

EMC TEST REPORT

No. 2025001STO-108

Electromagnetic disturbances

EQUIPMENT UNDER TEST

Equipment: Charging station together with Table standing luminaire

Type/Model: E2021 Bettorp and E2022 Bettorp

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 and Subpart C: Intentional radiators. Section 15.209.

ICES-005 Issue 5: Lighting Equipment, Class B (2018)
RSS-216 Issue 2: Wireless Power Transfer Devices
RSS-Gen Issue 5: General Requirements for Compliance of Radio Apparatus

For details, see clause 2 – 4.

Date of issue: April 22, 2021

Tested by:



Anders Lindström

Approved by:



Matti Virkki

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 no.	Release no.	Date of issue	Description
2025001STO-108	1	April 22, 2021	

Terms, definitions and abbreviations

The following terms, definitions and abbreviations may be used throughout the report.

Term/definition/abbreviation	Meaning
AAN	Asymmetrical Artificial Network
AC	Alternating Current
AE	Associated Equipment
AMN	Artificial Mains Network
AV	Average
BW	Bandwidth
CAV	CISPR Average
CM	Common Mode
CMAD	Common Mode Absorption Device
DC	Direct Current
DM	Differential Mode
EM	Electromagnetic
EMC	Electromagnetic Compatibility
EUT	Equipment Under Test
F	Fail
FAR	Fully Anechoic Room
F_x	Highest fundamental frequency generated or used within the EUT, or highest frequency at which it operates
H	Horizontal
I_{ref}	Reference Current
ISN	Impedance Stabilizing Network
MU	Measurement Uncertainty
N/A	Not Applicable
P	Pass
PE	Protective Earth
PK	Peak
Pol.	Polarisation
QP / QPK	Quasi-Peak
RBW	Resolution Bandwidth
RF	Radio Frequency
RGP	Reference Ground Plane
RH	Relative Humidity
RMS	Root Mean Square
Rx	Receiver / Receiving
SAC	Semi-Anechoic Chamber
Tx	Transmitter / Transmitting
V	Vertical
VBW	Video Bandwidth

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	7
2.3 Additional information about the EUT	7
2.4 Peripheral equipment.....	7
2.5 Decision rule	8
3. Test Specifications	9
3.1 Additions, deviations and exclusions from standards and accreditation	9
3.2 Test site.....	9
3.3 Mode of operation during the test	9
4. Test Summary	11
5. Conducted continuous disturbances	12
5.1 Test results, AC Power input port, Class B, Mode no. 1.....	13
5.2 Test results, AC Power input port, Class B, Mode no. 2.....	14
5.3 Test equipment	15
6. Radiated rf Emission in the frequency-range 30 MHz – 1000 MHz	16
6.1 Test results, 30 – 1000 MHz, FCC, Class B, Mode no. 1	18
6.2 Test results, 30 – 1000 MHz, FCC, Class B, Mode no. 2	19
6.3 Test results, 30 – 1000 MHz, FCC, Class B, Mode no. 3	20
6.4 Test equipment	21
7. Radiated electromagnetic disturbances, loop antenna	22
7.1 Test results, Radiated disturbances, 0,009 – 30 MHz, mode no. 1	23
7.2 Test results, Radiated disturbances, 0,009 – 30 MHz, mode no. 2	24
7.3 Test equipment	25

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	Adina Zugrav

2. EQUIPMENT UNDER TEST (EUT)

2.1 Identification of the EUT

Equipment:	Charging station together with Table standing luminaire														
Type/Model:	E2021 Bettorp and E2022 Bettorp														
Brand name:	IKEA														
S/N:	--														
Manufacturer:	IKEA of Sweden AB														
Installation class:	<input type="checkbox"/> I <input checked="" type="checkbox"/> II * <input checked="" type="checkbox"/> III ** <input type="checkbox"/> N/A * Power supply ** Charging station														
Highest clock frequency, F_X:	Induction charger frequency 112 – 148 KHz														
Software version:	-														
Hardware version:	-														
Mounting position: (during normal use)	<input checked="" type="checkbox"/> Table-top <input type="checkbox"/> Floor-standing <input type="checkbox"/> Wall/ceiling <input type="checkbox"/> Hand-held <input type="checkbox"/> Other:														
Supplementary information:															
Input ratings	Voltage [V]	Freq. [Hz]	Current [A]	Power [W]	Coupling										
<input checked="" type="checkbox"/> AC	100-240	50/60		23	<table border="0"> <tr> <td>L1</td> <td>L2</td> <td>L3</td> <td>N</td> <td>PE</td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	L1	L2	L3	N	PE	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
L1	L2	L3	N	PE											
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>											
<input checked="" type="checkbox"/> DC	24			19	<table border="0"> <tr> <td>V+</td> <td>V-</td> <td>PE</td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	V+	V-	PE	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>				
V+	V-	PE													
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>													
<input checked="" type="checkbox"/> Battery	5			5	<table border="0"> <tr> <td>V+</td> <td>V-</td> <td>PE</td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	V+	V-	PE	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>				
V+	V-	PE													
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>													
<input type="checkbox"/> Other:															



Intertek

???????

Type No. E2021

Bettorp

Made in

FCC ID:FHO-E2021

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.

Sup. No.00000



TYP E2021 NA Version 1



Intertek

4002352

Type No. E2022

Bettorp

Made in China

Conforms to: UL Std 153 Certified to: CSA
Std C22.2 No. 250.4
CAN ICES-005 (B) / NMB-005 (B)

Sup. No.22217



TYP B2022 NA Version 1

Photo/copy of marking/rating plate(s)

2.2 Test set up and EUT photos

Test set up and EUT photos are enclosed in a photo annex no. 2105001STO-109 Annex 1

2.3 Additional information about the EUT

The EUT is a Charging station provided with two wireless charging plates. A rechargeable Table standing luminaire is also included. The EUT is tested in a table-top standing configuration.

The EUT has the following noted auxiliary equipment:

Power supply IKEA, type ICPSW24-19-1.

The Power supply is not considered as test-item, however necessary for the function of the EUT, and therefore included in the tests.

The EUT consists of the following units:

Unit	S/N	Description
Charging station	-	IKEA, type E2021 Bettorp
Table standing luminaire	-	IKEA, type E2022 Bettorp

The EUT has the following noted components:

Noted component	Type
Built-in Wireless charger	IKEA, type ICTD-5-BI-3

The EUT has the following ports:

Port type	Port name	Shielded
AC I/O		
<input checked="" type="checkbox"/> AC power input	AC Input power	<input type="checkbox"/>
<input type="checkbox"/> AC power output		<input type="checkbox"/>
DC I/O		
<input checked="" type="checkbox"/> DC power input	DC Input power	<input type="checkbox"/>
<input type="checkbox"/> DC power output		<input type="checkbox"/>
Signal/control I/O		
<input type="checkbox"/> Telecom/network		<input type="checkbox"/>
<input type="checkbox"/> Signal/control		<input type="checkbox"/>
Supplementary information:		

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	Manufacturer	Type/Model	S/N
Cell phone dummy	IKEA	-	-

2.5 Decision rule

The statements of conformity are reported as:

Passed – When the measured values are within the specified limits.

Failed – When one or more measures values are outside the specified limits.

3. TEST SPECIFICATIONS

3.1 Additions, deviations and exclusions from standards and accreditation

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

The following editions of basic standards were applied instead of the standards referenced in FCC 47 CFR Part 15 and ICES-005:

Referenced	Applied
ANSI C63.4-2014	ANSI C63.4-2014
ANSI C63.10-2013	ANSI C63.10-2013
CISPR 15:2015	CISPR 15:2018

3.2 Test site

Measurements were performed at:

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

Intertek Semko AB is an FCC listed test site with site registration number 90913
Intertek Semko AB is an 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 #
<input checked="" type="checkbox"/> STORA HALLEN	Semi-anechoic 10 m and 3 m	2042G-2
<input type="checkbox"/> BJÖRKHALLEN	Semi-anechoic 3 m	2042G-1
<input type="checkbox"/> 5 m CHAMBER	Semi-anechoic 5 m	2042G-3

3.3 Mode of operation during the test

Mode no.	Supply	Description
1	120 V AC, 60 Hz	Induction charger loaded with the luminaire E2022 Bettorp (Light set to maximum) and with a cell phone dummy supplied by the manufacturer.
2	120 V AC, 60 Hz	Charger in standby, no load on charging plate
3	-	Luminaire only, battery operated

Test	Mode of operation
Conducted continuous emission	1,2
Radiated emission of EM fields 30 – 1000 MHz	1,2,3
Radiated emission of EM fields 9 kHz – 30 MHz	1,2

4. TEST SUMMARY

The test has been carried out at the Intertek Semko AB premises in Kista, Sweden.

The results in this report apply only to sample tested.

Result: P – F – N/A

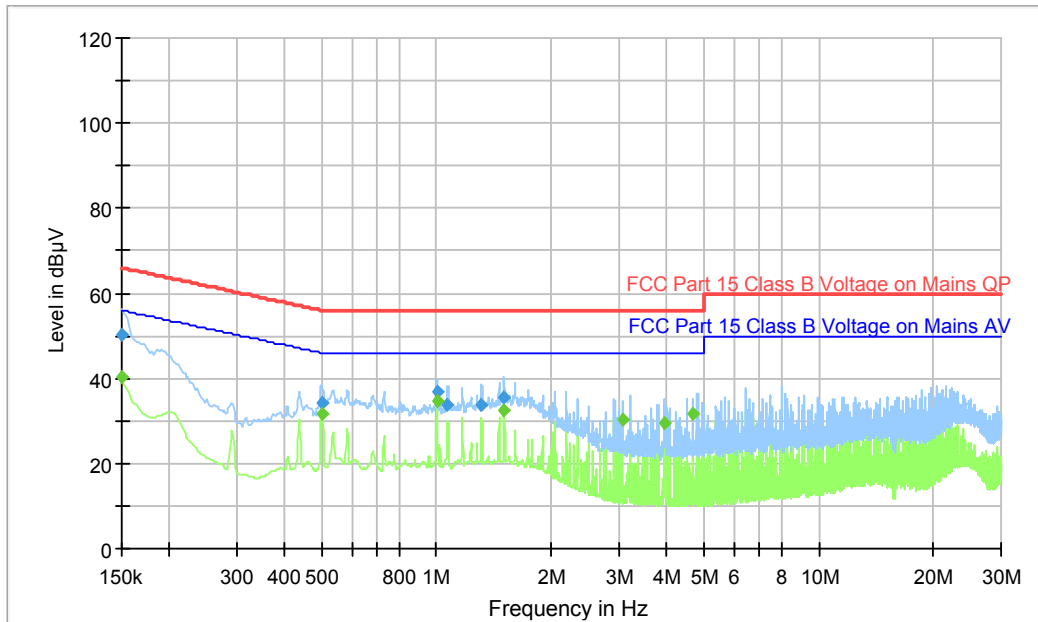
EMISSION TESTS					
Chapter	Standard(s)	Description	Port type(s)	Note(s)	Verdict
4	FCC Part 15 subpart B	Conducted continuous emission	AC input	-	P
4	ICES-005	Conducted continuous emission	AC input	-	P
5	FCC Part 15 subpart B	Radiated emission of EM fields	Enclosure	-	P
5	ICES-005	Radiated emission of EM fields	Enclosure	-	P
6	FCC Part 15 subpart C	Radiated emission of EM fields	Enclosure	-	P
6	RSS-216, RSS-Gen	Radiated emission of EM fields	Enclosure	-	P
Supplementary information:					

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

Date of test	Temp. [°C]	Humidity [%RH]	Tested by
March 4, 2021	22	17	Anders Lindström

Test setup and procedure:	EUT was placed 0.8 m from the AMN /ISN. Overview sweeps were performed for each lead of the cable(s). AE requiring mains power to operate was/were connected to AMN /ISN terminated with 50 Ω, when applicable.		
EUT position:	<input checked="" type="checkbox"/> Table-top (EUT 0.4 m from the RGP) <input type="checkbox"/> Floor-standing (EUT 12 mm from the RGP) <input type="checkbox"/> Other:		
Tested port type(s):	Coupling device	Measurement uncertainty	
		Frequency range	Value
<input checked="" type="checkbox"/> AC power	<input checked="" type="checkbox"/> AMN	0.15 – 30 MHz	± 3.3 dB
Supplementary information: Measurement uncertainty is calculated in accordance with CISPR 16-4-2:2011. The measurement uncertainty is given with a confidence of 95 %.			

5.1 Test results, AC Power input port, Class B, Mode no. 1



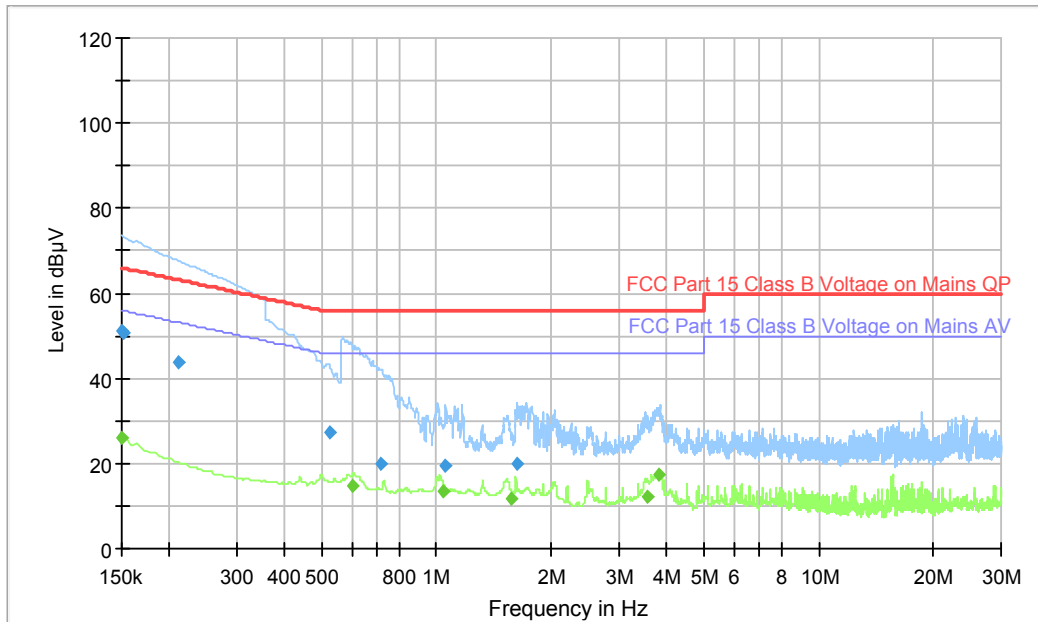
Diagram, Peak and AV overview sweep

Measurement results, Quasi-peak and Average

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	PE
0.150000	---	40.33	56.00	15.67	1000.0	9.000	N	GND
0.150000	50.46	---	66.00	15.54	1000.0	9.000	L1	GND
0.501000	---	31.46	46.00	14.54	1000.0	9.000	N	GND
0.501000	34.42	---	56.00	21.58	1000.0	9.000	N	GND
1.002750	---	34.61	46.00	11.39	1000.0	9.000	N	GND
1.002750	36.90	---	56.00	19.10	1000.0	9.000	L1	GND
1.068000	33.94	---	56.00	22.06	1000.0	9.000	N	GND
1.313250	33.66	---	56.00	22.34	1000.0	9.000	L1	GND
1.504500	35.32	---	56.00	20.68	1000.0	9.000	L1	GND
1.504500	---	32.31	46.00	13.69	1000.0	9.000	N	GND
3.057000	---	30.51	46.00	15.49	1000.0	9.000	N	GND
3.930000	---	29.50	46.00	16.50	1000.0	9.000	N	GND
4.659000	---	31.82	46.00	14.18	1000.0	9.000	N	GND

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

5.2 Test results, AC Power input port, Class B, Mode no. 2



Diagram, Peak and AV overview sweep

Measurement results, Quasi-peak and Average

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	PE
0.150000	---	26.10	56.00	29.97	1000.0	9.000	L1	GND
0.150000	51.03	---	66.00	14.97	1000.0	9.000	L1	GND
0.152250	50.90	---	65.88	14.98	1000.0	9.000	L1	GND
0.210750	43.72	---	63.18	19.46	1000.0	9.000	N	GND
0.528000	27.14	---	56.00	28.86	1000.0	9.000	L1	GND
0.602250	---	14.85	46.00	31.15	1000.0	9.000	L1	GND
0.717000	19.96	---	56.00	36.04	1000.0	9.000	N	GND
1.043250	---	13.64	46.00	32.36	1000.0	9.000	N	GND
1.050000	19.41	---	56.00	36.59	1000.0	9.000	L1	GND
1.574250	---	11.71	46.00	34.29	1000.0	9.000	N	GND
1.617000	20.03	---	56.00	35.97	1000.0	9.000	N	GND
3.547500	---	12.21	46.00	33.79	1000.0	9.000	N	GND
3.799500	---	17.24	46.00	28.76	1000.0	9.000	N	GND

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

5.3 Test equipment

Equipment type	Manufacturer	Model	Inv. No.	Last Cal. date	Cal. interval
Measurement software	Rohde & Schwarz	EMC32 - Version	--	--	--
Receiver	Rohde & Schwarz	ESU 8	12866	July 2020	1 year
AMN / LISN	Rohde & Schwarz	ESH3-Z5	2728	July 2020	1 year
Pulse limiter	Rohde & Schwarz	ESH3-Z2	4623	May 2020	1 year
Cable	Huber + Suhner	RG 223/U	9815	June 2020	1 year
Cable	Huber	G03232 D-01	9701	June 2020	1 year
Multimeter	Gossen Metrawatt	Metra Hit 16S	8141	June 2020	1 year
Temp/Hygro	Vaisala	HMI41	8335	November 2020	1 year

6. RADIATED RF EMISSION IN THE FREQUENCY-RANGE 30 MHZ – 1000 MHZ

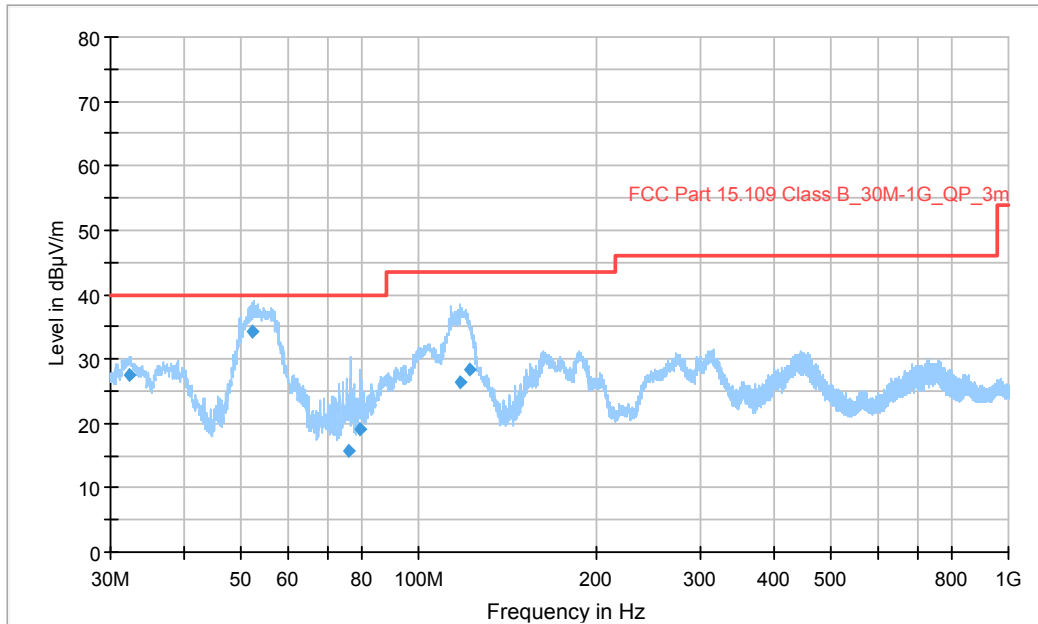
Date of test	Temp. [°C]	Humidity [%RH]	Tested by
March 5, 2021	22	14	Anders Lindström

Test setup and procedure:	The EUT was placed on a non-conductive support on the RGP. Overview sweeps were performed with the measurement receiver in max hold mode and the peak detector activated in the frequency range 30 – 1000 MHz. Above 1 GHz, both the peak and average detectors were activated, when applicable. During height scan above 1 GHz the EUT was kept in antennas cone of radiation.		
EUT position:	<input checked="" type="checkbox"/> Table-top (EUT 0.8 m from the RGP) <input type="checkbox"/> Floor-standing (EUT 12 mm from the RGP) <input type="checkbox"/> Other:		
Highest measured frequency:	<input checked="" type="checkbox"/> $F_X \leq 108$ MHz: 1 GHz <input type="checkbox"/> $108 \text{ MHz} < F_X \leq 500$ MHz: 2 GHz <input type="checkbox"/> $500 \text{ MHz} < F_X \leq 1$ GHz: 5 GHz <input type="checkbox"/> $F_X > 1$ GHz: $5 \times F_X$ up to a max. of 40 GHz <input type="checkbox"/> F_X is unknown: 40 GHz		
Frequency range:	Measuring distance	Measurement uncertainty	
<input checked="" type="checkbox"/> 30 to 1000 MHz	3 m	± 5.1 dB	
<input type="checkbox"/> 30 to 1000 MHz	10 m	± 5.0 dB	
<input type="checkbox"/> 1.0 to 18 GHz	3 m	± 4.5 dB	
<input type="checkbox"/> 18 to 26 GHz	3 m	± 4.8 dB	
<input type="checkbox"/> 26 to 40 GHz	3 m	± 5.7 dB	
Supplementary information: Measurement uncertainty is calculated in accordance with CISPR 16-4-2:2011. The measurement uncertainty is given with a confidence of 95 %.			

Test	Freq. [MHz]	Meas. angle [°]	Antenna			RBW [kHz]			VBW [kHz]
			Type	Height	Pol.	QP	PK	AV	PK
Preview	30 – 1000	0 – 359	Bilog	1 – 4 m	V and H	-	120	-	1000
Final						120	-	-	
Preview	1000 – 40000	0 – 359	Horn	1 – 4 m	V and H	-	1000	1000	3000
Final						-	1000	1000	-

Measurement distance [m]	Frequency [MHz]	Limits [dBµV/m]		
		QP	PK	AV
Limits, FCC, Class A				
<input type="checkbox"/> 3 / <input type="checkbox"/> 10	30 – 88	49.6 / 39.1	-	-
	88 – 216	54.0 / 43.5	-	-
	216 – 960	56.9 / 46.4	-	-
	960 – 1000	60.0 / 49.5	-	-
<input type="checkbox"/> 3	Above 1000	-	80.0	60.0
Limits, FCC, Class B				
<input checked="" type="checkbox"/> 3 / <input type="checkbox"/> 10	30 – 88	40.0 / 29.5	-	-
	88 – 216	43.5 / 33.1	-	-
	216 – 960	46.0 / 35.6	-	-
	960 – 1000	54.0 / 43.5	-	-
<input type="checkbox"/> 3	Above 1000	-	74.0	54.0
Limits, ICES-005 Class A				
<input type="checkbox"/> 3 / <input type="checkbox"/> 10	30 – 88	49.5 / 39.1	-	-
	88 – 216	54.0 / 43.5	-	-
	230 – 1000	56.9 / 46.4	-	-
Limits, ICES-005, Class B				
<input checked="" type="checkbox"/> 3 / <input type="checkbox"/> 10	30 – 88	40.0 / 29.5	-	-
	88 – 216	43.5 / 33.1	-	-
	230 – 1000	46.0 / 35.6	-	-

6.1 Test results, 30 – 1000 MHz, FCC, Class B, Mode no. 1



Diagram, Peak overview sweep

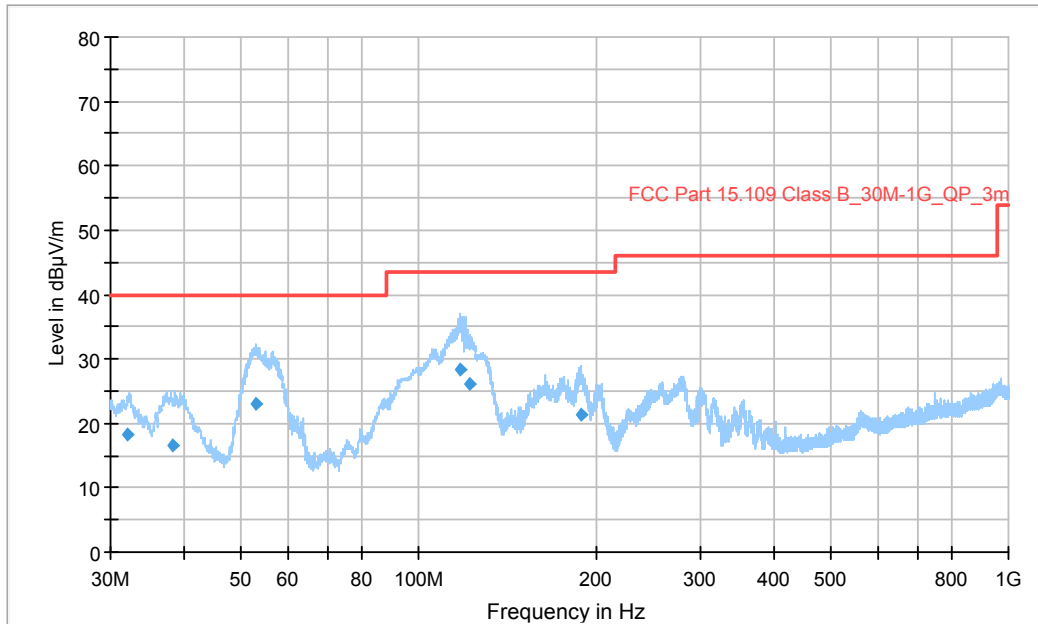
Measurement results, Quasi-peak

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
32.220	27.49	40.00	12.51	1000.0	120.0	111.0	V	239.0
52.320	34.27	40.00	5.73	1000.0	120.0	133.0	V	120.0
76.320	15.63	40.00	24.37	1000.0	120.0	100.0	V	281.0
79.650	18.97	40.00	21.03	1000.0	120.0	116.0	V	283.0
117.480	26.49	43.52	17.03	1000.0	120.0	100.0	V	247.0
121.710	28.28	43.52	15.24	1000.0	120.0	105.0	V	319.0

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, page 17.

6.2 Test results, 30 – 1000 MHz, FCC, Class B, Mode no. 2



Diagram, Peak overview sweep

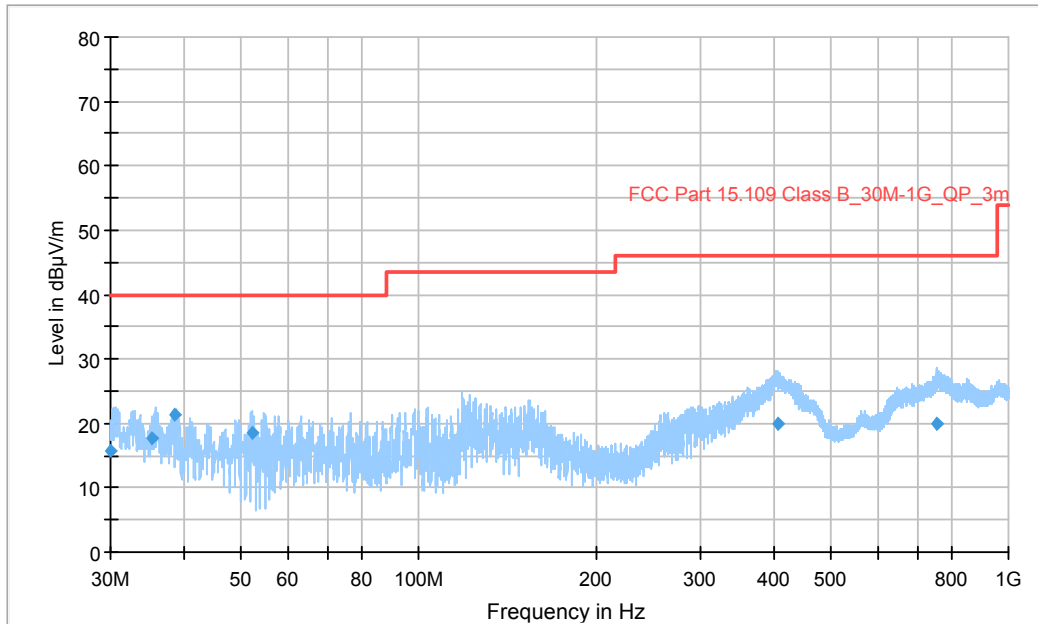
Measurement results, Quasi-peak

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
32.130	18.13	40.00	21.87	1000.0	120.0	100.0	V	171.0
38.400	16.55	40.00	23.45	1000.0	120.0	150.0	V	143.0
53.040	23.10	40.00	16.90	1000.0	120.0	190.0	V	307.0
117.630	28.24	43.52	15.28	1000.0	120.0	100.0	V	275.0
121.710	26.23	43.52	17.29	1000.0	120.0	109.0	V	127.0
188.610	21.39	43.52	22.13	1000.0	120.0	122.0	V	208.0

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, page 17.

6.3 Test results, 30 – 1000 MHz, FCC, Class B, Mode no. 3



Diagram, Peak overview sweep

Measurement results, Quasi-peak

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
30.030	15.68	40.00	24.32	1000.0	120.0	122.0	V	123.0
35.370	17.77	40.00	22.23	1000.0	120.0	100.0	V	173.0
38.550	21.35	40.00	18.65	1000.0	120.0	104.0	V	145.0
52.140	18.40	40.00	21.60	1000.0	120.0	150.0	V	164.0
404.970	19.80	46.02	26.22	1000.0	120.0	141.0	V	280.0
758.070	20.02	46.02	26.00	1000.0	120.0	141.0	V	92.0

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, page 17.

6.4 Test equipment

Equipment type	Manufacturer	Model	Inv. No.	Last Cal. date	Cal. interval
Measurement software	Rohde & Schwarz	EMC32 - Version	--	--	--
Measurement Receiver	Rohde & Schwarz	ESW 44	34030	July 2020	1 year
Antenna	Teseq	CBL 6111D	32400	March 2020	3 year
Preamplifier	Semko	AM1331	S7992	June 2020	1 year
Measurement cable	Huber + Suhner	Sucoflex 106	39122	April 2020	1 year
Measurement cable	Rosenberger	LA5-S003-10000 (UFB293C)	39163	February 2021	1 year
Multimeter	Gossen Metrawatt	Metra Hit 16S	8125	November 2020	1 year
Temp/Hygro	Vaisala	HMI41	31215	June 2020	1 year

7. RADIATED ELECTROMAGNETIC DISTURBANCES, LOOP ANTENNA

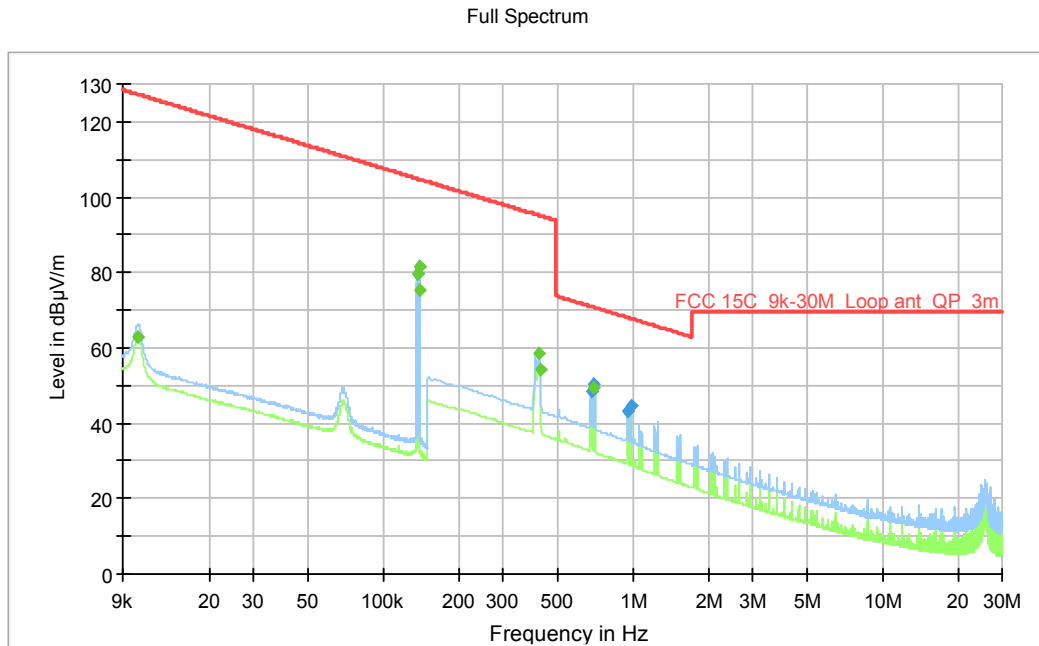
Date of test	Temp. [°C]	Humidity [%RH]	Tested by
March 15, 2021	21	19	Anders Lindström

Test setup and procedure:	The radiated electromagnetic disturbances were measured with a loop antenna. Overview sweeps were performed with the measurement receiver in max hold mode and the peak detector activated in the frequency range 0,009 – 30 MHz.
EUT position:	<input checked="" type="checkbox"/> Loop antenna (The EUT was placed on an insulating support 0,8 m above a turntable which is part of the reference ground plane, an 3 m from the antenna)
Supplementary information:	

Limits FCC 15.209, RSS-216 and RSS-Gen, table 6

Loop antenna, Limits at 3 m distance			
Frequency [MHz]	Field strength at 3 m [dBµV/m]	Detector [dBµV/m] (2)	Measurement uncertainty
0.009 – 0.09	128.5- 108.5 (1)	Average	± 3.2 dB
0.09 – 0.110	108.5 – 106.8 (1)	Quasi-peak	
0.110 – 0.490	106.8 – 93.8 (1)	Average	
0.490 – 1.705	73.8 - 62.9 (1)	Quasi-peak	
1.705 – 30.000	69.5	Quasi-peak	
Supplementary information:			
(1) The limits decrease linearly with the logarithm of the frequency.			
(2) At transitional frequencies the lower limit applies.			
Measurement uncertainty is calculated in accordance with EN 55016-4-2:2011.			
The measurement uncertainty is given with a confidence of 95 %.			

7.1 Test results, Radiated disturbances, 0,009 – 30 MHz, mode no. 1



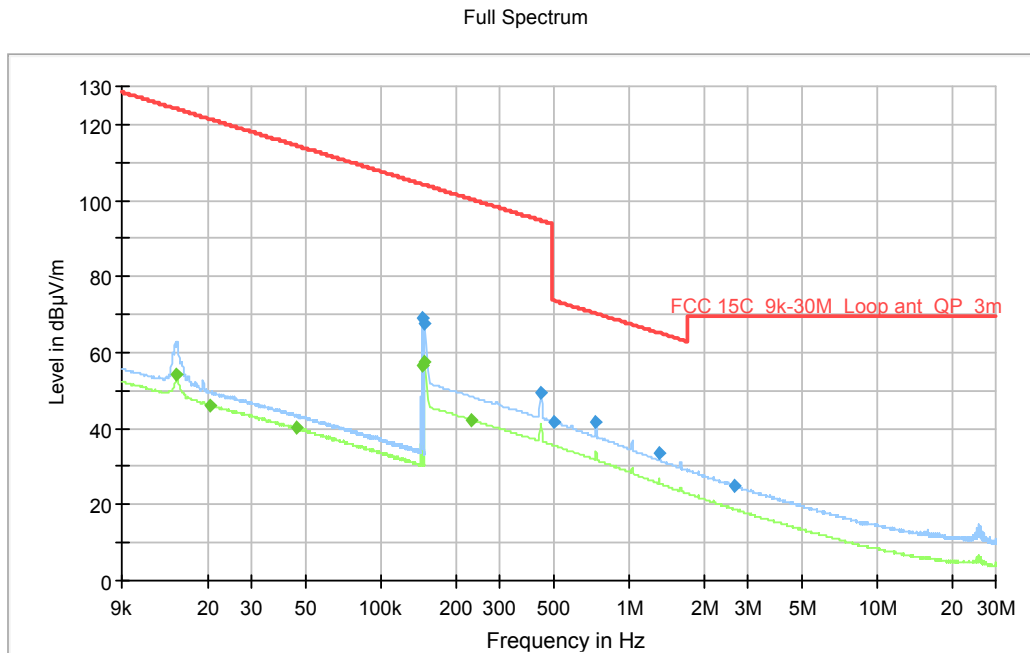
Diagram, Peak overview sweep

Measurement results, Quasi-peak and Average

Frequency (MHz)	QuasiPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol
0.010	---	62.98	128.30	65.32	1500.0	0.2	V
0.136	---	79.72	104.95	25.23	1500.0	0.2	V
0.139	---	81.58	104.74	23.14	1500.0	0.2	V
0.139	---	75.39	104.74	29.35	1500.0	0.2	H
0.418	---	58.56	95.30	36.74	1000.0	9.0	V
0.422	---	54.10	95.10	41.00	1000.0	9.0	V
0.679	48.56	---	70.97	22.41	1000.0	9.0	V
0.697	50.40	---	70.74	20.35	1000.0	9.0	V
0.949	43.38	---	68.06	24.68	1000.0	9.0	V
0.976	44.50	---	67.82	23.32	1000.0	9.0	V

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

7.2 Test results, Radiated disturbances, 0,009 – 30 MHz, mode no. 2



Diagram, Peak overview sweep

Measurement results, Quasi-peak and Average

Frequency (MHz)	QuasiPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol
0.015	---	54.31	127.00	72.69	1500.0	0.2	V
0.020	---	46.06	125.80	79.74	1500.0	0.2	H
0.046	---	40.06	119.40	79.34	1500.0	0.2	V
0.147	---	68.94	104.27	35.33	1500.0	0.2	V
0.147	---	56.46	104.27	47.81	1500.0	0.2	V
0.150	---	57.33	104.08	46.75	1000.0	9.0	V
0.150	---	67.55	104.08	36.53	1000.0	9.0	V
0.231	---	42.36	101.70	59.34	1000.0	9.0	V
0.440	---	49.54	94.73	45.19	1000.0	9.0	V
0.494	41.78	---	73.73	31.95	1000.0	9.0	V
0.735	41.63	---	70.28	28.65	1000.0	9.0	V
1.322	33.48	---	65.18	31.70	1000.0	9.0	V
2.634	25.06	---	69.50	44.44	1000.0	9.0	H

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

7.3 Test equipment

Equipment type	Manufacturer	Model	Inv. No.	Last Cal. date	Cal. interval
Measurement software	Rohde & Schwarz	EMC32 - Version	--	--	--
Measurement Receiver	Rohde & Schwarz	ESW 44	34030	July 2020	1 year
Pulse limiter	Rohde & Schwarz	ESH3-Z2	32457	July 2020	1 year
Loop Antenna	EMCO	6502	8853	January 2019	3 year
Measurement cable	Suhner	RG 214/U	8911	May 2020	1 year
Measurement cable	Suhner	RG 214/U	9798	February 2021	1 year
Measurement cable	Rohde & Schwarz	-	9206	February 2021	1 year
Multimeter	Gossen Metrawatt	Metra Hit 16S	8125	November 2020	1 year
Temp/Hygro	Vaisala	HMI41	31215	June 2020	1 year