

EMC TEST REPORT

No. 2011711STO-101

Electromagnetic disturbances

EQUIPMENT UNDER TEST

Equipment: Surface-mounted luminaire with LED
Type/Model: L2002 Översidan, L2003 Översidan,
L2004 Översidan
Manufacturer: IKEA of Sweden AB
Tested by request of: IKEA of Sweden AB

SUMMARY

Referring to the emission limits, and the operating mode during the tests specified in this report, the equipment complies with the requirements according to the following standards:

FCC 47 CFR Part 15: Radio frequency devices, Subpart B: Unintentional radiators. Class B equipment.

ICES-005 Issue 5: Lighting Equipment, Class B. (2018)

For details, see clause 2 – 4.

Date of issue: June 18, 2020

Tested by:



Anna Pogosian

Approved by:



Per Granberg

This report is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to permit copying or distribution of this report and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results in this report are relevant only to the sample tested. This report by itself does not imply that the material, product, or service is or has ever been under an Intertek certification program.

Revision History

Test report number	Date	Description	Changes
2011711STO-101	June 18, 2020	First release	

CONTENTS

	Page
1. Client Information	5
2. Equipment under test (EUT).....	5
2.1 Identification of the EUT	5
2.2 Test set up and EUT photos	6
2.3 Additional information about the EUT	6
2.4 Peripheral equipment	6
3. Test Specifications	7
3.1 Standards	7
3.2 Additions, deviations and exclusions from standards and accreditation	7
3.3 Test site	7
3.4 Mode of operation during the test	7
3.5 Compliance	8
4. Test Summary	9
5. Conducted continuous disturbances	10
5.1 Operating environment.....	10
5.2 Test setup and test procedure	10
5.3 Measurement uncertainty.....	10
5.4 Test results, AC Power input port, Class B, L2002 Översidan,	
ICPSLC24-10NA-IL-1, max intensity	11
5.5 Test results, AC Power input port, Class B, L2002 Översidan,	
ICPSLC24-10NA-IL-1, min intensity	12
5.6 Test results, AC Power input port, Class B, L2002 Översidan,	
ICPSLC24-10NA-IL-1, standby.....	13
5.7 Test results, AC Power input port, Class B, L2002 Översidan,	
ICPSLC24-30NA-IL-1, max intensity	14
5.8 Test results, AC Power input port, Class B, L2002 Översidan,	
ICPSLC24-30NA-IL-1, min intensity	15
5.9 Test results, AC Power input port, Class B, L2002 Översidan,	
ICPSLC24-30NA-IL-1, standby.....	16
5.10 Test results, AC Power input port, Class B, L2003 Översidan,	
ICPSLC24-10NA-IL-1, max intensity	17
5.11 Test results, AC Power input port, Class B, L2003 Översidan,	
ICPSLC24-10NA-IL-1, min intensity	18
5.12 Test results, AC Power input port, Class B, L2003 Översidan,	
ICPSLC24-10NA-IL-1, standby.....	19
5.13 Test results, AC Power input port, Class B, L2003 Översidan,	
ICPSLC24-30NA-IL-1, max intensity	20
5.14 Test results, AC Power input port, Class B, L2003 Översidan,	
ICPSLC24-30NA-IL-1, min intensity	21
5.15 Test results, AC Power input port, Class B, L2003 Översidan,	
ICPSLC24-30NA-IL-1, standby.....	22
5.16 Test results, AC Power input port, Class B, L2004 Översidan,	
ICPSLC24-10NA-IL-1, max intensity	23
5.17 Test results, AC Power input port, Class B, L2004 Översidan,	
ICPSLC24-10NA-IL-1, min intensity	24
5.18 Test results, AC Power input port, Class B, L2004 Översidan,	
ICPSLC24-10NA-IL-1, standby.....	25
5.19 Test results, AC Power input port, Class B, L2004 Översidan,	
ICPSLC24-30NA-IL-1, max intensity	26
5.20 Test results, AC Power input port, Class B, L2004 Översidan,	
ICPSLC24-30NA-IL-1, min intensity	27
5.21 Test results, AC Power input port, Class B, L2004 Översidan,	
ICPSLC24-30NA-IL-1, standby.....	28
5.22 Test equipment	28

6.	Radiated rf Emission in the frequency-range 30 MHz – 1 GHz	29
6.1	Operating environment.....	29
6.2	Test setup and test procedure	29
6.3	Test conditions	29
6.4	Measurement uncertainty.....	29
6.5	Test results, 30 – 1000 MHz, FCC, Class B, L2002 Översidan,	
	ICPSLC24-10NA-IL-1, max intensity	30
6.6	Test results, 30 – 1000 MHz, FCC, Class B, L2002 Översidan,	
	ICPSLC24-10NA-IL-1, min intensity	31
6.7	Test results, 30 – 1000 MHz, FCC, Class B, L2002 Översidan,	
	ICPSLC24-10NA-IL-1, standby.....	32
6.8	Test results, 30 – 1000 MHz, FCC, Class B, L2002 Översidan,	
	ICPSLC24-30NA-IL-1, max intensity	33
6.9	Test results, 30 – 1000 MHz, FCC, Class B, L2002 Översidan,	
	ICPSLC24-30NA-IL-1, min intensity	34
6.10	Test results, 30 – 1000 MHz, FCC, Class B, L2002 Översidan,	
	ICPSLC24-30NA-IL-1, standby.....	35
6.11	Test results, 30 – 1000 MHz, FCC, Class B, L2003 Översidan,	
	ICPSLC24-10NA-IL-1, max intensity	36
6.12	Test results, 30 – 1000 MHz, FCC, Class B, L2003 Översidan,	
	ICPSLC24-10NA-IL-1, min intensity	37
6.13	Test results, 30 – 1000 MHz, FCC, Class B, L2003 Översidan,	
	ICPSLC24-10NA-IL-1, standby.....	38
6.14	Test results, 30 – 1000 MHz, FCC, Class B, L2003 Översidan,	
	ICPSLC24-30NA-IL-1, max intensity	39
6.15	Test results, 30 – 1000 MHz, FCC, Class B, L2003 Översidan,	
	ICPSLC24-30NA-IL-1, min intensity	40
6.16	Test results, 30 – 1000 MHz, FCC, Class B, L2003 Översidan,	
	ICPSLC24-30NA-IL-1, standby.....	41
6.17	Test results, 30 – 1000 MHz, FCC, Class B, L2004 Översidan,	
	ICPSLC24-10NA-IL-1, max intensity	42
6.18	Test results, 30 – 1000 MHz, FCC, Class B, L2004 Översidan,	
	ICPSLC24-10NA-IL-1, min intensity	43
6.19	Test results, 30 – 1000 MHz, FCC, Class B, L2004 Översidan,	
	ICPSLC24-10NA-IL-1, standby.....	44
6.20	Test results, 30 – 1000 MHz, FCC, Class B, L2004 Översidan,	
	ICPSLC24-30NA-IL-1, max intensity	45
6.21	Test results, 30 – 1000 MHz, FCC, Class B, L2004 Översidan,	
	ICPSLC24-30NA-IL-1, min intensity	46
6.22	Test results, 30 – 1000 MHz, FCC, Class B, L2004 Översidan,	
	ICPSLC24-30NA-IL-1, standby.....	47
6.23	Test equipment	48

1. CLIENT INFORMATION

The EUT has been tested by request of

Company **IKEA of Sweden AB**
 Box 702
 343 81 Älmhult Sweden


Name of contact **Elias Molin**

2. EQUIPMENT UNDER TEST (EUT)

2.1 Identification of the EUT


Equipment **Surface-mounted luminaire with LED**
 Type/Model **L2002 Översidan, L2003 Översidan, L2004 Översidan**
 Brand name **IKEA**
 Serial Number **-**
 Manufacturer **IKEA of Sweden AB**
 Rating **L2002 Översidan: 24 V DC, 2.3 W**
L2003 Översidan: 24V DC, 3.5 W
L2004 Översidan: 24 V DC, 4.6 W
 Class **III**
 Highest clock frequency **< 108 MHz**
 Software/Firmware version **-**
 FCC ID **FHO-L2002, FHO-L2003, FHO-L2004**

FCC ID: FHO-L2002




Conforms to: UL Std 2108 Certified to: CSA
 Std C22.2 No 9.0
 CAN ICES-005 (B) / NMB-005 (B)
 This device complies with Part 15 of the FCC
 Rules. Operation is subject to the following
 two conditions: (1) this device may not
 cause harmful interference, and (2) this
 device must accept any interference
 received, including interference that may
 cause undesired operation.

Intertek
 ???????
 Type No. L2002
 Översidan
 Made in




FCC ID: FHO-L2003




Conforms to: UL Std 2108 Certified to: CSA
 Std C22.2 No 9.0
 CAN ICES-005 (B) / NMB-005 (B)
 This device complies with Part 15 of the FCC
 Rules. Operation is subject to the following
 two conditions: (1) this device may not
 cause harmful interference, and (2) this
 device must accept any interference
 received, including interference that may
 cause undesired operation.

Intertek
 ???????
 Type No. L2003
 Översidan
 Made in




FCC ID: FHO-L2004



Conforms to: UL Std 2108 Certified to: CSA
 Std C22.2 No 9.0
 CAN ICES-005 (B) / NMB-005 (B)
 This device complies with Part 15 of the FCC
 Rules. Operation is subject to the following
 two conditions: (1) this device may not
 cause harmful interference, and (2) this
 device must accept any interference
 received, including interference that may
 cause undesired operation.

Intertek
 ???????
 Type No. L2004
 Översidan
 Made in



Rating plate

2.2 Test set up and EUT photos

Test set up and EUT photos are enclosed in Annex 1 No. 2011711STO-102 to this test report.

2.3 Additional information about the EUT

The EUT is a dimmable surface-mounted luminaire with LED supplied by an external LED driver, tested in a table-top configuration.

The EUT was equipped with the following cables:

Port	Type	Length [m]	Specifications
DC input	Two core	3,5	

2.4 Peripheral equipment

Peripheral equipment is equipment needed for correct operation of the EUT, but not included as part of the testing and evaluation of the EUT.

Equipment	Type / Model	Manufacturer	Serial no.
LED driver	ICPSLC24-30NA-IL-1	IKEA	-
LED driver	ICPSLC24-10NA-IL-1	IKEA	-

3. TEST SPECIFICATIONS

3.1 Standards

Requirements:

FCC 47 CFR Part 15: Radio frequency devices, Subpart B: Unintentional radiators.

ICES-005 Issue 5: Lighting Equipment (2018).

Test methods:

ANSI C63.4: 2014: 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

3.2 Additions, deviations and exclusions from standards and accreditation

No additions, deviations or exclusions have been made from standards and accreditation.

3.3 Test site

Measurements were performed at:

Intertek Semko AB.
Torshamnsgatan 43,
P.O. Box 1103
SE-164 22 Kista

Intertek Semko AB is a FCC listed test site with site registration number 90913
Intertek Semko AB is a FCC accredited conformity assessment body with designation number SE0002
Intertek Semko AB is an Industry Canada listed test facility with IC assigned code 2042G

Measurement chambers

Measurement Chamber	Type of chamber	IC Site filing #
STORA HALLEN	Semi-anechoic 10 m and 3 m	2042G-2

3.4 Mode of operation during the test

The EUT was tested with 120 V, 60 Hz.

The EUT was measured with the dimmer regulation set to max luminous intensity, min luminous intensity and in standby mode with two alternative LED drivers, type ICPSLC24-30NA-IL-1 and ICPSLC24-10NA-IL-1.

3.5 Compliance

The EUT shall comply with the emission limits according to the standards as listed below

Conducted emission requirements:

The EUT shall meet the limits for the standards.

Reference: 47 CFR §15.107
ICES-005, section 5.5.2

Limits for conducted emission according to FCC and ICES-005

Class B

Frequency range [MHz]	Limits [dBµV]	
	Quasi-Peak	Average
0.15 – 0.50	66 – 56	56 – 46
0.50 – 5.00	56	46
5.00 – 30.0	60	50

Radiated Emission requirements:

The EUT shall meet the limits for the standards.

Reference: 47 CFR §15.109
ICES-005, section 5.5.3

Limits for radiated emission according to FCC

Class B

Frequency range [MHz]	Field strength at 3 m (dBµV/m)	Field strength at 10 m (dBµV/m)	Detector
30 – 88	40.0	29.5	Quasi Peak
88 – 216	43.5	33.1	Quasi Peak
216 – 960	46.0	35.6	Quasi Peak
960 – 1000	54.0	43.5	Quasi Peak
Above 1000	54.0 / 74.0	43.5 / 63.5	Average / Peak

The values for 10 m measuring distance are calculated by subtracting 10.5 dB from the 3 m limit. (i.e. an extrapolation factor of 20 dB/decade according to §15.31(f)(1))

Limits for radiated emission according to ICES-005

Class B

Frequency range [MHz]	Field strength at 3 m (dBµV/m)	Field strength at 10 m (dBµV/m)	Detector
30 – 88	40.0	29.5	Quasi Peak
88 – 216	43.5	33.1	Quasi Peak
216 – 1000	46.0	35.6	Quasi Peak

4. TEST SUMMARY

The results in this report apply only to sample tested:

Standard	Description	Result
	Emission	
FCC Part 15 subpart B ICES-005	Conducted continuous emission in the frequency range 0.150 – 30 MHz, AC Power input port The EUT complies with the Class B limits. L2002 Översidan: The margin to the limit was at least 11.8 dB at 0.605 MHz L2003 Översidan: The margin to the limit was at least 14.5 dB at 0.605 MHz L2004: Översidan: The margin to the limit was at least 12.9 dB at 4.355 MHz See clause 5.4-5.21.	PASS
FCC Part 15 subpart B ICES-005	Radiated emission of electromagnetic fields in the frequency range 30 – 1000 MHz The EUT complies with the Class B limits. L2002 Översidan: The margin to the limit was at least 4.9* dB at 43.080 MHz L2003 Översidan: The margin to the limit was at least 8.1 dB at 42.240 MHz L2004: Översidan: The margin to the limit was at least 6.6 dB at 56.790 MHz * The measured value is within the measurement uncertainty interval to the limit. See clause 6.5-6.22.	PASS
FCC Part 15 subpart B ICES-005	Radiated emission of electromagnetic fields in the frequency range > 1 GHz Not applicable. The highest clock frequency of the EUT is below 108 MHz.	N/A

**5. CONDUCTED CONTINUOUS DISTURBANCES
in the frequency-range 0.15 – 30 MHz**

5.1 Operating environment

Date of test:	Temperature:	Relative Humidity:
April 9, 2020	22 [°C]	23 [%]

5.2 Test setup and test procedure

The test method is in accordance with ANSI C63.4.

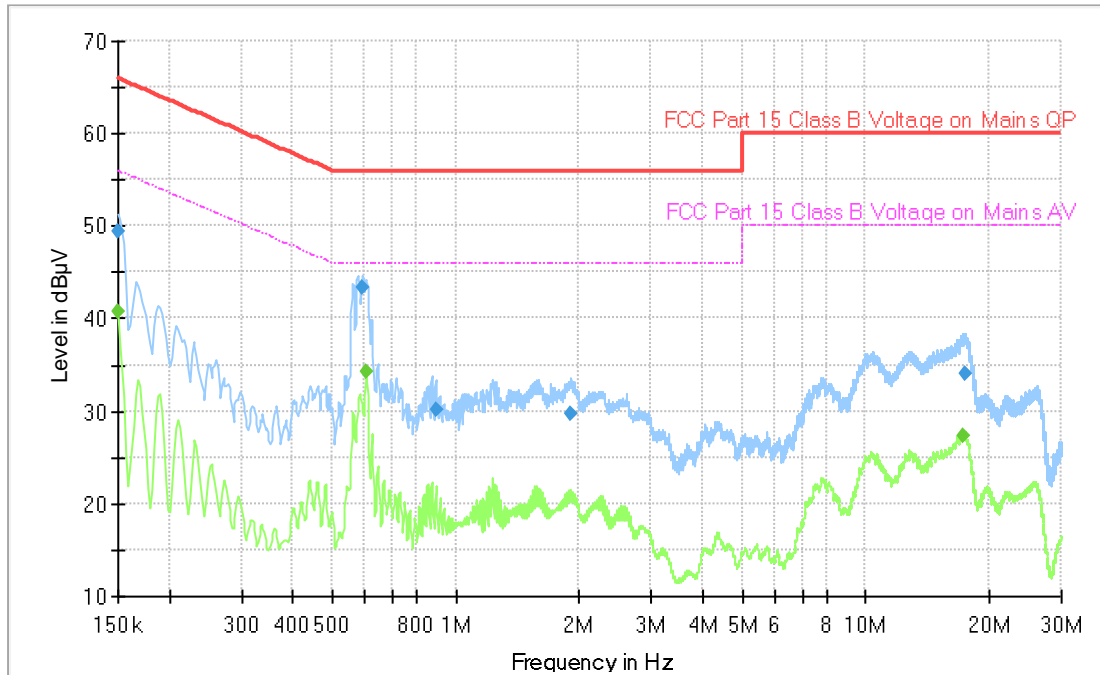
The EUT was connected to the power via Artificial Mains Networks AMN.
 The EUT was placed on an insulating support 0.8 m above the floor, 0.4 m from the vertical reference ground plane (RGP) and 0.8 m from the AMN.
 Overview sweeps were performed for each lead.
 During the tests the EUT was operated according to the mode of operation mentioned in clause 3.4.

5.3 Measurement uncertainty

Continuous conducted disturbances with AMN
 in the frequency range 150 kHz to 30 MHz ± 3.3 dB

Measurement uncertainty is calculated in accordance with CISPR 16-4-2:2011.
 The measurement uncertainty is given with a confidence of 95 %.

5.4 Test results, AC Power input port, Class B, L2002 Översidan, ICPSLC24-10NA-IL-1, max intensity



Diagram, Peak and Average overview sweep

Measurement results, Quasi-peak, Class B

Frequency [MHz]	Result [dBµV]	Limit [dBµV]	Line L/N	Margin [dB]
0.150	49.4	66.0	L	16.6
0.593	43.3	56.0	L	12.7

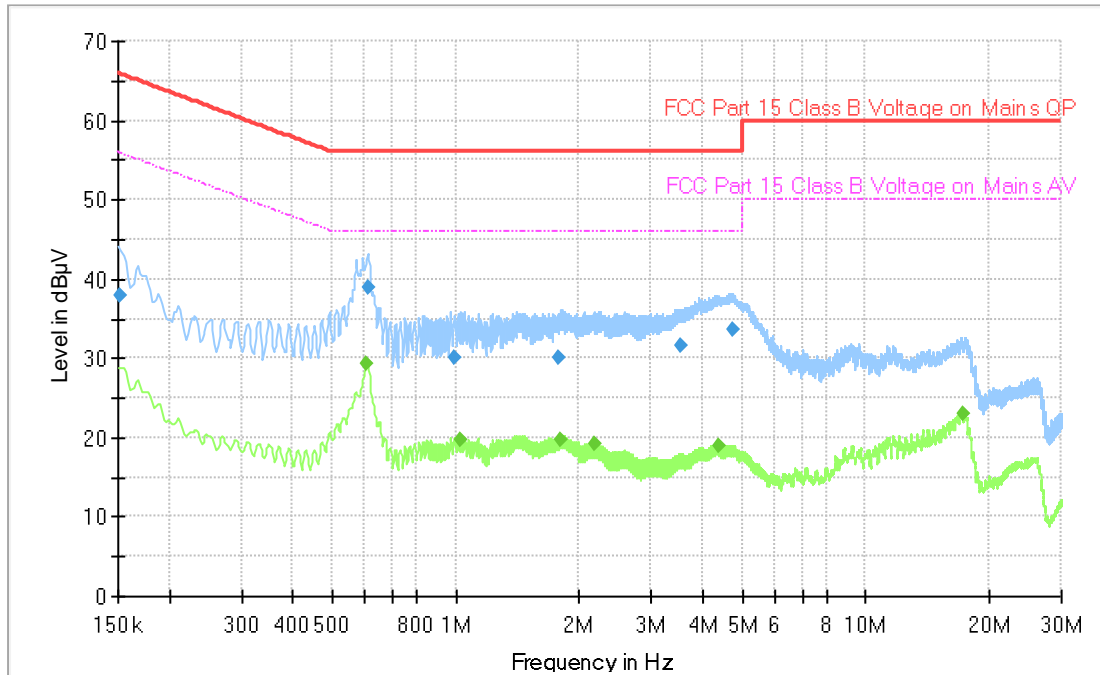
Measurement results, Average, Class B

Frequency [MHz]	Result [dBµV]	Limit [dBµV]	Line L/N	Margin [dB]
0.150	40.7	56.0	L	15.3
0.605	34.2	46.0	L	11.8

All other measured disturbances have a margin of more than 20 dB to the limits.

Result [dBµV] = Analyser reading [dBµV] + cable loss [dB] + LISN insertion loss [dB]

5.5 Test results, AC Power input port, Class B, L2002 Översidan, ICPSLC24-10NA-IL-1, min intensity



Diagram, Peak and Average overview sweep

Measurement results, Quasi-peak, Class B

Frequency [MHz]	Result [dBµV]	Limit [dBµV]	Line L/N	Margin [dB]
0.609	38.9	56.0	L	17.1

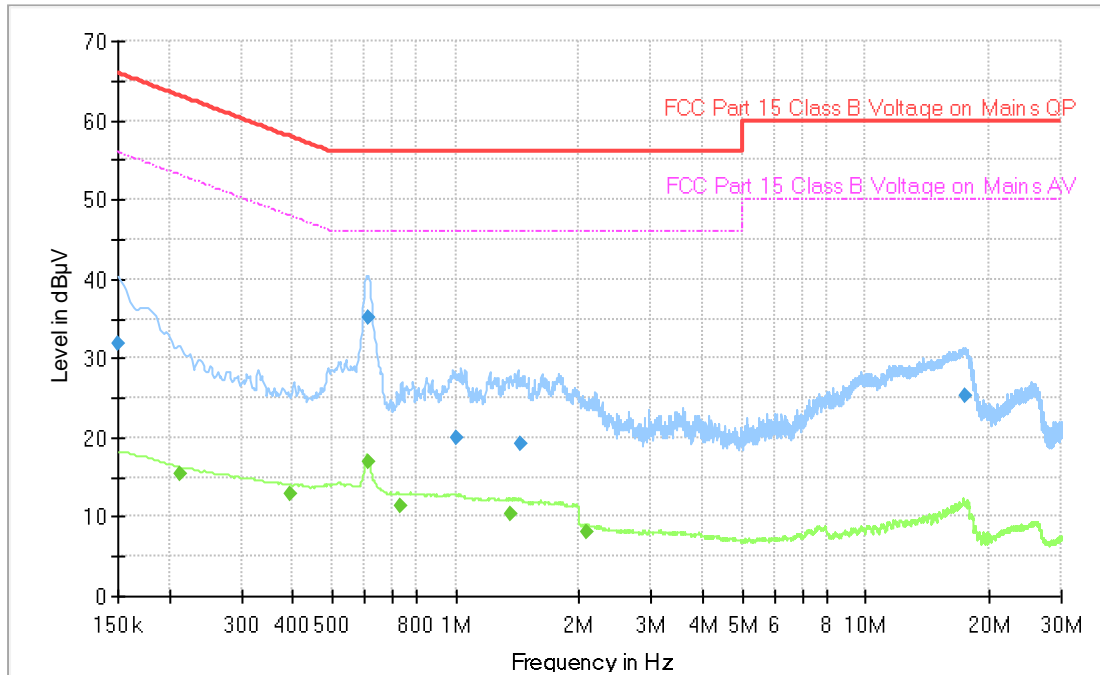
Measurement results, Average, Class B

Frequency [MHz]	Result [dBµV]	Limit [dBµV]	Line L/N	Margin [dB]
0.607	29.3	46.0	L	16.7

All other measured disturbances have a margin of more than 20 dB to the limits.

Result [dBµV] = Analyser reading [dBµV] + cable loss [dB] + LISN insertion loss [dB]

5.6 Test results, AC Power input port, Class B, L2002 Översidan, ICPSLC24-10NA-IL-1, standby



Diagram, Peak and Average overview sweep

Measurement results, Quasi-peak, Class B

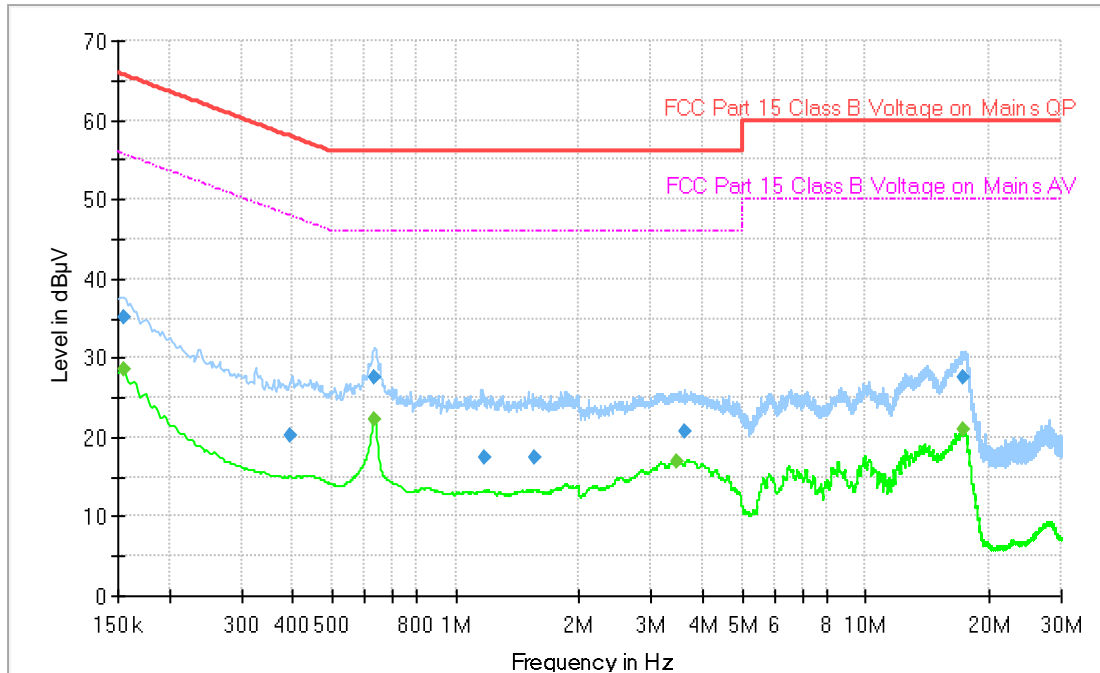
The margin to the limit is at least 20 dB for all frequencies

Measurement results, Average, Class B

The margin to the limit is at least 20 dB for all frequencies

$$\text{Result [dB}\mu\text{V]} = \text{Analyser reading [dB}\mu\text{V]} + \text{cable loss [dB]} + \text{LISN insertion loss [dB]}$$

5.7 Test results, AC Power input port, Class B, L2002 Översidan, ICPSLC24-30NA-IL-1, max intensity



Diagram, Peak and Average overview sweep

Measurement results, Quasi-peak, Class B

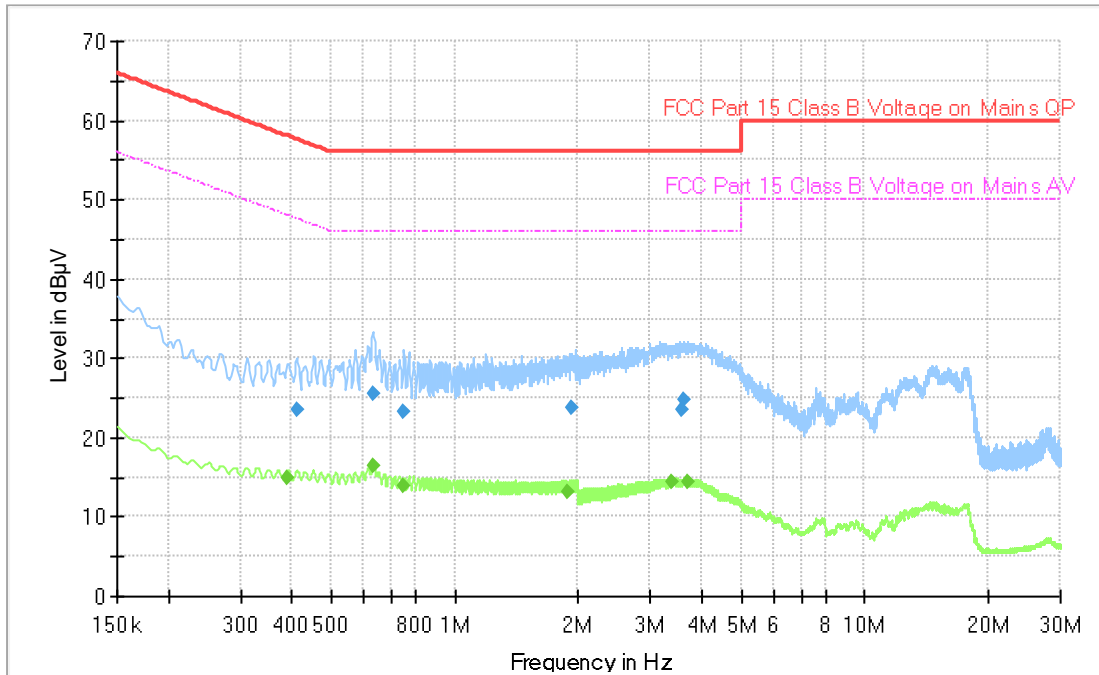
The margin to the limit is at least 20 dB for all frequencies

Measurement results, Average, Class B

The margin to the limit is at least 20 dB for all frequencies

$$\text{Result [dB}\mu\text{V]} = \text{Analyser reading [dB}\mu\text{V]} + \text{cable loss [dB]} + \text{LISN insertion loss [dB]}$$

5.8 Test results, AC Power input port, Class B, L2002 Översidan, ICPSLC24-30NA-IL-1, min intensity



Diagram, Peak and Average overview sweep

Measurement results, Quasi-peak, Class B

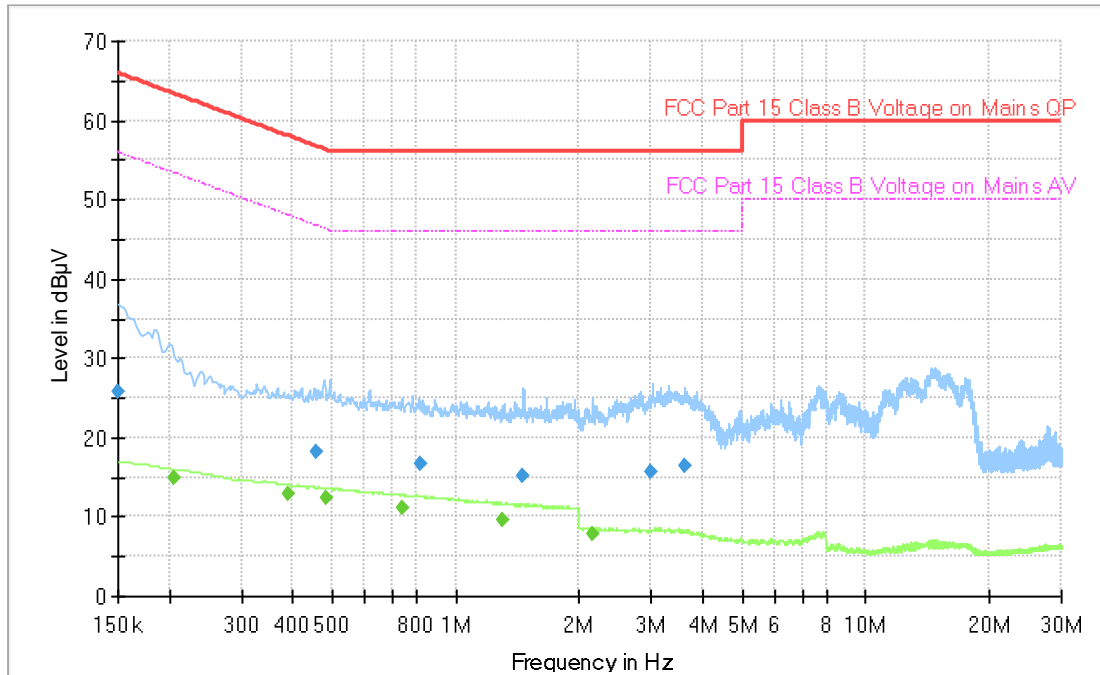
The margin to the limit is at least 20 dB for all frequencies

Measurement results, Average, Class B

The margin to the limit is at least 20 dB for all frequencies

$$\text{Result [dB}\mu\text{V]} = \text{Analyser reading [dB}\mu\text{V]} + \text{cable loss [dB]} + \text{LISN insertion loss [dB]}$$

5.9 Test results, AC Power input port, Class B, L2002 Översidan, ICPSLC24-30NA-IL-1, standby



Diagram, Peak and Average overview sweep

Measurement results, Quasi-peak, Class B

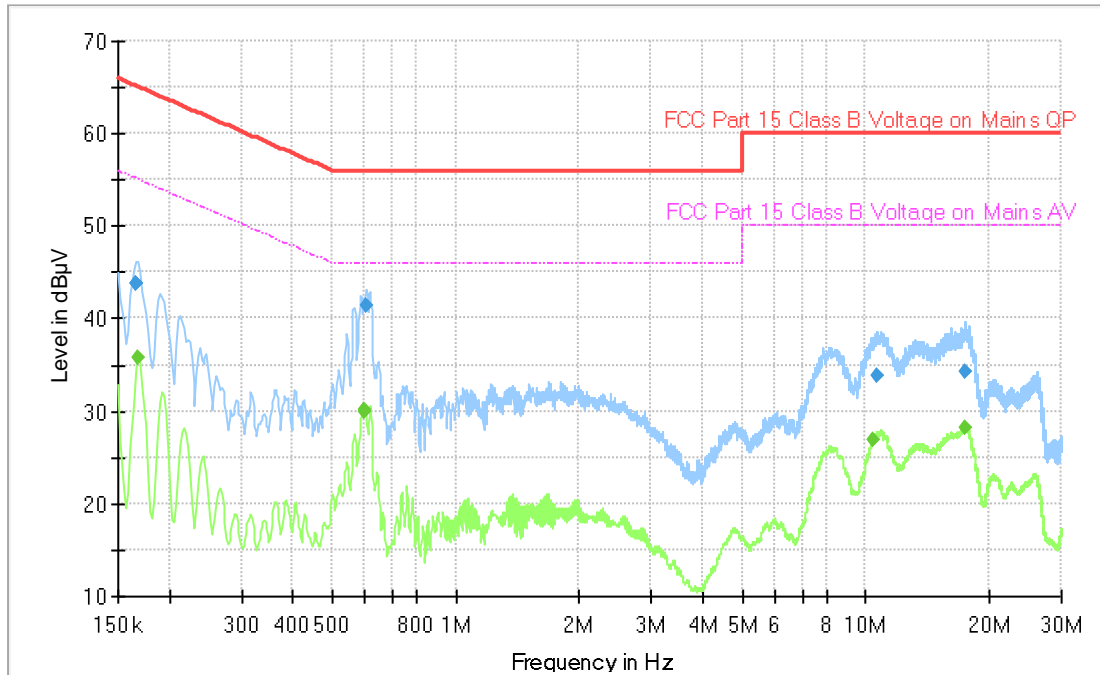
The margin to the limit is at least 20 dB for all frequencies

Measurement results, Average, Class B

The margin to the limit is at least 20 dB for all frequencies

$$\text{Result [dB}\mu\text{V]} = \text{Analyser reading [dB}\mu\text{V]} + \text{cable loss [dB]} + \text{LISN insertion loss [dB]}$$

5.10 Test results, AC Power input port, Class B, L2003 Översidan, ICPSLC24-10NA-IL-1, max intensity



Diagram, Peak and Average overview sweep

Measurement results, Quasi-peak, Class B

Frequency [MHz]	Result [dBµV]	Limit [dBµV]	Line L/N	Margin [dB]
0.605	41.5	56.0	L	14.5

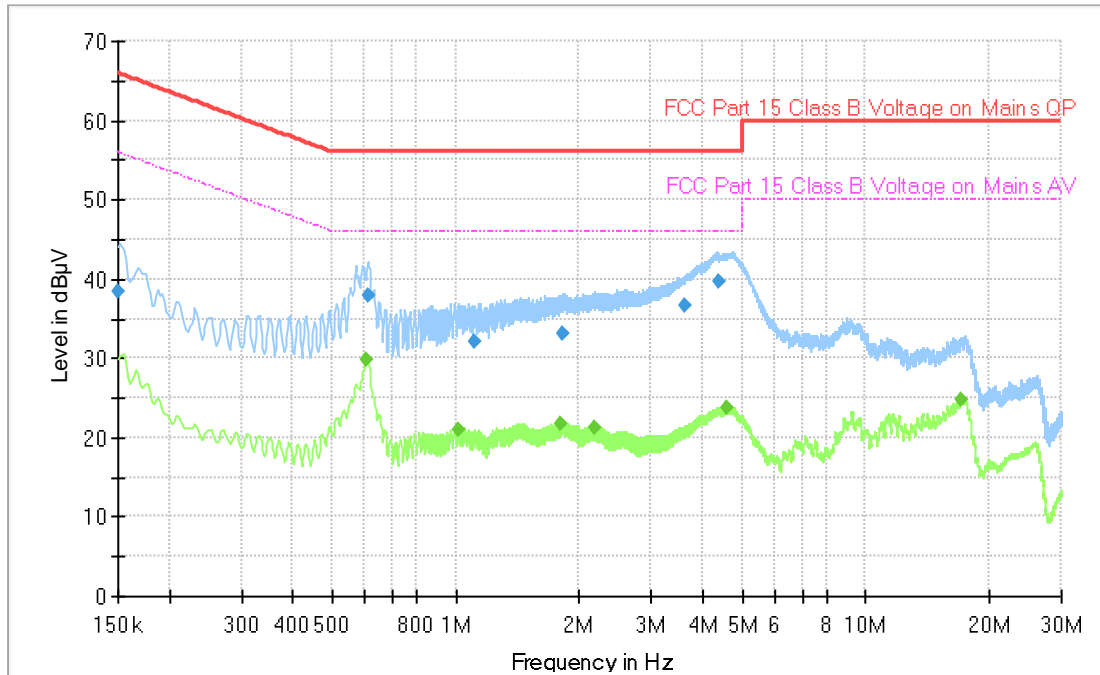
Measurement results, Average, Class B

Frequency [MHz]	Result [dBµV]	Limit [dBµV]	Line L/N	Margin [dB]
0.168	35.8	55.1	L	19.3
0.596	30.1	46.0	L	15.9
0.598	29.9	46.0	L	16.1

All other measured disturbances have a margin of more than 20 dB to the limits.

Result [dBµV] = Analyser reading [dBµV] + cable loss [dB] + LISN insertion loss [dB]

5.11 Test results, AC Power input port, Class B, L2003 Översidan, ICPSLC24-10NA-IL-1, min intensity



Diagram, Peak and Average overview sweep

Measurement results, Quasi-peak, Class B

Frequency [MHz]	Result [dBµV]	Limit [dBµV]	Line L/N	Margin [dB]
0.611	38.0	56.0	L	18.0
3.604	36.7	56.0	L	19.3
4.398	39.6	56.0	L	16.4

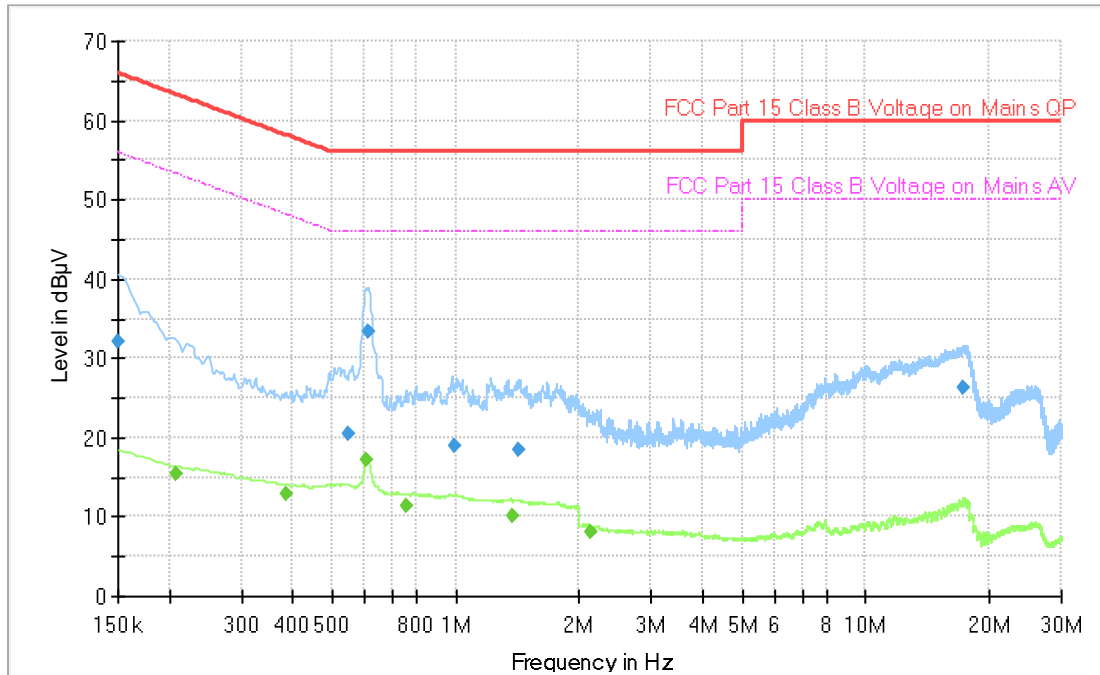
Measurement results, Average, Class B

Frequency [MHz]	Result [dBµV]	Limit [dBµV]	Line L/N	Margin [dB]
0.607	29.8	46.0	L	16.2

All other measured disturbances have a margin of more than 20 dB to the limits.

Result [dBµV] = Analyser reading [dBµV] + cable loss [dB] + LISN insertion loss [dB]

5.12 Test results, AC Power input port, Class B, L2003 Översidan, ICPSLC24-10NA-IL-1, standby



Diagram, Peak and Average overview sweep

Measurement results, Quasi-peak, Class B

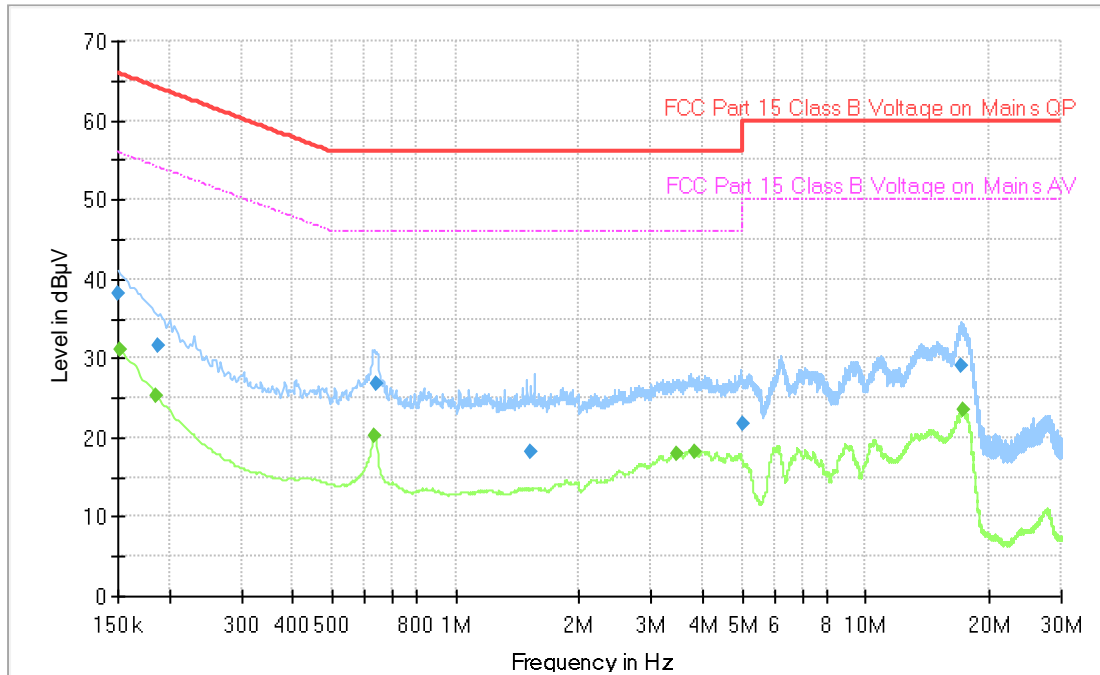
The margin to the limit is at least 20 dB for all frequencies

Measurement results, Average, Class B

The margin to the limit is at least 20 dB for all frequencies

$$\text{Result [dB}\mu\text{V]} = \text{Analyser reading [dB}\mu\text{V]} + \text{cable loss [dB]} + \text{LISN insertion loss [dB]}$$

5.13 Test results, AC Power input port, Class B, L2003 Översidan, ICPSLC24-30NA-IL-1, max intensity



Diagram, Peak and Average overview sweep

Measurement results, Quasi-peak, Class B

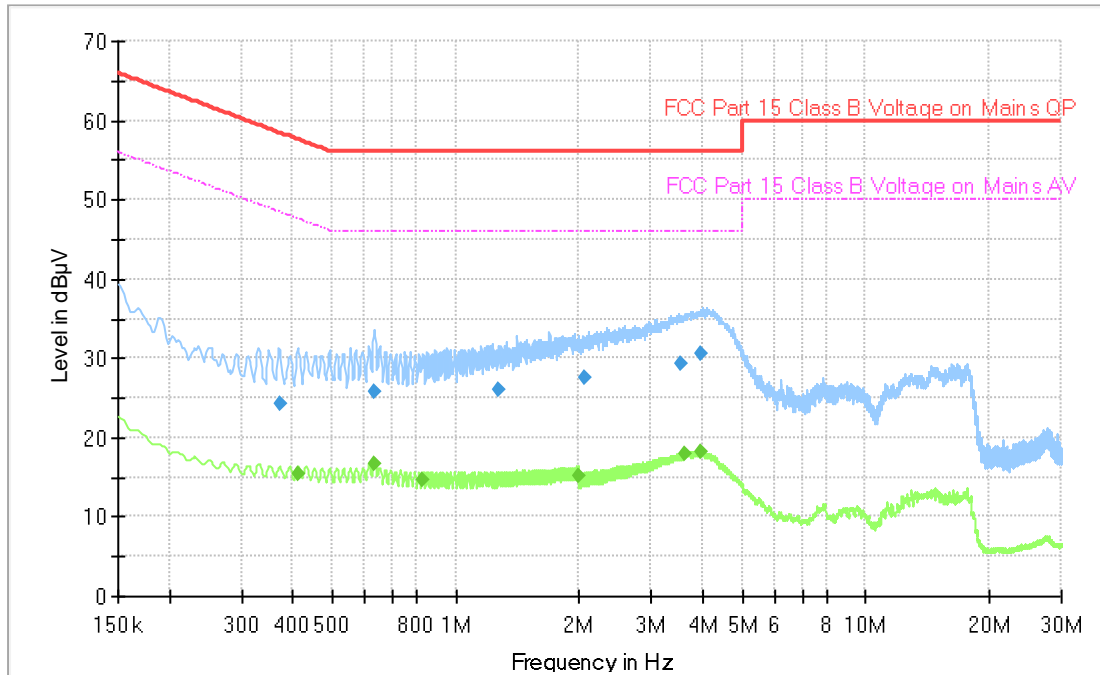
The margin to the limit is at least 20 dB for all frequencies

Measurement results, Average, Class B

The margin to the limit is at least 20 dB for all frequencies

$$\text{Result [dB}\mu\text{V]} = \text{Analyser reading [dB}\mu\text{V]} + \text{cable loss [dB]} + \text{LISN insertion loss [dB]}$$

5.14 Test results, AC Power input port, Class B, L2003 Översidan, ICPSLC24-30NA-IL-1, min intensity



Diagram, Peak and Average overview sweep

Measurement results, Quasi-peak, Class B

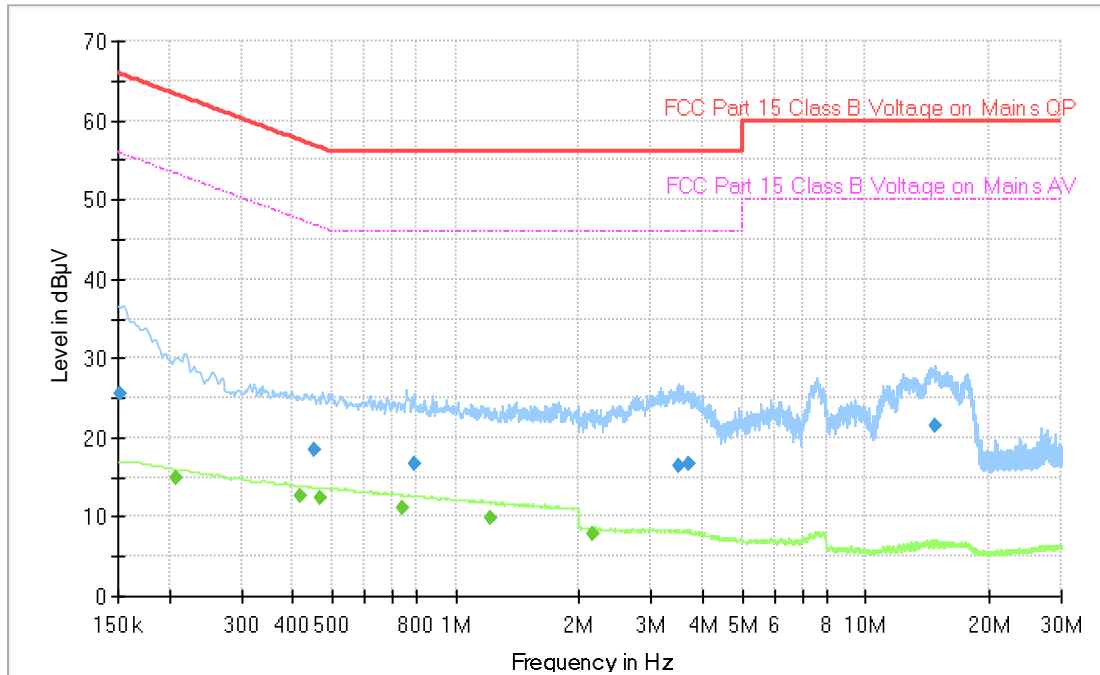
The margin to the limit is at least 20 dB for all frequencies

Measurement results, Average, Class B

The margin to the limit is at least 20 dB for all frequencies

$$\text{Result [dB}\mu\text{V]} = \text{Analyser reading [dB}\mu\text{V]} + \text{cable loss [dB]} + \text{LISN insertion loss [dB]}$$

5.15 Test results, AC Power input port, Class B, L2003 Översidan, ICPSLC24-30NA-IL-1, standby



Diagram, Peak and Average overview sweep

Measurement results, Quasi-peak, Class B

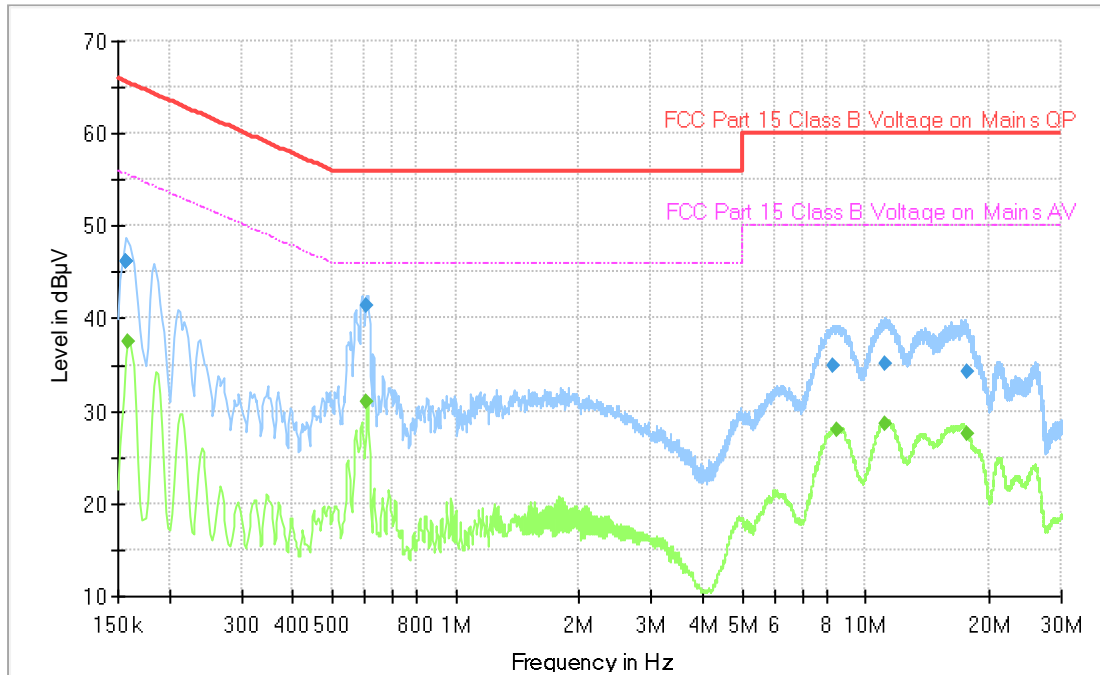
The margin to the limit is at least 20 dB for all frequencies

Measurement results, Average, Class B

The margin to the limit is at least 20 dB for all frequencies

$$\text{Result [dB}\mu\text{V]} = \text{Analyser reading [dB}\mu\text{V]} + \text{cable loss [dB]} + \text{LISN insertion loss [dB]}$$

5.16 Test results, AC Power input port, Class B, L2004 Översidan, ICPSLC24-10NA-IL-1, max intensity



Diagram, Peak and Average overview sweep

Measurement results, Quasi-peak, Class B

Frequency [MHz]	Result [dBµV]	Limit [dBµV]	Line L/N	Margin [dB]
0.157	46.3	65.6	L	19.3
0.607	41.3	56.0	L	14.7

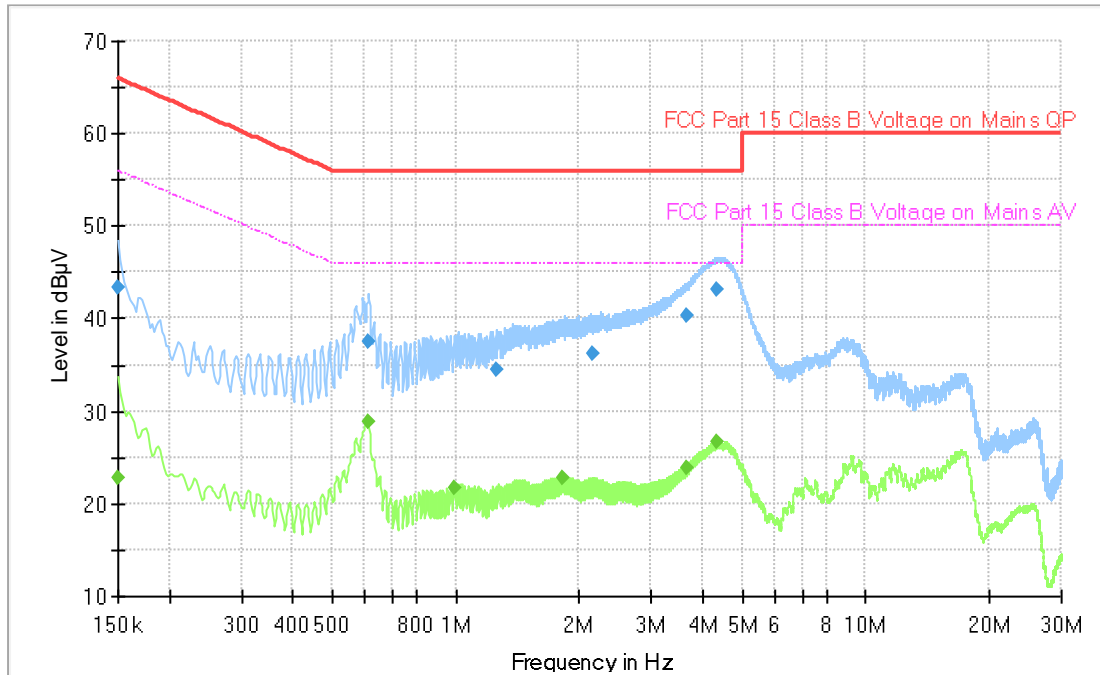
Measurement results, Average, Class B

Frequency [MHz]	Result [dBµV]	Limit [dBµV]	Line L/N	Margin [dB]
0.159	37.6	55.5	L	17.9
0.607	30.9	46.0	L	15.1

All other measured disturbances have a margin of more than 20 dB to the limits.

Result [dBµV] = Analyser reading [dBµV] + cable loss [dB] + LISN insertion loss [dB]

5.17 Test results, AC Power input port, Class B, L2004 Översidan, ICPSLC24-10NA-IL-1, min intensity



Diagram, Peak and Average overview sweep

Measurement results, Quasi-peak, Class B

Frequency [MHz]	Result [dBµV]	Limit [dBµV]	Line L/N	Margin [dB]
0.611	37.6	56.0	L	18.4
2.150	36.2	56.0	L	19.8
3.642	40.4	56.0	L	15.6
4.355	43.1	56.0	L	12.9

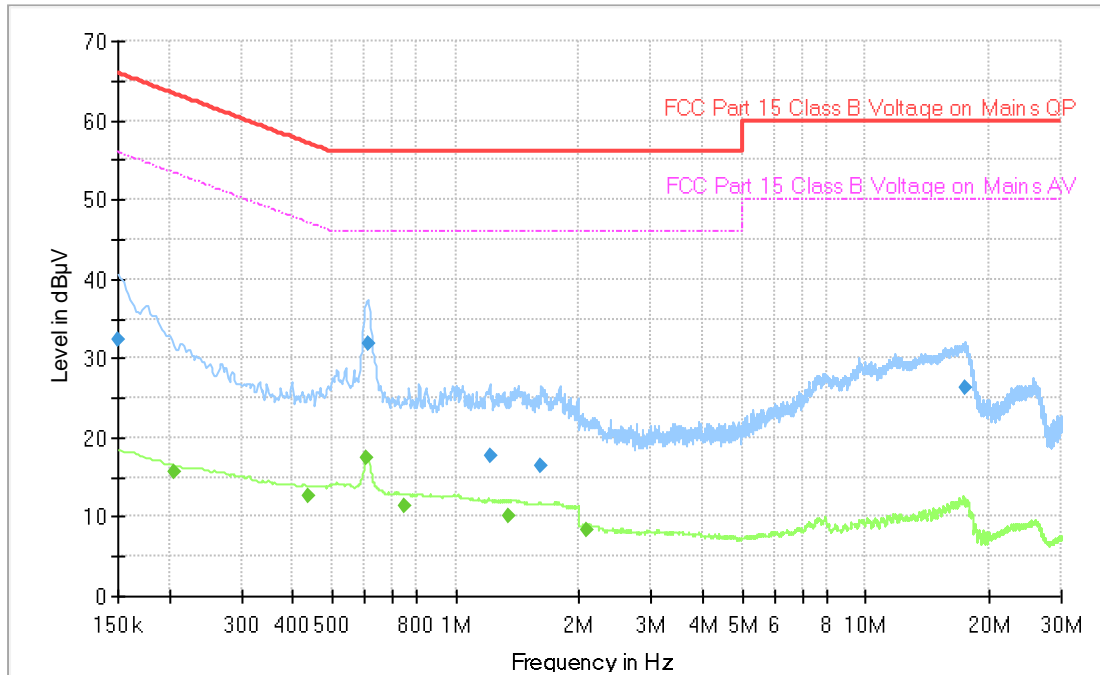
Measurement results, Average, Class B

Frequency [MHz]	Result [dBµV]	Limit [dBµV]	Line L/N	Margin [dB]
0.609	28.8	46.0	L	17.2
4.355	26.6	46.0	L	19.4

All other measured disturbances have a margin of more than 20 dB to the limits.

Result [dBµV] = Analyser reading [dBµV] + cable loss [dB] + LISN insertion loss [dB]

5.18 Test results, AC Power input port, Class B, L2004 Översidan, ICPSLC24-10NA-IL-1, standby



Diagram, Peak and Average overview sweep

Measurement results, Quasi-peak, Class B

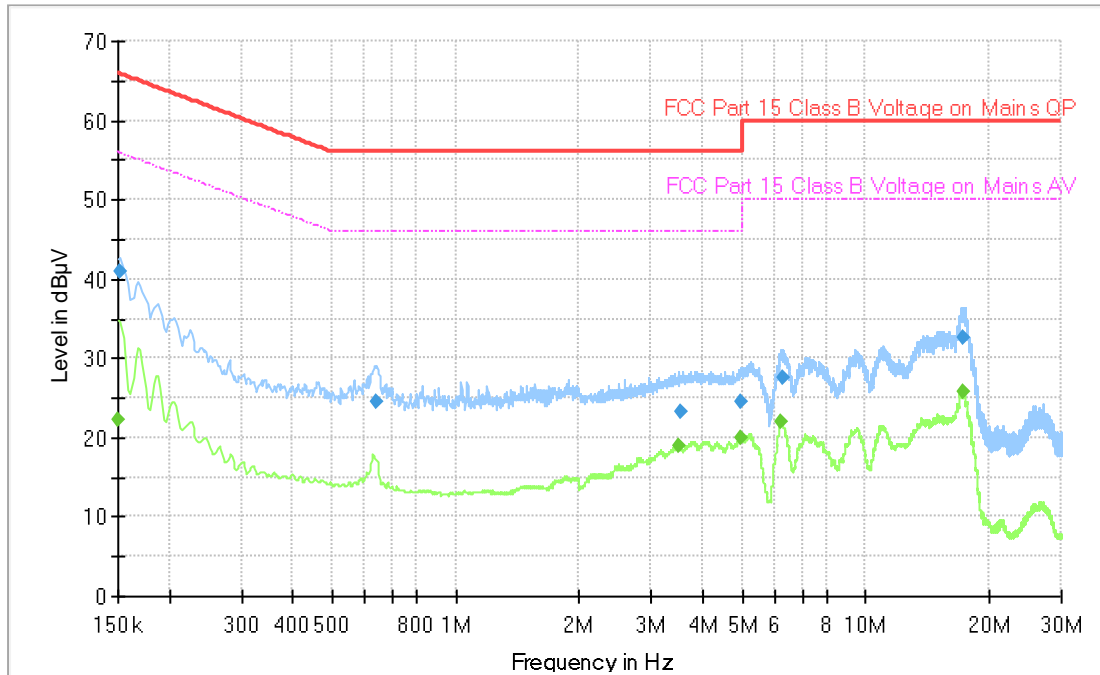
The margin to the limit is at least 20 dB for all frequencies

Measurement results, Average, Class B

The margin to the limit is at least 20 dB for all frequencies

$$\text{Result [dB}\mu\text{V]} = \text{Analyser reading [dB}\mu\text{V]} + \text{cable loss [dB]} + \text{LISN insertion loss [dB]}$$

5.19 Test results, AC Power input port, Class B, L2004 Översidan, ICPSLC24-30NA-IL-1, max intensity



Diagram, Peak and Average overview sweep

Measurement results, Quasi-peak, Class B

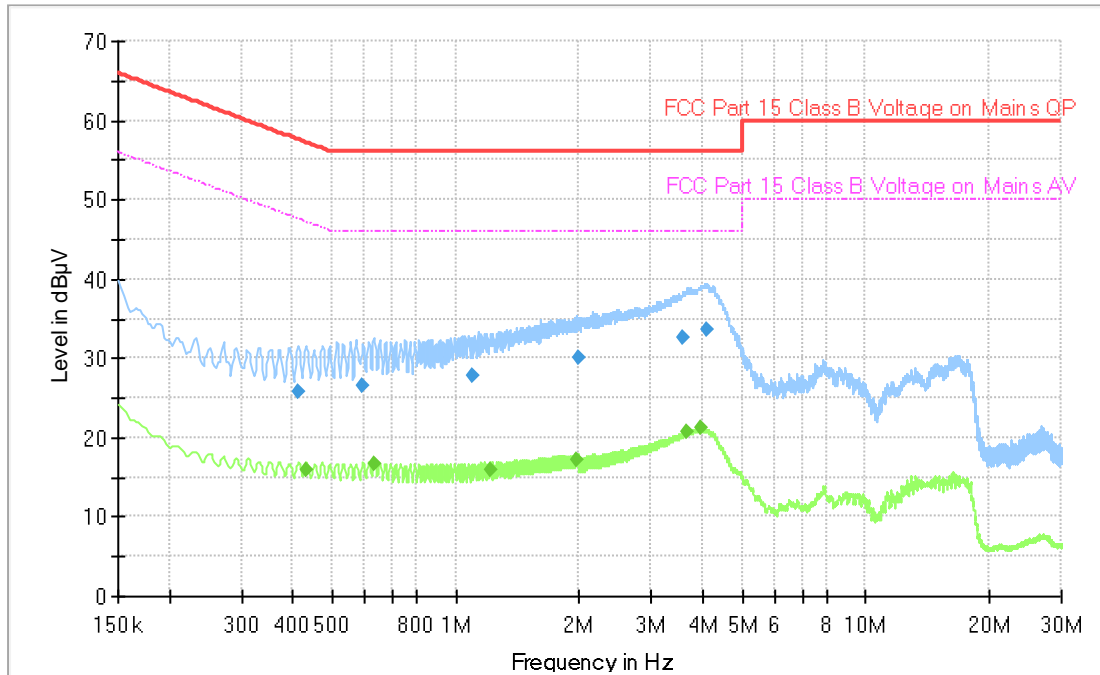
The margin to the limit is at least 20 dB for all frequencies

Measurement results, Average, Class B

The margin to the limit is at least 20 dB for all frequencies

$$\text{Result [dB}\mu\text{V]} = \text{Analyser reading [dB}\mu\text{V]} + \text{cable loss [dB]} + \text{LISN insertion loss [dB]}$$

5.20 Test results, AC Power input port, Class B, L2004 Översidan, ICPSLC24-30NA-IL-1, min intensity



Diagram, Peak and Average overview sweep

Measurement results, Quasi-peak, Class B

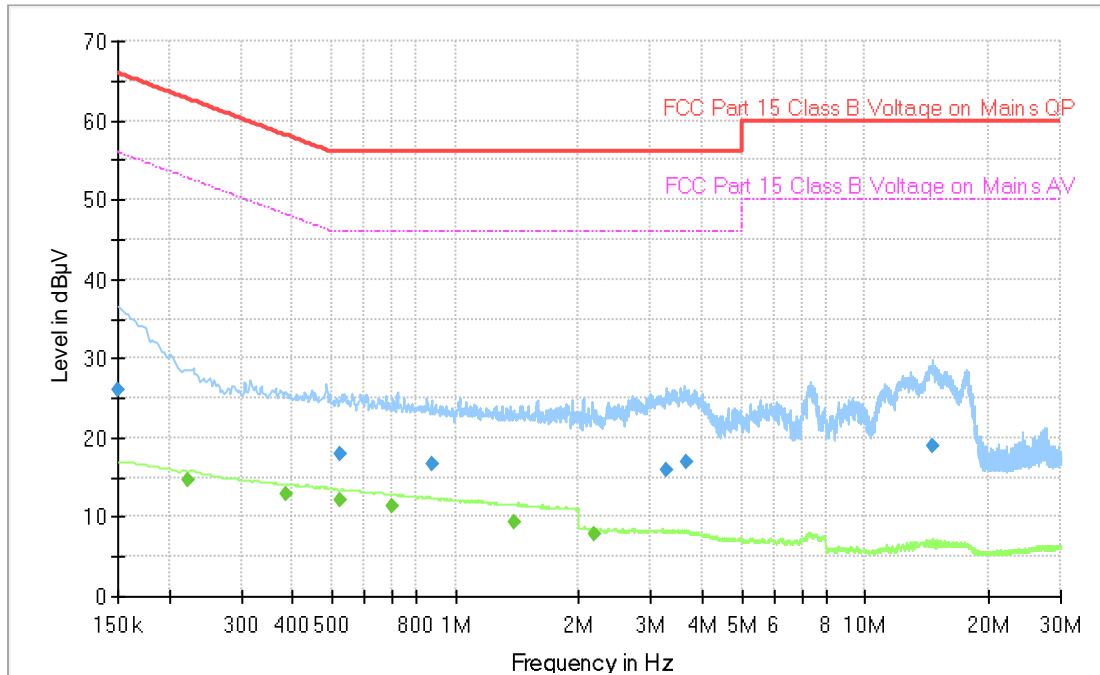
The margin to the limit is at least 20 dB for all frequencies

Measurement results, Average, Class B

The margin to the limit is at least 20 dB for all frequencies

$$\text{Result [dB}\mu\text{V]} = \text{Analyser reading [dB}\mu\text{V]} + \text{cable loss [dB]} + \text{LISN insertion loss [dB]}$$

5.21 Test results, AC Power input port, Class B, L2004 Översidan, ICPSLC24-30NA-IL-1, standby



Diagram, Peak and Average overview sweep

Measurement results, Quasi-peak, Class B

The margin to the limit is at least 20 dB for all frequencies

Measurement results, Average, Class B

The margin to the limit is at least 20 dB for all frequencies

Result [dBµV] = Analyser reading [dBµV] + cable loss [dB] + LISN insertion loss [dB]

5.22 Test equipment

Equipment type	Manufacturer	Model	Inv. No.	Last Cal. date	Cal. interval
Measurement software	Rohde & Schwarz	EMC32	--	--	--
Receiver	Rohde & Schwarz	ESU8	12866	06-2019	1 year
AMN / LISN	Rohde & Schwarz	ESH3-Z5	2728	06-2019	1 year
Pulse limiter	Rohde & Schwarz	ESH3-Z3	4623	03-2019	13 months
Cable	Huber+Suhner	RG223/U	9815	06-2019	1 year
Cable	Surhner	GO3232D-01	9701	06-2019	1 year

6. RADIATED RF EMISSION IN THE FREQUENCY-RANGE 30 MHZ – 1 GHZ

6.1 Operating environment

Date of test:	Temperature:	Relative Humidity:
May 15, 2020	20 [°C]	22 [%]
May 20, 2020	21 [°C]	29 [%]
June 5, 2020	20 [°C]	56 [%]

6.2 Test setup and test procedure

The test method is in accordance with ANSI C63.4.

The EUT was set up according to the standard

The EUT was placed on an insulating support 0.8 m above the turntable which is part of the reference ground plane.

Overview sweeps were performed with the measurement receiver in max-hold mode and the peak detector activated in the frequency-range 30 – 1000 MHz.

6.3 Test conditions

Test setup:

30 – 1000 MHz

Test receiver set-up:

Preview test:

Peak, RBW 120 kHz VBW 1 MHz

Final test:

Quasi-Peak, RBW 120 kHz

Measuring distance:

3 m

Measuring angle:

0 – 359°

Antenna

Height above ground plane:

1 – 4 m

Polarisation:

Vertical and Horizontal

Type:

Bilog

6.4 Measurement uncertainty

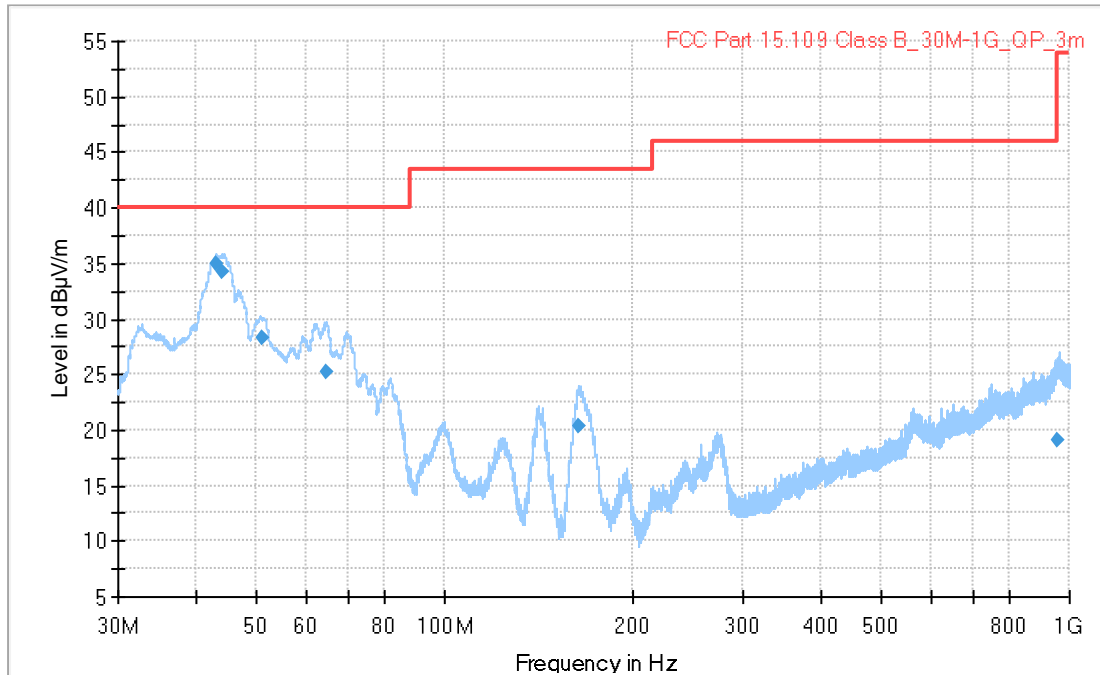
Measurement uncertainty for radiated disturbance

Uncertainty for the frequency range 30 to 1000 MHz at 3 m ± 5.1 dB

Measurement uncertainty is calculated in accordance with CISPR 16-4-2:2011.

The measurement uncertainty is given with a confidence of 95 %.

6.5 Test results, 30 – 1000 MHz, FCC, Class B, L2002 Översidan, ICPSLC24-10NA-IL-1, max intensity



Diagram, Peak overview sweep, 30 – 1000 MHz at 3 m distance.

Measurement results, Quasi Peak, Class B

Frequency [MHz]	Result [dBµV/m]	Limit [dBµV/m]	Polarization H/V	Margin [dB]
43.080	35.1	40.0	V	4.9*
44.010	34.2	40.0	V	5.8
51.150	28.3	40.0	V	11.7
64.620	25.2	40.0	V	14.8

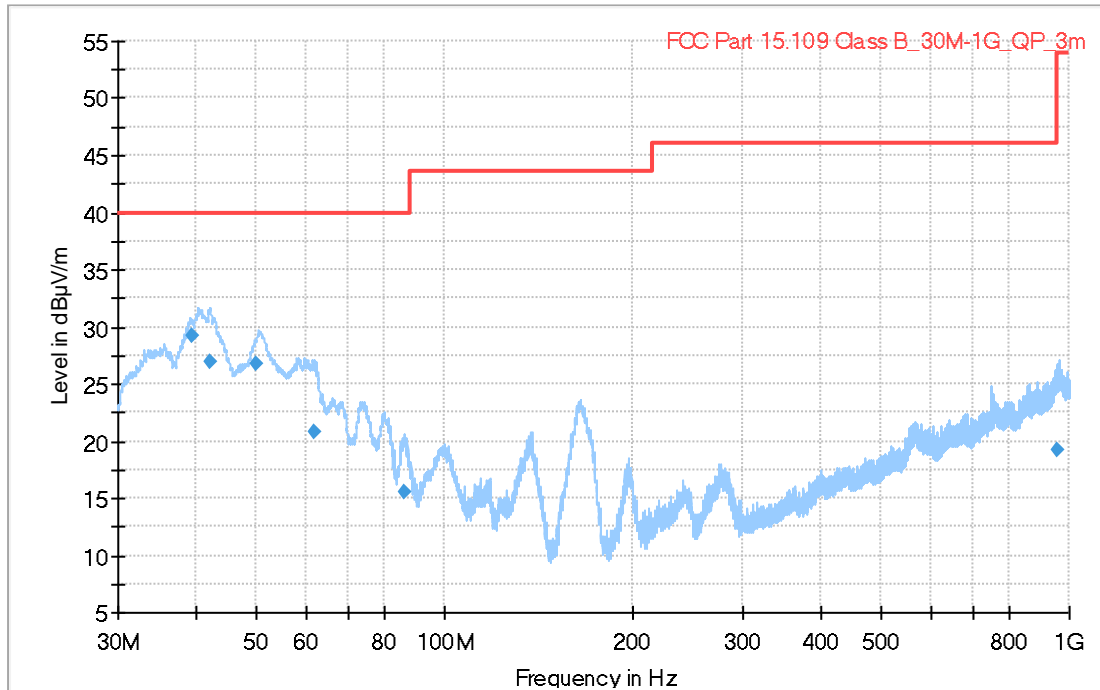
* The measured result is below the limit by a margin of less than the measurement uncertainty; it is therefore not possible to state compliance based on the 95% level of confidence. However, the result indicates that compliance is more probable than non-compliance with the specification limit.

All other measured disturbances have a margin of more than 20 dB to the limits.

Result [dBµV/m] = Analyser reading [dBµV] + Antenna factor [1/m] - Amplifier gain [dB] + Cable loss [dB]

The EUT also fulfils the limit for ICES-005, see limit table, clause 3.5 Compliance in this test report.

6.6 Test results, 30 – 1000 MHz, FCC, Class B, L2002 Översidan, ICPSLC24-10NA-IL-1, min intensity



Diagram, Peak overview sweep, 30 – 1000 MHz at 3 m distance.

Measurement results, Quasi Peak, Class B

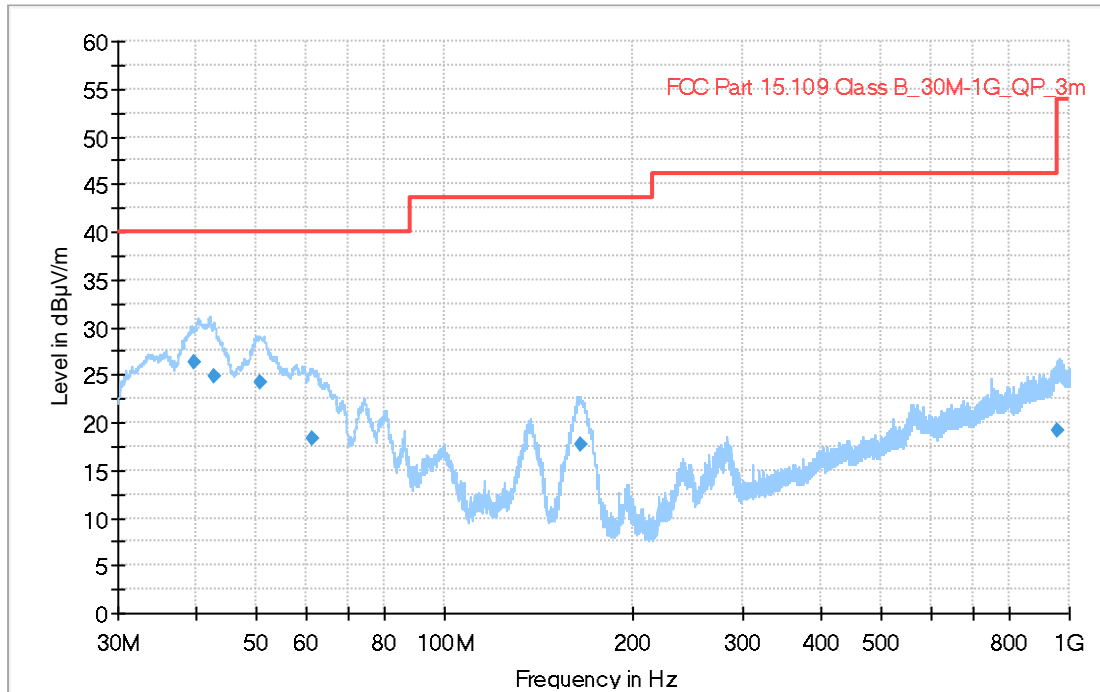
Frequency [MHz]	Result [dBµV/m]	Limit [dBµV/m]	Polarization H/V	Margin [dB]
39.450	29.3	40.0	V	10.7
42.150	27.0	40.0	V	13.0
49.980	26.8	40.0	V	13.2
61.860	20.7	40.0	V	19.3

All other measured disturbances have a margin of more than 20 dB to the limits.

Result [dBµV/m] = Analyser reading [dBµV] + Antenna factor [1/m] - Amplifier gain [dB] + Cable loss [dB]

The EUT also fulfils the limit for ICES-005, see limit table, clause 3.5 Compliance in this test report.

6.7 Test results, 30 – 1000 MHz, FCC, Class B, L2002 Översidan, ICPSLC24-10NA-IL-1, standby



Diagram, Peak overview sweep, 30 – 1000 MHz at 3 m distance.

Measurement results, Quasi Peak, Class B

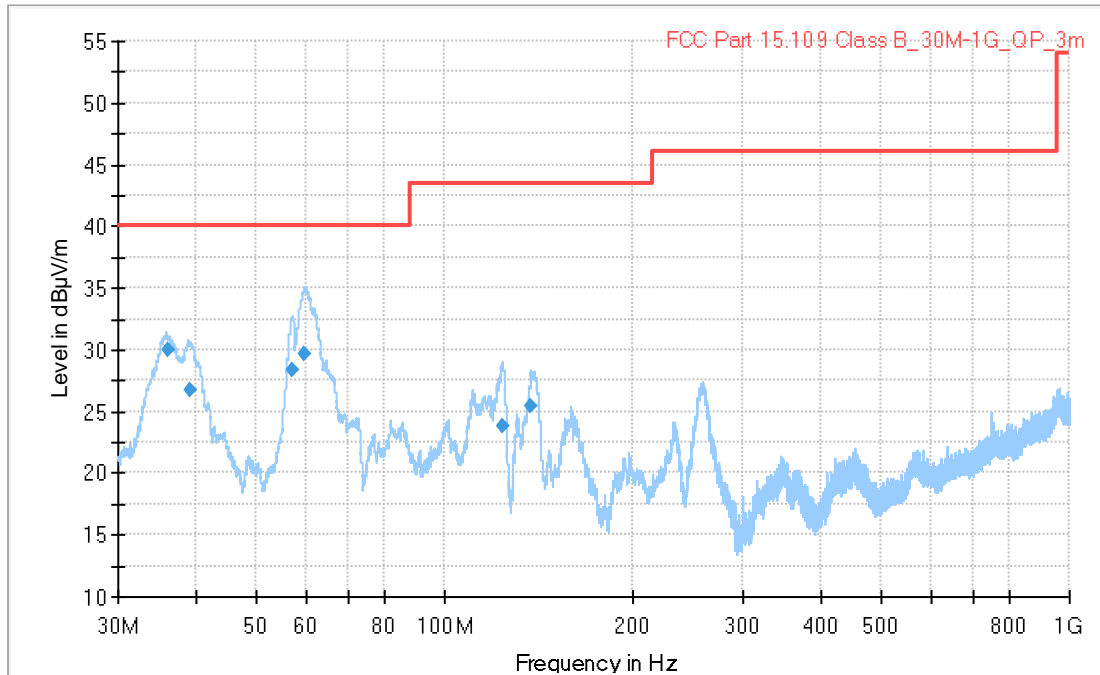
Frequency [MHz]	Result [dBµV/m]	Limit [dBµV/m]	Polarization H/V	Margin [dB]
39.630	26.3	40.0	V	13.7
42.720	24.9	40.0	V	15.1
50.580	24.1	40.0	V	15.9

All other measured disturbances have a margin of more than 20 dB to the limits.

Result [dBµV/m] = Analyser reading [dBµV] + Antenna factor [1/m] - Amplifier gain [dB] + Cable loss [dB]

The EUT also fulfils the limit for ICES-005, see limit table, clause 3.5 Compliance in this test report.

6.8 Test results, 30 – 1000 MHz, FCC, Class B, L2002 Översidan, ICPSLC24-30NA-IL-1, max intensity



Diagram, Peak overview sweep, 30 – 1000 MHz at 3 m distance.

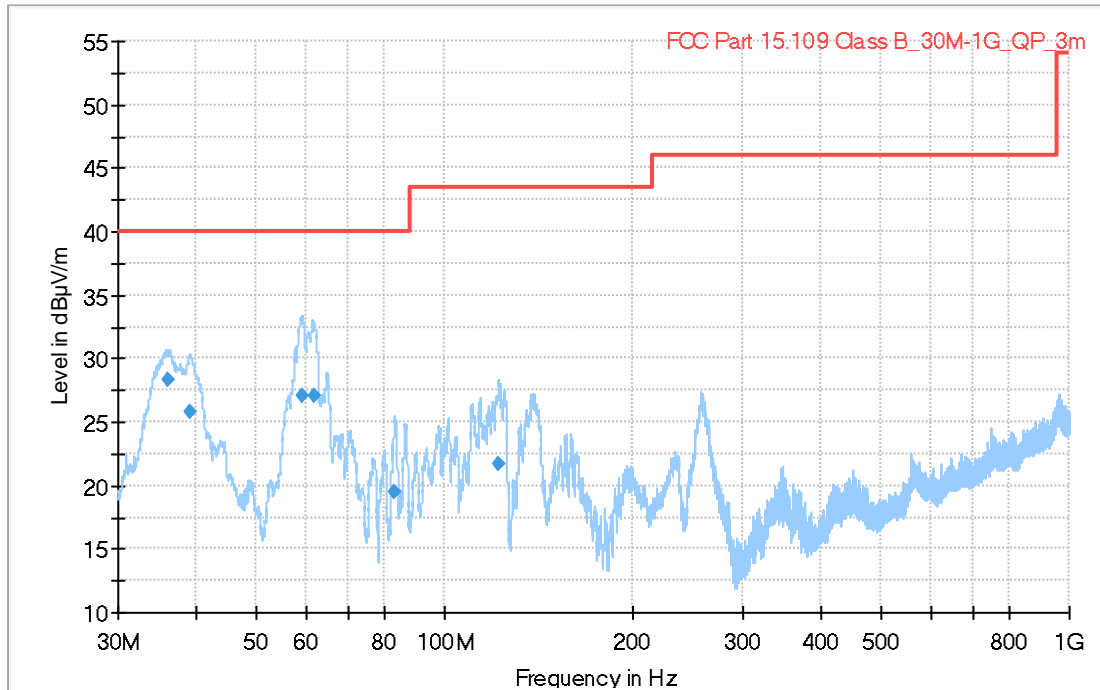
Measurement results, Quasi Peak, Class B

Frequency [MHz]	Result [dBµV/m]	Limit [dBµV/m]	Polarization H/V	Margin [dB]
36.030	30.1	40.0	V	9.9
39.210	26.8	40.0	V	13.2
57.030	28.3	40.0	V	11.7
59.730	29.6	40.0	V	10.4
123.480	23.7	43.5	V	19.8
137.490	25.4	43.5	V	18.1

Result [dBµV/m] = Analyser reading [dBµV] + Antenna factor [1/m] - Amplifier gain [dB] + Cable loss [dB]

The EUT also fulfils the limit for ICES-005, see limit table, clause 3.5 Compliance in this test report.

6.9 Test results, 30 – 1000 MHz, FCC, Class B, L2002 Översidan, ICPSLC24-30NA-IL-1, min intensity



Diagram, Peak overview sweep, 30 – 1000 MHz at 3 m distance.

Measurement results, Quasi Peak, Class B

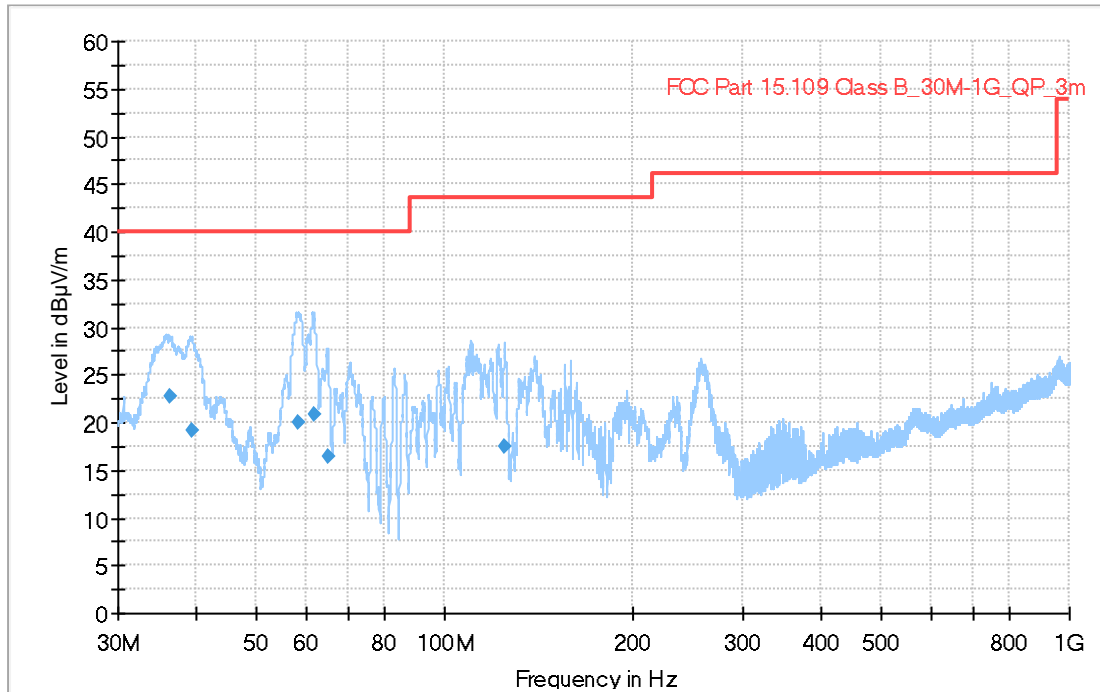
Frequency [MHz]	Result [dBµV/m]	Limit [dBµV/m]	Polarization H/V	Margin [dB]
36.210	28.4	40.0	V	11.6
39.270	25.8	40.0	V	14.2
59.070	27.0	40.0	V	13.0
61.800	27.9	40.0	V	12.1

All other measured disturbances have a margin of more than 20 dB to the limits.

Result [dBµV/m] = Analyser reading [dBµV] + Antenna factor [1/m] - Amplifier gain [dB] + Cable loss [dB]

The EUT also fulfils the limit for ICES-005, see limit table, clause 3.5 Compliance in this test report.

6.10 Test results, 30 – 1000 MHz, FCC, Class B, L2002 Översidan, ICPSLC24-30NA-IL-1, standby



Diagram, Peak overview sweep, 30 – 1000 MHz at 3 m distance.

Measurement results, Quasi Peak, Class B

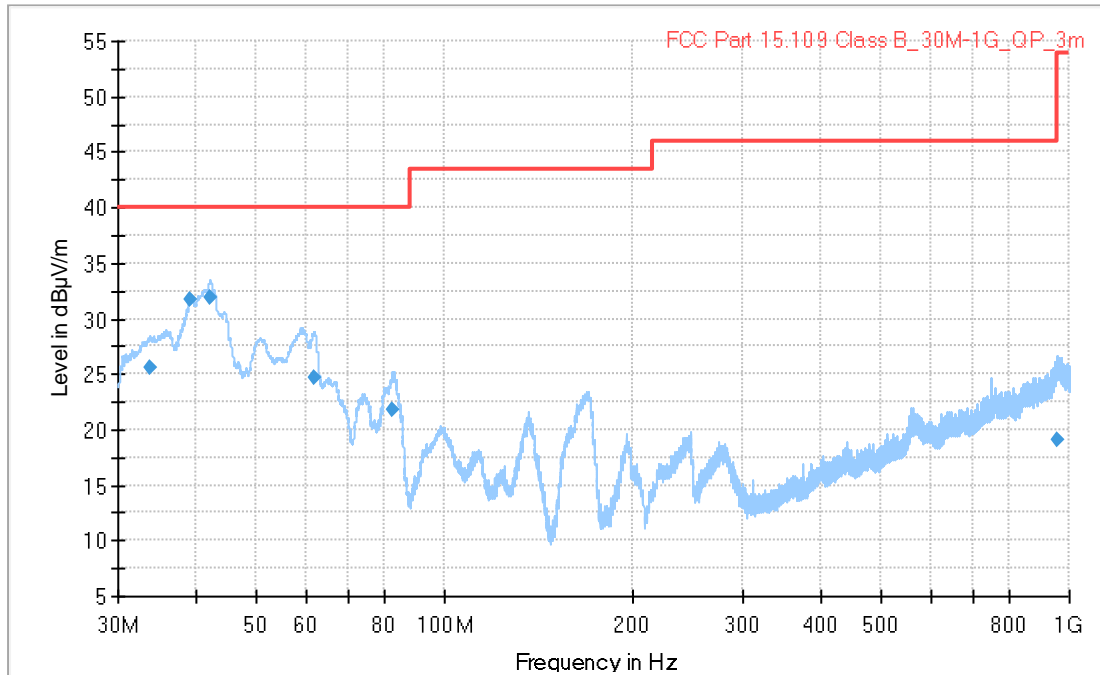
Frequency [MHz]	Result [dBµV/m]	Limit [dBµV/m]	Polarization H/V	Margin [dB]
36.420	22.7	40.0	V	17.3
61.710	20.8	40.0	V	19.2

All other measured disturbances have a margin of more than 20 dB to the limits.

Result [dBµV/m] = Analyser reading [dBµV] + Antenna factor [1/m] - Amplifier gain [dB] + Cable loss [dB]

The EUT also fulfils the limit for ICES-005, see limit table, clause 3.5 Compliance in this test report.

6.11 Test results, 30 – 1000 MHz, FCC, Class B, L2003 Översidan, ICPSLC24-10NA-IL-1, max intensity



Diagram, Peak overview sweep, 30 – 1000 MHz at 3 m distance.

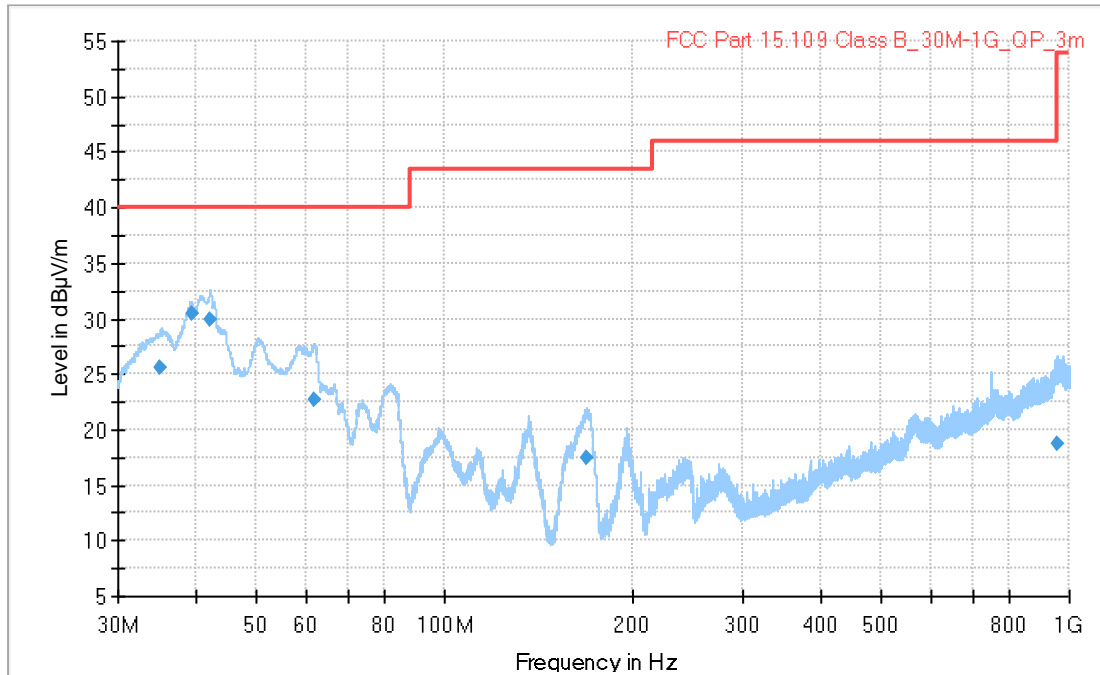
Measurement results, Quasi Peak, Class B

Frequency [MHz]	Result [dBµV/m]	Limit [dBµV/m]	Polarization H/V	Margin [dB]
33.810	25.6	40.0	V	14.4
39.210	31.6	40.0	V	8.4
42.240	31.9	40.0	V	8.1
61.740	24.6	40.0	V	15.4
82.620	21.8	40.0	V	18.2
959.370	19.1	46.0	H	26.9

Result [dBµV/m] = Analyser reading [dBµV] + Antenna factor [1/m] - Amplifier gain [dB] + Cable loss [dB]

The EUT also fulfils the limit for ICES-005, see limit table, clause 3.5 Compliance in this test report.

6.12 Test results, 30 – 1000 MHz, FCC, Class B, L2003 Översidan, ICPSLC24-10NA-IL-1, min intensity



Diagram, Peak overview sweep, 30 – 1000 MHz at 3 m distance.

Measurement results, Quasi Peak, Class B

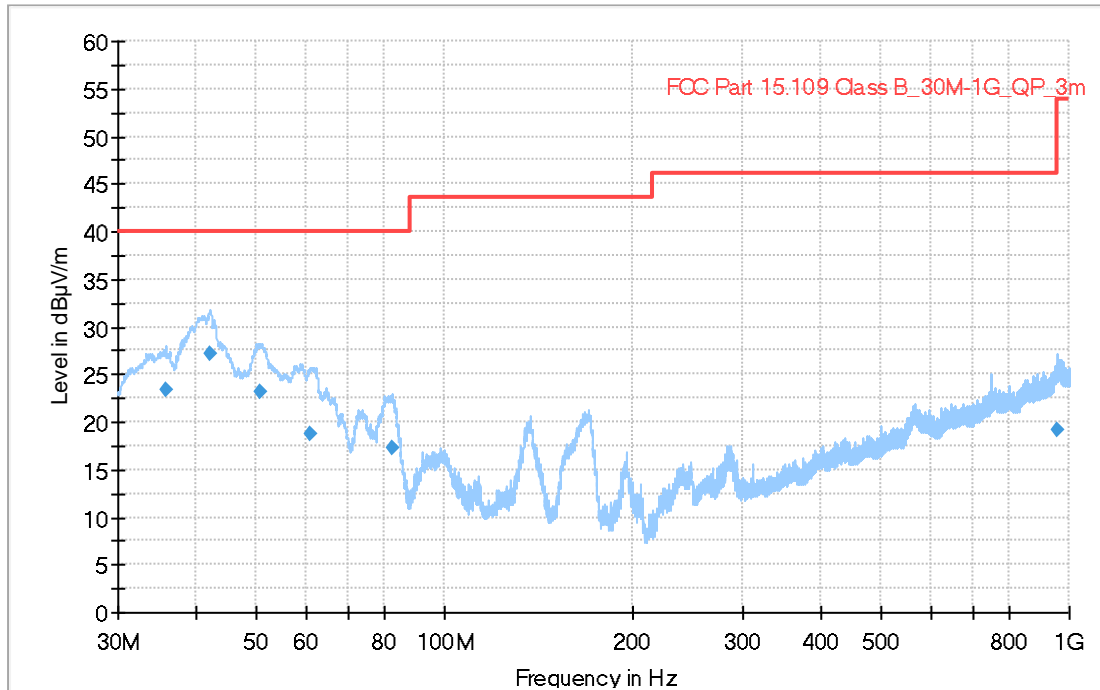
Frequency [MHz]	Result [dBµV/m]	Limit [dBµV/m]	Polarization H/V	Margin [dB]
35.040	25.6	40.0	V	14.4
39.390	30.4	40.0	V	9.6
42.120	29.9	40.0	V	10.1
62.040	22.7	40.0	V	17.3

All other measured disturbances have a margin of more than 20 dB to the limits.

Result [dBµV/m] = Analyser reading [dBµV] + Antenna factor [1/m] - Amplifier gain [dB] + Cable loss [dB]

The EUT also fulfils the limit for ICES-005, see limit table, clause 3.5 Compliance in this test report.

6.13 Test results, 30 – 1000 MHz, FCC, Class B, L2003 Översidan, ICPSLC24-10NA-IL-1, standby



Diagram, Peak overview sweep, 30 – 1000 MHz at 3 m distance.

Measurement results, Quasi Peak, Class B

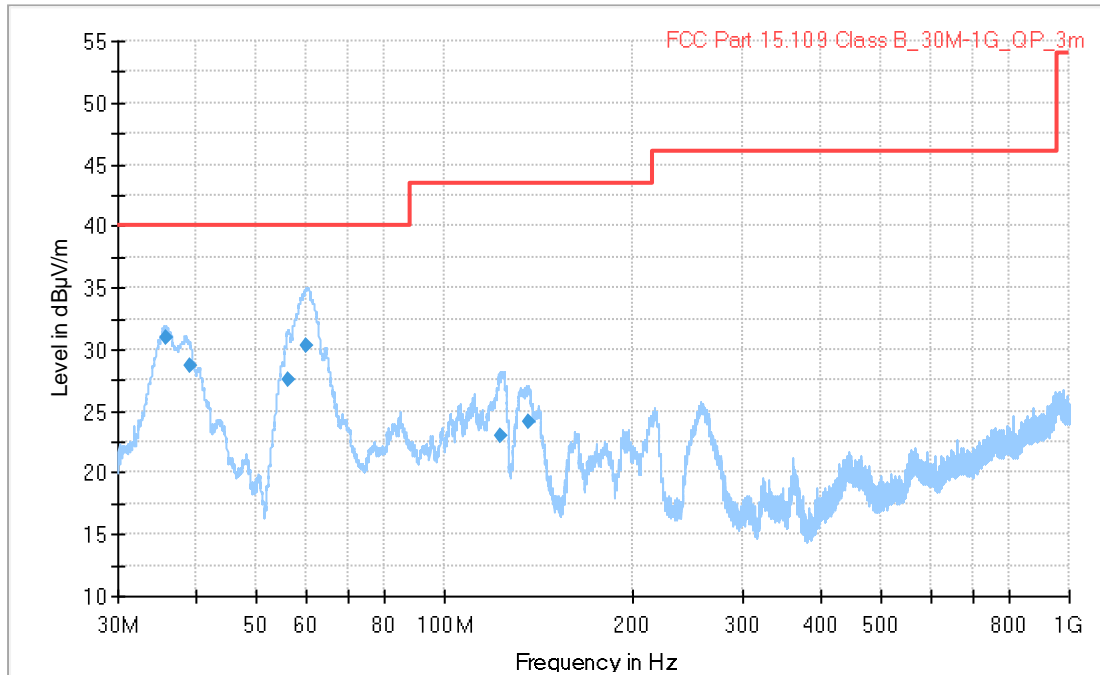
Frequency [MHz]	Result [dBµV/m]	Limit [dBµV/m]	Polarization H/V	Margin [dB]
35.850	23.3	40.0	V	16.7
42.180	27.2	40.0	V	12.8
50.490	23.3	40.0	V	16.7

All other measured disturbances have a margin of more than 20 dB to the limits.

Result [dBµV/m] = Analyser reading [dBµV] + Antenna factor [1/m] - Amplifier gain [dB] + Cable loss [dB]

The EUT also fulfils the limit for ICES-005, see limit table, clause 3.5 Compliance in this test report.

6.14 Test results, 30 – 1000 MHz, FCC, Class B, L2003 Översidan, ICPSLC24-30NA-IL-1, max intensity



Diagram, Peak overview sweep, 30 – 1000 MHz at 3 m distance.

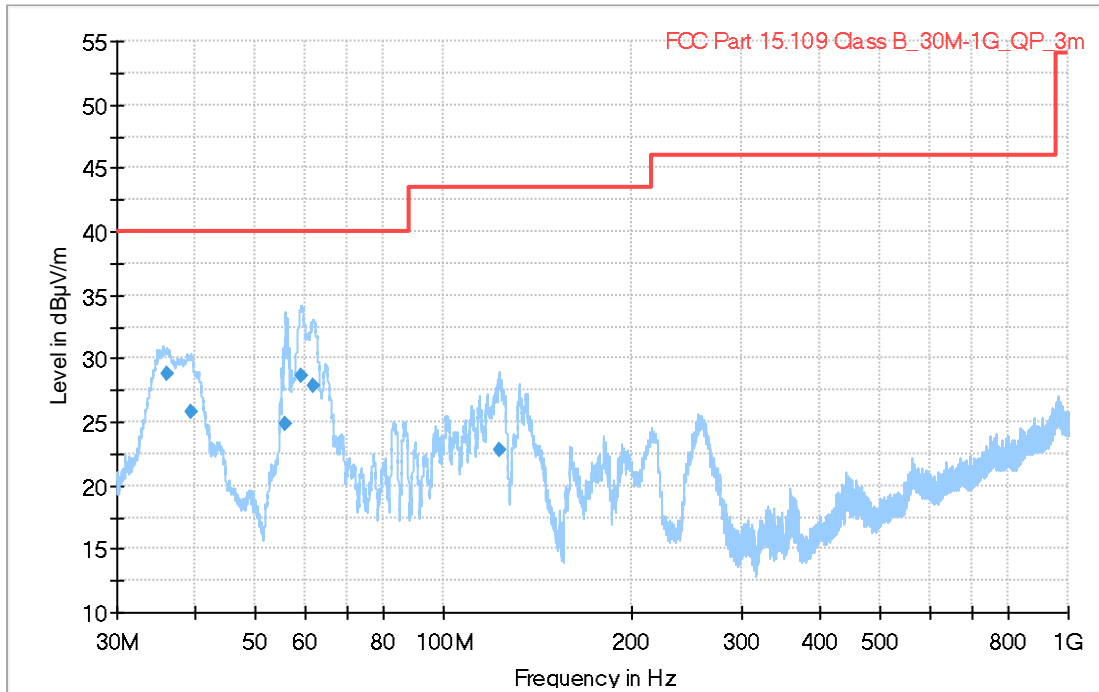
Measurement results, Quasi Peak, Class B

Frequency [MHz]	Result [dBµV/m]	Limit [dBµV/m]	Polarization H/V	Margin [dB]
35.730	30.9	40.0	V	9.1
39.000	28.6	40.0	V	11.4
56.010	27.5	40.0	V	12.5
60.240	30.3	40.0	V	9.7
122.670	22.0	43.5	V	20.5
136.050	24.2	43.5	V	19.3

Result [dBµV/m] = Analyser reading [dBµV] + Antenna factor [1/m] - Amplifier gain [dB] + Cable loss [dB]

The EUT also fulfils the limit for ICES-005, see limit table, clause 3.5 Compliance in this test report.

6.15 Test results, 30 – 1000 MHz, FCC, Class B, L2003 Översidan, ICPSLC24-30NA-IL-1, min intensity



Diagram, Peak overview sweep, 30 – 1000 MHz at 3 m distance.

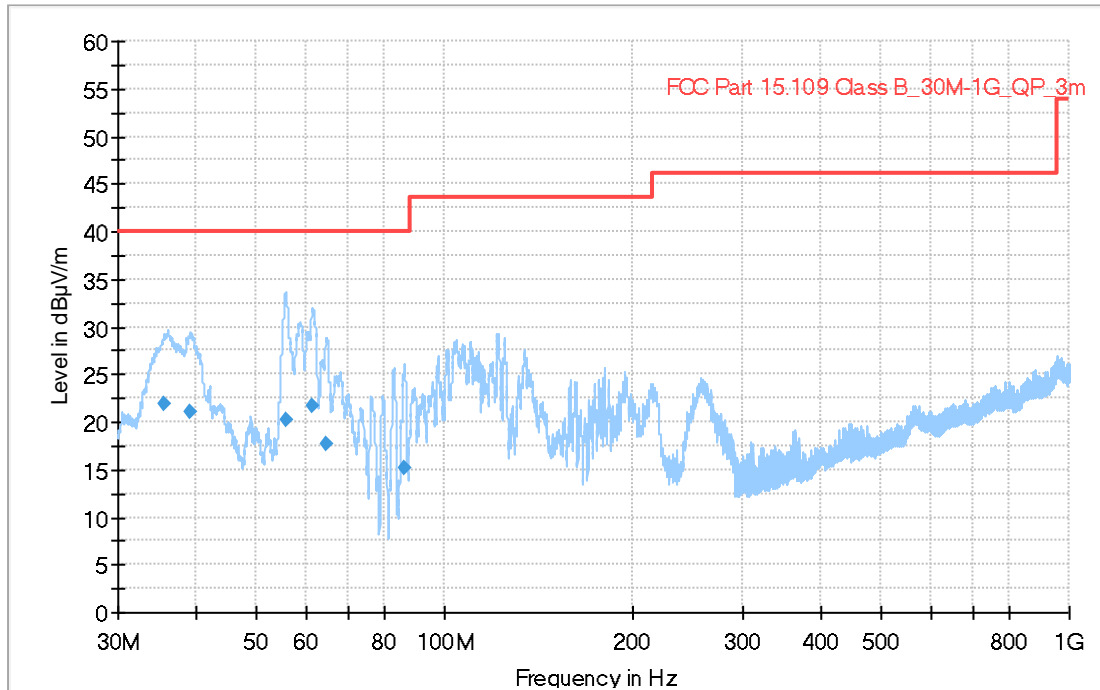
Measurement results, Quasi Peak, Class B

Frequency [MHz]	Result [dBµV/m]	Limit [dBµV/m]	Polarization H/V	Margin [dB]
36.120	28.7	40.0	V	11.3
39.360	25.9	40.0	V	14.1
55.710	24.8	40.0	V	15.2
59.340	28.6	40.0	V	11.4
61.920	27.8	40.0	V	12.2
122.820	22.8	43.5	V	20.7

Result [dBµV/m] = Analyser reading [dBµV] + Antenna factor [1/m] - Amplifier gain [dB] + Cable loss [dB]

The EUT also fulfils the limit for ICES-005, see limit table, clause 3.5 Compliance in this test report.

6.16 Test results, 30 – 1000 MHz, FCC, Class B, L2003 Översidan, ICPSLC24-30NA-IL-1, standby



Diagram, Peak overview sweep, 30 – 1000 MHz at 3 m distance.

Measurement results, Quasi Peak, Class B

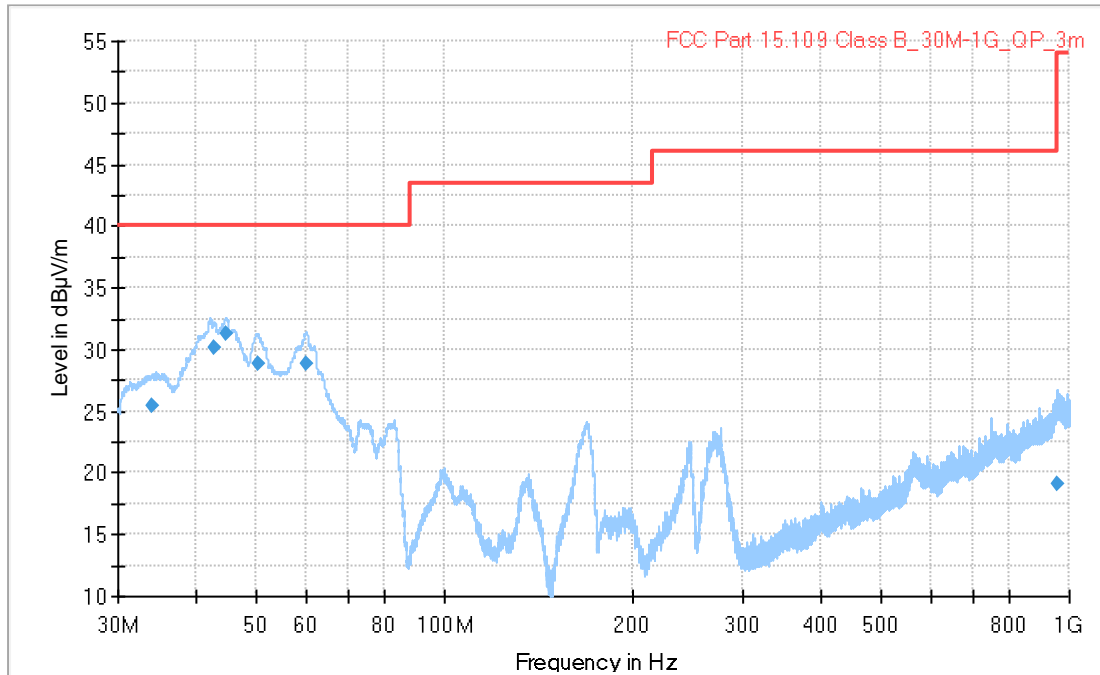
Frequency [MHz]	Result [dBµV/m]	Limit [dBµV/m]	Polarization H/V	Margin [dB]
35.670	22.0	40.0	V	18.0
39.120	21.0	40.0	V	19.0
55.650	20.1	40.0	V	19.9
61.530	21.8	40.0	V	18.2

All other measured disturbances have a margin of more than 20 dB to the limits.

Result [dBµV/m] = Analyser reading [dBµV] + Antenna factor [1/m] - Amplifier gain [dB] + Cable loss [dB]

The EUT also fulfils the limit for ICES-005, see limit table, clause 3.5 Compliance in this test report.

6.17 Test results, 30 – 1000 MHz, FCC, Class B, L2004 Översidan, ICPSLC24-10NA-IL-1, max intensity



Diagram, Peak overview sweep, 30 – 1000 MHz at 3 m distance.

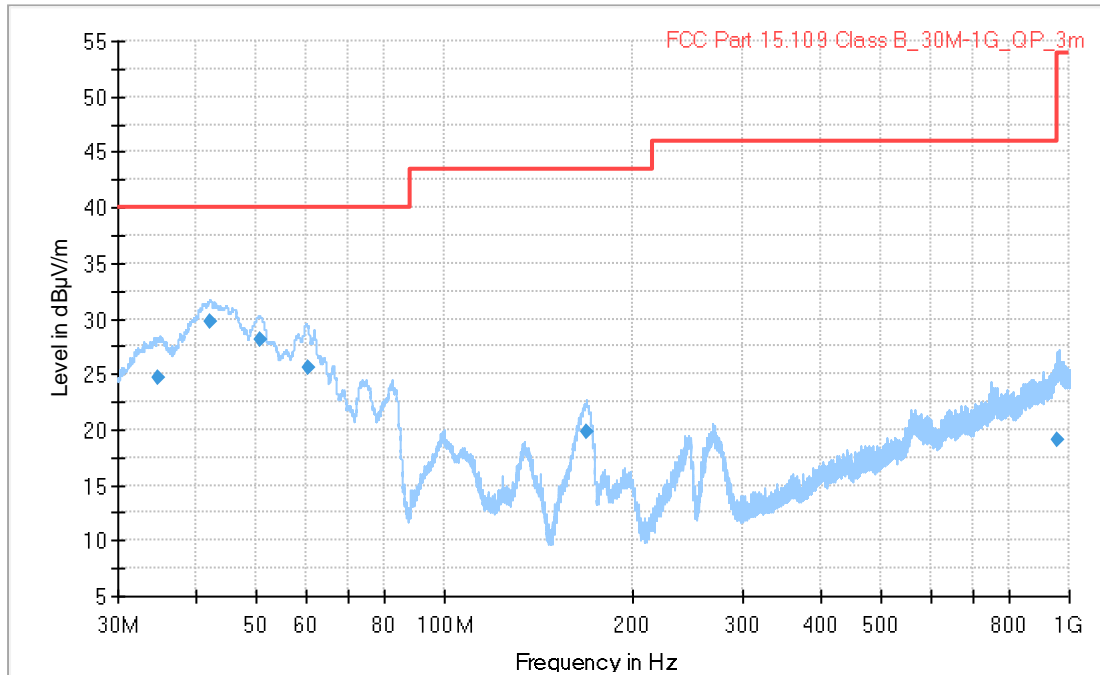
Measurement results, Quasi Peak, Class B

Frequency [MHz]	Result [dBµV/m]	Limit [dBµV/m]	Polarization H/V	Margin [dB]
34.020	25.4	40.0	V	14.6
42.840	30.2	40.0	V	9.8
44.670	31.2	40.0	V	8.8
50.310	28.8	40.0	V	11.2
60.000	28.9	40.0	V	11.1
959.490	19.1	46.0	V	26.9

Result [dBµV/m] = Analyser reading [dBµV] + Antenna factor [1/m] - Amplifier gain [dB] + Cable loss [dB]

The EUT also fulfils the limit for ICES-005, see limit table, clause 3.5 Compliance in this test report.

6.18 Test results, 30 – 1000 MHz, FCC, Class B, L2004 Översidan, ICPSLC24-10NA-IL-1, min intensity



Diagram, Peak overview sweep, 30 – 1000 MHz at 3 m distance.

Measurement results, Quasi Peak, Class B

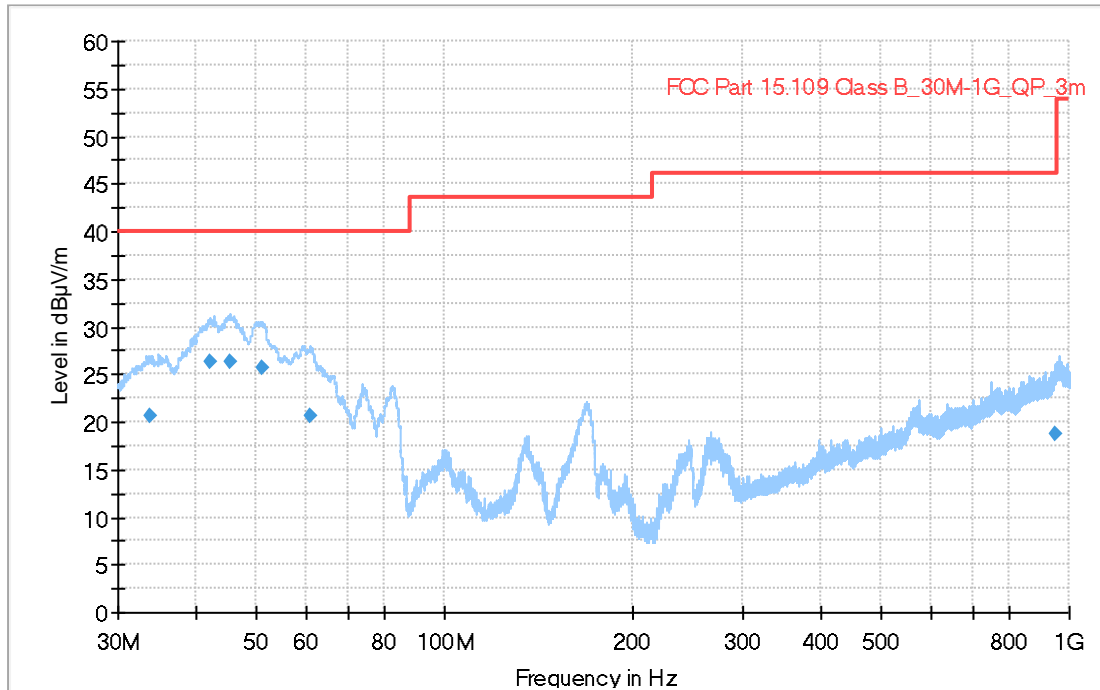
Frequency [MHz]	Result [dBµV/m]	Limit [dBµV/m]	Polarization H/V	Margin [dB]
34.770	24.7	40.0	V	15.3
42.270	29.8	40.0	V	10.2
50.520	28.2	40.0	V	11.8
60.330	25.6	40.0	V	14.4

All other measured disturbances have a margin of more than 20 dB to the limits.

$$\text{Result [dB}\mu\text{V/m]} = \text{Analyser reading [dB}\mu\text{V]} + \text{Antenna factor [1/m]} - \text{Amplifier gain [dB]} + \text{Cable loss [dB]}$$

The EUT also fulfils the limit for ICES-005, see limit table, clause 3.5 Compliance in this test report.

6.19 Test results, 30 – 1000 MHz, FCC, Class B, L2004 Översidan, ICPSLC24-10NA-IL-1, standby



Diagram, Peak overview sweep, 30 – 1000 MHz at 3 m distance.

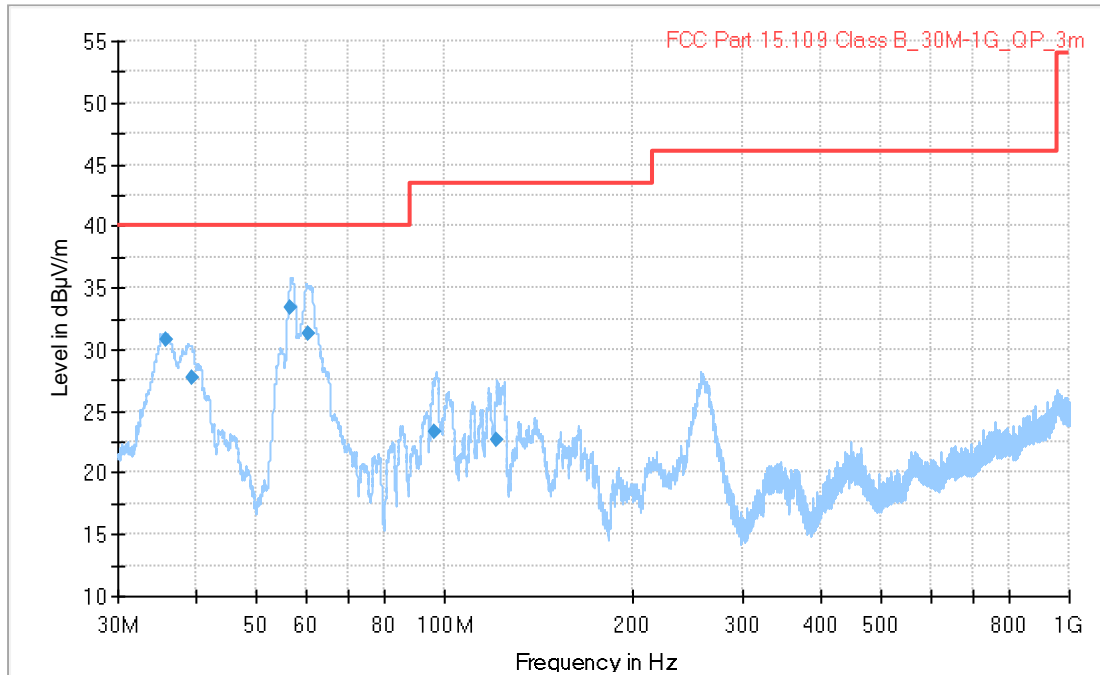
Measurement results, Quasi Peak, Class B

Frequency [MHz]	Result [dBµV/m]	Limit [dBµV/m]	Polarization H/V	Margin [dB]
33.720	20.7	40.0	V	19.3
42.240	26.4	40.0	V	13.6
45.330	26.3	40.0	V	13.7
51.060	25.8	40.0	V	14.2
61.080	20.6	40.0	V	19.4
952.830	18.6	46.0	H	27.4

Result [dBµV/m] = Analyser reading [dBµV] + Antenna factor [1/m] - Amplifier gain [dB] + Cable loss [dB]

The EUT also fulfils the limit for ICES-005, see limit table, clause 3.5 Compliance in this test report.

6.20 Test results, 30 – 1000 MHz, FCC, Class B, L2004 Översidan, ICPSLC24-30NA-IL-1, max intensity



Diagram, Peak overview sweep, 30 – 1000 MHz at 3 m distance.

Measurement results, Quasi Peak, Class B

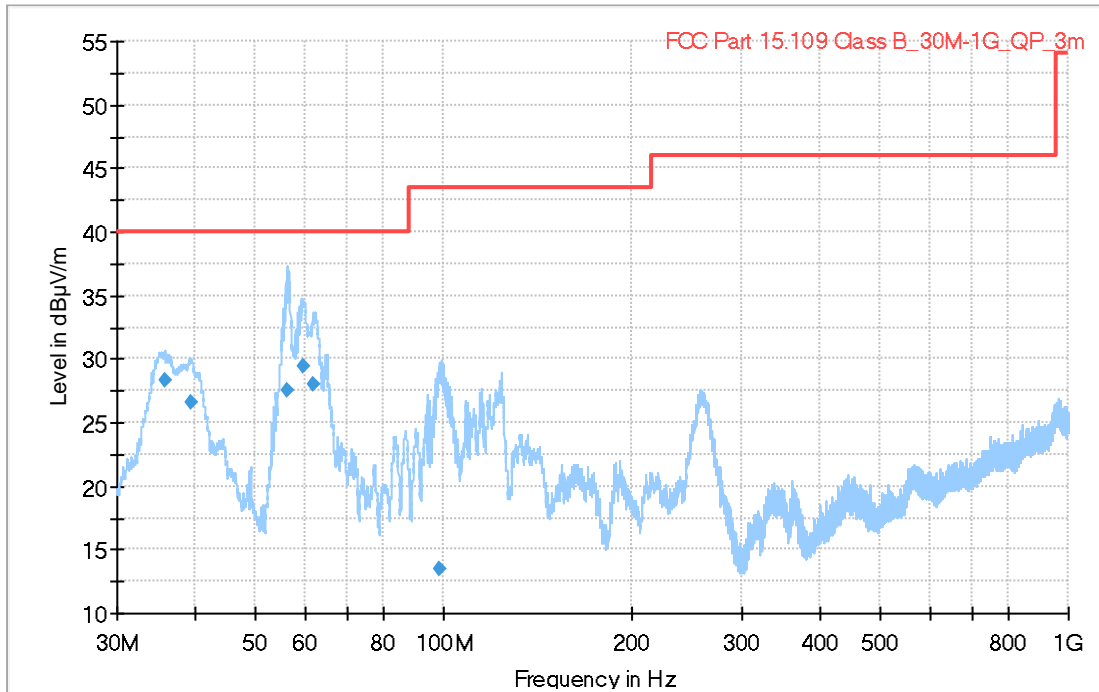
Frequency [MHz]	Result [dBµV/m]	Limit [dBµV/m]	Polarization H/V	Margin [dB]
35.850	30.7	40.0	V	9.3
39.330	27.8	40.0	V	12.2
56.790	33.4	40.0	V	6.6
60.510	31.3	40.0	V	8.7

All other measured disturbances have a margin of more than 20 dB to the limits.

Result [dBµV/m] = Analyser reading [dBµV] + Antenna factor [1/m] - Amplifier gain [dB] + Cable loss [dB]

The EUT also fulfils the limit for ICES-005, see limit table, clause 3.5 Compliance in this test report.

6.21 Test results, 30 – 1000 MHz, FCC, Class B, L2004 Översidan, ICPSLC24-30NA-IL-1, min intensity



Diagram, Peak overview sweep, 30 – 1000 MHz at 3 m distance.

Measurement results, Quasi Peak, Class B

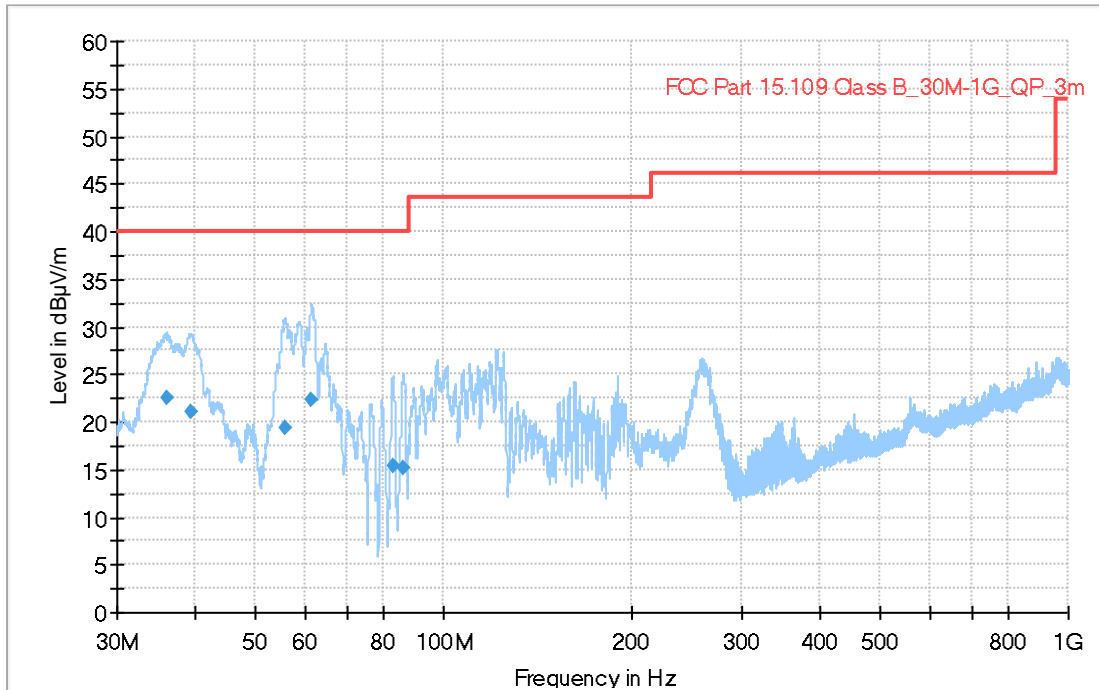
Frequency [MHz]	Result [dBµV/m]	Limit [dBµV/m]	Polarization H/V	Margin [dB]
35.730	28.3	40.0	V	11.7
39.450	26.5	40.0	V	13.5
56.220	27.6	40.0	V	12.4
59.430	29.5	40.0	V	10.5
62.010	28.0	40.0	V	12.0
98.820	13.5	43.5	H	30.0*

* Note: The peak at 98.820 was verified manually

Result [dBµV/m] = Analyser reading [dBµV] + Antenna factor [1/m] - Amplifier gain [dB] + Cable loss [dB]

The EUT also fulfils the limit for ICES-005, see limit table, clause 3.5 Compliance in this test report.

6.22 Test results, 30 – 1000 MHz, FCC, Class B, L2004 Översidan, ICPSLC24-30NA-IL-1, standby



Diagram, Peak overview sweep, 30 – 1000 MHz at 3 m distance.

Measurement results, Quasi Peak, Class B

Frequency [MHz]	Result [dBµV/m]	Limit [dBµV/m]	Polarization H/V	Margin [dB]
36.030	22.4	40.0	V	17.6
39.510	21.2	40.0	V	18.8
61.500	22.3	40.0	V	17.7

All other measured disturbances have a margin of more than 20 dB to the limits.

$$\text{Result [dB}\mu\text{V/m]} = \text{Analyser reading [dB}\mu\text{V]} + \text{Antenna factor [1/m]} - \text{Amplifier gain [dB]} + \text{Cable loss [dB]}$$

The EUT also fulfils the limit for ICES-005, see limit table, clause 3.5 Compliance in this test report.

6.23 Test equipment

Equipment type	Manufacturer	Model	Inv. No.	Last Cal. date	Cal. interval
Measurement software	Rohde & Schwarz	EMC32 -	--	--	--
Measurement Receiver	Rohde & Schwarz	ESW 44	33890	2019-06-28	1 year
Antenna	Teseq	CBL6111D	34200	2020-03-18	1 year
Preamplifier	Semko	AM1331	7992	2019-04-24	13 months*
Measurement cable	Rosenberger	LA5-S003-10000	39163	2019-04-23	13 months*
Measurement cable	Rosenberger	LA5-S003-8500	39148	2020-04-01	1 year
Measurement cable	Suhner	RG214/U	9798	2020-01-15	1 year
Measurement cable	Huber+Suhner	Sucoflex 106	39122	2020-04-16	1 year

* Calibration interval extended based on sufficient calibration data and experience of use