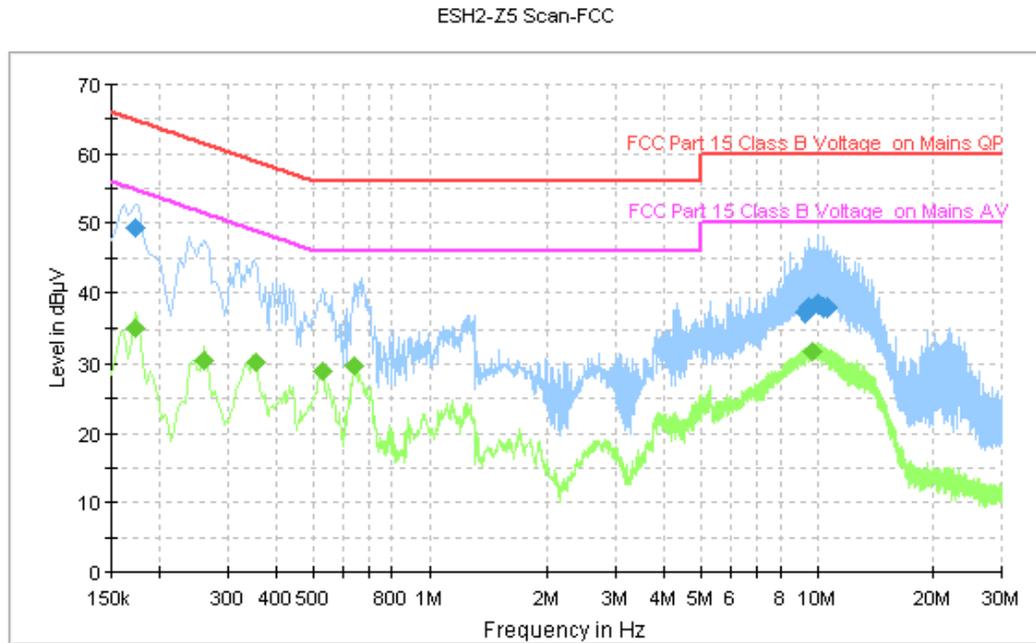


Figure A.10 Conducted Emission

Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.174000	49.2	GND	N	9.6	15.5	64.8
9.282000	37.2	GND	N	9.8	22.8	60.0
9.474000	37.9	GND	N	9.9	22.1	60.0
10.070000	38.4	GND	N	9.8	21.6	60.0
10.366000	38.0	GND	N	9.9	22.0	60.0
10.558000	38.0	GND	N	9.9	22.0	60.0

Final Measurement Detector 2

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.174000	35.2	GND	N	9.6	19.6	54.8
0.262000	30.5	GND	N	9.6	20.9	51.4
0.354000	30.1	GND	N	9.6	18.8	48.9
0.530000	28.9	GND	N	9.7	17.1	46.0
0.642000	29.8	GND	N	9.6	16.2	46.0
9.718000	31.9	GND	N	9.9	18.1	50.0

Charging mode: Set.2
Voltage: 120V

ESH2-Z5 Scan-FCC

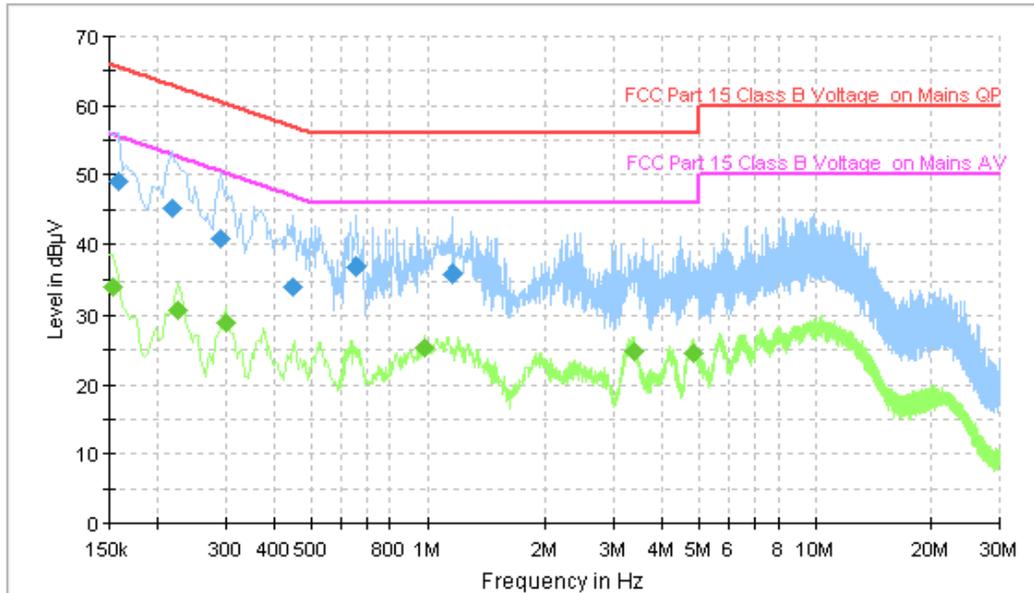


Figure A.11 Conducted Emission

Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.158000	49.0	GND	N	9.6	16.6	65.6
0.218000	45.1	GND	N	9.6	17.8	62.9
0.290000	40.7	GND	N	9.6	19.8	60.5
0.446000	34.1	GND	N	9.7	22.9	56.9
0.654000	37.0	GND	N	9.6	19.0	56.0
1.166000	36.0	GND	N	9.5	20.0	56.0

Final Measurement Detector 2

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.154000	34.0	GND	N	9.6	21.8	55.8
0.226000	30.7	GND	N	9.6	21.9	52.6
0.302000	28.8	GND	N	9.6	21.4	50.2
0.982000	25.4	GND	N	9.6	20.6	46.0
3.410000	24.7	GND	N	9.6	21.3	46.0
4.838000	24.7	GND	N	9.6	21.3	46.0

Charging mode: Set.3
Voltage: 120V

ESH2-Z5 Scan-FCC

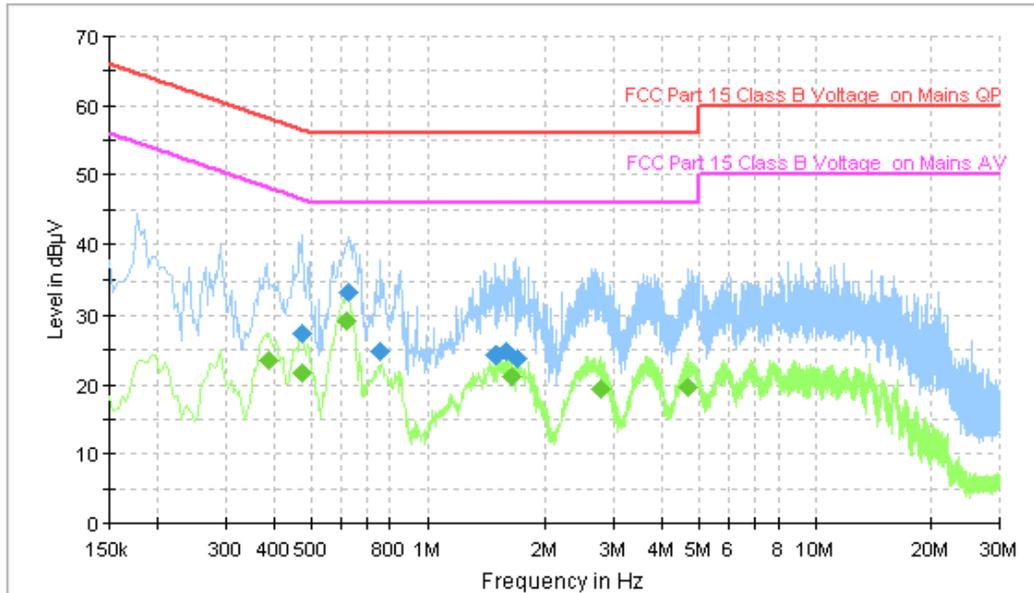


Figure A.12 Conducted Emission

Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.474000	27.4	GND	N	9.7	29.0	56.4
0.626000	33.4	GND	N	9.6	22.6	56.0
0.758000	24.7	GND	N	9.6	31.3	56.0
1.490000	24.3	GND	N	9.6	31.7	56.0
1.586000	24.9	GND	N	9.6	31.1	56.0
1.682000	23.8	GND	N	9.5	32.2	56.0

Final Measurement Detector 2

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.390000	23.5	GND	N	9.6	24.6	48.1
0.474000	21.6	GND	N	9.7	24.8	46.4
0.618000	29.2	GND	N	9.6	16.8	46.0
1.630000	21.1	GND	N	9.6	24.9	46.0
2.786000	19.3	GND	N	9.6	26.7	46.0
4.670000	19.7	GND	N	9.6	26.3	46.0

Charging mode:Set.1
Voltage:240V

ESH2-Z5 Scan-FCC

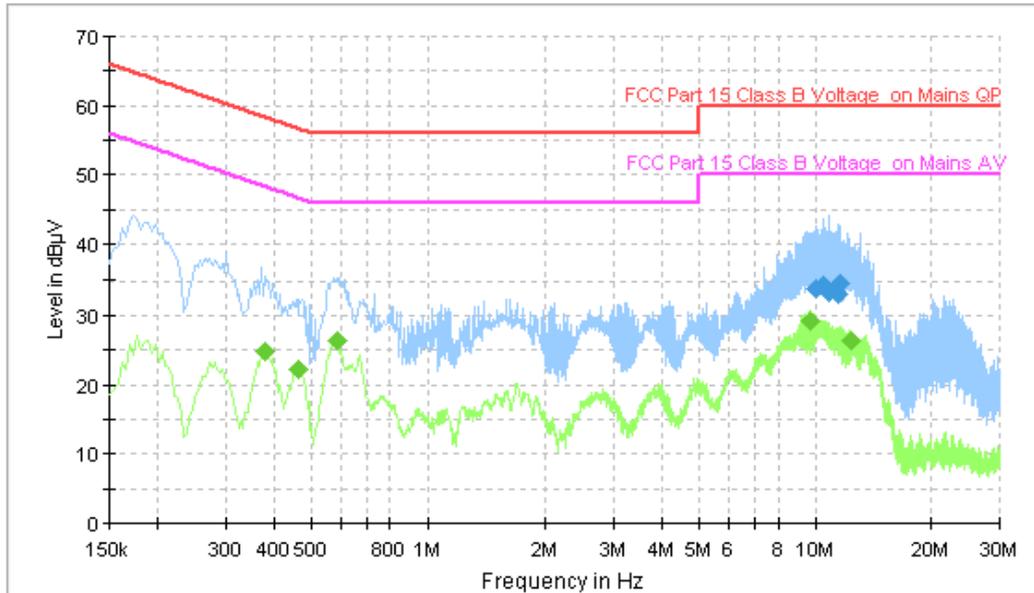


Figure A.13 Conducted Emission

Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
10.078000	33.8	GND	N	9.8	26.2	60.0
10.546000	34.2	GND	N	9.9	25.8	60.0
10.646000	34.1	GND	N	9.9	25.9	60.0
10.842000	33.3	GND	N	9.9	26.7	60.0
11.502000	33.1	GND	N	9.9	26.9	60.0
11.526000	34.6	GND	N	9.9	25.4	60.0

Final Measurement Detector 2

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.378000	24.7	GND	N	9.6	23.6	48.3
0.466000	22.3	GND	N	9.7	24.3	46.6
0.582000	26.3	GND	N	9.6	19.7	46.0
9.658000	29.1	GND	N	9.9	20.9	50.0
9.758000	29.1	GND	N	9.9	20.9	50.0
12.450000	26.4	GND	N	9.9	23.6	50.0

Charging mode: Set.2
Voltage: 240V

ESH2-Z5 Scan-FCC

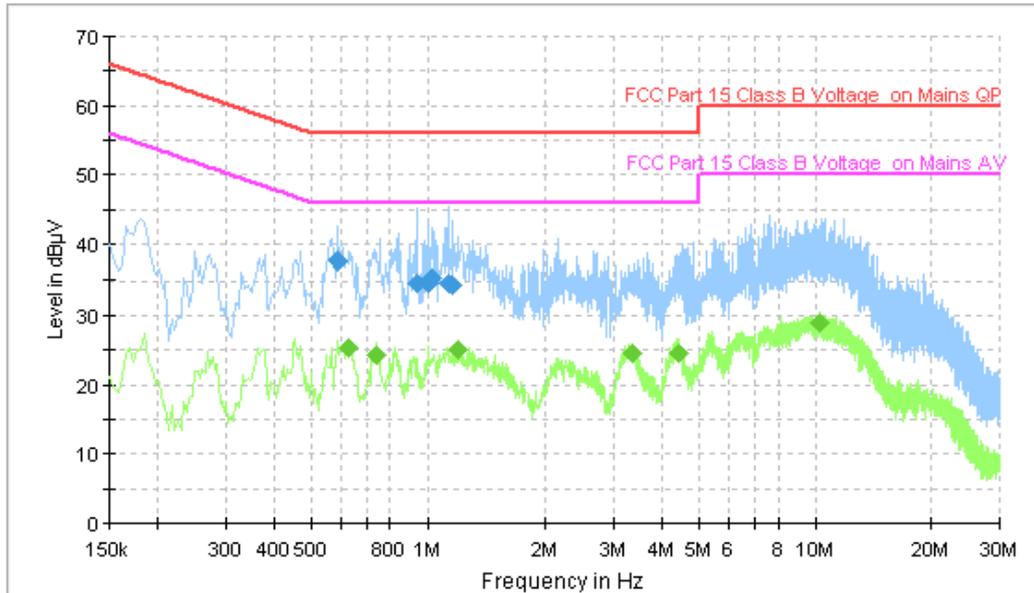


Figure A.14 Conducted Emission

Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.582000	37.8	GND	N	9.6	18.2	56.0
0.938000	34.6	GND	N	9.6	21.4	56.0
1.002000	34.5	GND	N	9.5	21.5	56.0
1.030000	35.4	GND	N	9.5	20.6	56.0
1.130000	34.7	GND	N	9.6	21.3	56.0
1.162000	34.5	GND	N	9.5	21.5	56.0

Final Measurement Detector 2

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.626000	25.2	GND	N	9.6	20.8	46.0
0.734000	24.3	GND	N	9.5	21.7	46.0
1.202000	25.0	GND	N	9.5	21.0	46.0
3.362000	24.5	GND	N	9.6	21.5	46.0
4.414000	24.6	GND	N	9.6	21.4	46.0
10.262000	28.9	GND	N	9.9	21.1	50.0

Charging mode: Set.3
Voltage: 240V

ESH2-Z5 Scan-FCC

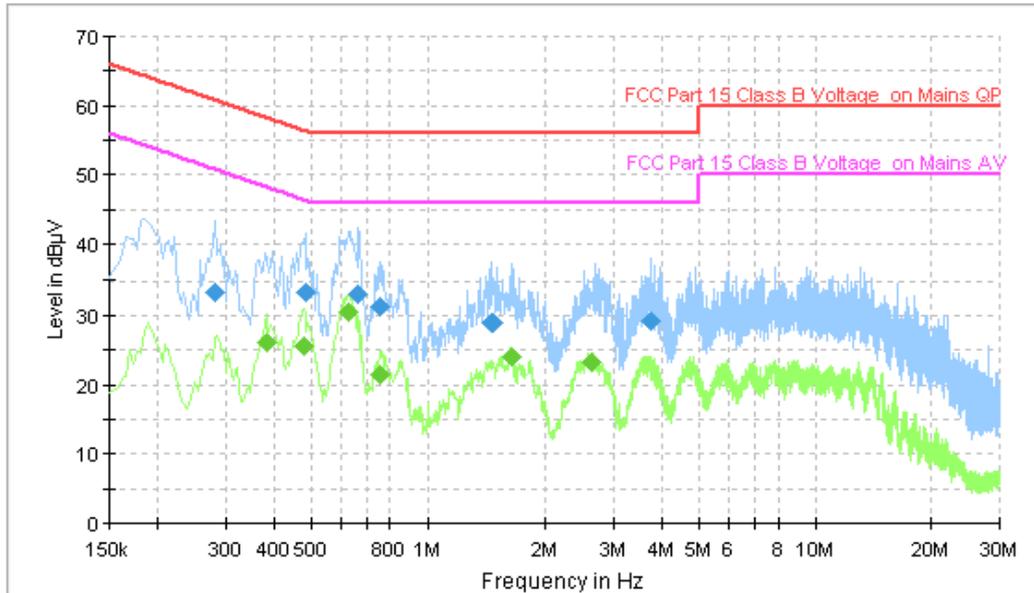


Figure A.15 Conducted Emission

Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.282000	33.4	GND	N	9.6	27.4	60.8
0.482000	33.2	GND	N	9.7	23.1	56.3
0.662000	33.2	GND	N	9.5	22.8	56.0
0.758000	31.2	GND	N	9.6	24.8	56.0
1.466000	29.0	GND	N	9.5	27.0	56.0
3.730000	29.3	GND	N	9.6	26.7	56.0

Final Measurement Detector 2

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.382000	26.0	GND	N	9.6	22.3	48.2
0.478000	25.6	GND	N	9.7	20.8	46.4
0.622000	30.6	GND	N	9.6	15.4	46.0
0.758000	21.3	GND	N	9.6	24.7	46.0
1.634000	24.0	GND	N	9.5	22.0	46.0
2.622000	23.4	GND	N	9.6	22.6	46.0

END OF REPORT