

EMC TEST REPORT

No. 2109495STO-102

Electromagnetic disturbances

EQUIPMENT UNDER TEST

Equipment: Decoration lamp with LED
Type/Model: J2112 Stråla
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: December 1, 2021

Tested by:



Viktor Uusimaa



Per Granberg

Approved by:



Anna Näslund

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Revision History

Test report no.	Release no.	Date of issue	Description
2109495STO-104	1	December 1, 2021	

Terms, definition 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
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

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1. CLIENT INFORMATION

The EUT has been tested by request of

Company	IKEA of Sweden AB Box 702 342 12 Älmhult Sweden
Name of contact	Jianqiu Chen
Client observer	--

2. EQUIPMENT UNDER TEST (EUT)

2.1 Identification of the EUT

Equipment:	Decoration luminaire with LED				
Type/Model:	J2112 Stråla				
Brand name:	IKEA				
S/N:	--				
Manufacturer:	IKEA of Sweden AB				
Highest clock frequency, F_x:	< 108 MHz				
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 type="checkbox"/> AC					L1 <input type="checkbox"/> L2 <input type="checkbox"/> L3 <input type="checkbox"/> N <input type="checkbox"/> PE <input type="checkbox"/>
<input checked="" type="checkbox"/> DC	5	-	1	0.26	V+ <input checked="" type="checkbox"/> V- <input checked="" type="checkbox"/> PE <input type="checkbox"/>
<input type="checkbox"/> Battery					V+ <input type="checkbox"/> V- <input type="checkbox"/> PE <input type="checkbox"/>
<input type="checkbox"/> Other:					



??????
Type No. J2112

Stråla

Made in

Conforms to:

UL Std 588

Certified to:

CSA Std C22.2 No. 37

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.

FCC ID: FHO-J2112

5V DC, 0.26W

Sup. No.00000



TYP J2112 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 Annex 1 to this test report.

2.3 Additional information about the EUT

The EUT has the following ports:

Port type	Port name	Shielded
AC I/O		
<input checked="" type="checkbox"/> AC power input	AC Mains*	<input type="checkbox"/>
<input type="checkbox"/> AC power output		<input type="checkbox"/>
DC I/O		
<input checked="" type="checkbox"/> DC power input	Local wired port	<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: *This port is referring to the LED driver of the luminaire which is AE		

The EUT ports were connected according to the following:

Port name	Cable type	Connected to
Local wired port	Two core cable	LED-driver

2.4 Peripheral/auxiliary equipment

Auxiliary

Equipment needed for correct operation of the EUT and is part of the system under test.

Equipment	Manufacturer	Type/Model	S/N
LED-driver	IKEA of Sweden AB	ICPSW5-NA-1	--

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

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
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, 60 Hz	Light switched on

Test	Mode of operation
Conducted continuous emission	1
Radiated emission of EM fields	1

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
5	ANSI C63.4	Conducted continuous emission	AC Mains	-	Pass
6	ANSI C63.4	Radiated emission of EM fields	Enclosure	-	Pass
Supplementary information:					

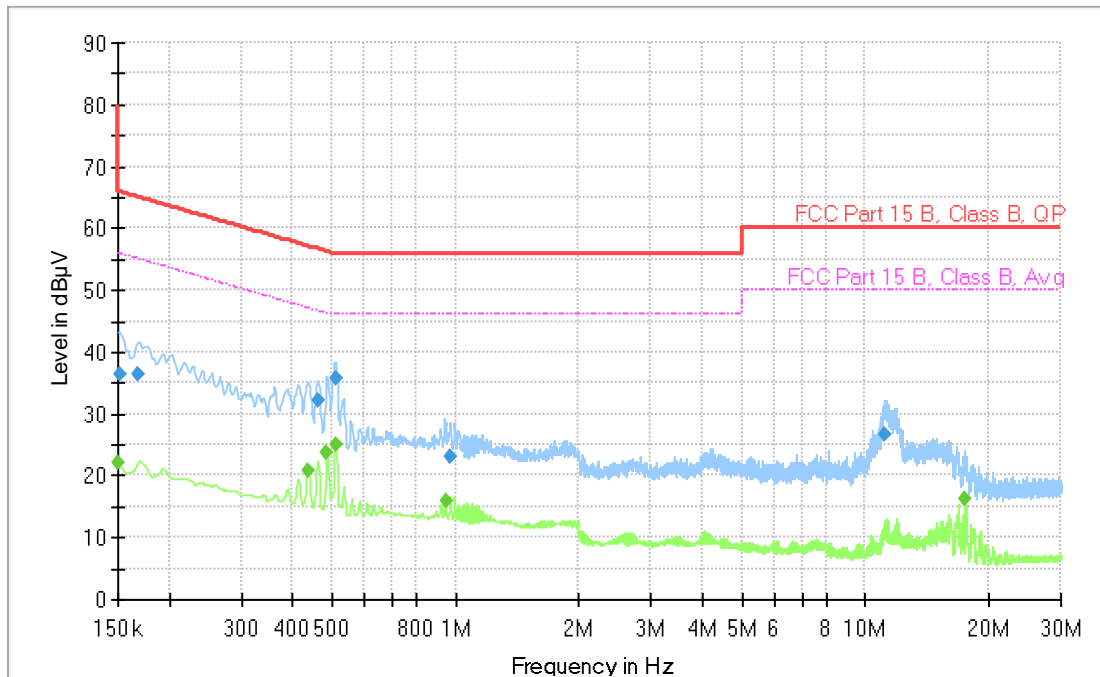
5. CONDUCTED CONTINUOUS DISTURBANCES
in the frequency-range 0.15 – 30 MHz

Date of test	Temp. [°C]	Humidity [%RH]	Tested by
November 17, 2021	21	29	VUU/PEG

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 %.			

Port	Frequency [MHz]	Voltage limits [dBμV] (2)	
		QP	AV
Limits FCC Part 15 subpart B and ICES-005			
<input type="checkbox"/> AC power input Class A	0.15 – 0.50	79	66
	0.50 – 30.0	73	60
<input checked="" type="checkbox"/> AC power input Class B	0.15 – 0.50	66 – 56 (1)	56 – 46 (1)
	0.50 – 5.00	56	46
	5.00 – 30.0	60	50
Supplementary information: (1) The limits decrease linearly with the logarithm of the frequency. (2) At transitional frequencies the lower limit applies.			

5.1 Test results, AC Power input port, Class B



Diagram, Peak and AV overview sweep

Measurement results, Quasi-peak

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	PE	Corr. (dB)
0.152250	36.32	65.88	29.56	1000.0	9.000	N	GND	10.0
0.168000	36.41	65.06	28.65	1000.0	9.000	N	GND	10.0
0.460500	32.23	56.68	24.45	1000.0	9.000	L1	GND	10.0
0.510000	35.83	56.00	20.17	1000.0	9.000	L1	GND	10.0
0.971250	23.22	56.00	32.78	1000.0	9.000	L1	GND	10.0
11.193000	26.61	60.00	33.39	1000.0	9.000	L1	GND	10.4

Measurement results, Average

Frequency (MHz)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	PE	Corr. (dB)
0.150020*	22.23*	56.00	33.77	1000.0	9.000	N	GND	10.0
0.435750	20.94	47.14	26.20	1000.0	9.000	N	GND	10.0
0.485250	23.87	46.25	22.38	1000.0	9.000	N	GND	10.0
0.510000	25.03	46.00	20.97	1000.0	9.000	N	GND	10.0
0.946500	15.81	46.00	30.19	1000.0	9.000	N	GND	10.0
17.499750	16.10	50.00	33.90	1000.0	9.000	N	GND	10.8

5.2 Test equipment

Equipment type	Manufacturer	Model	Inv. No.	Last Cal. date	Cal. interval
Test receiver	Rohde & Schwarz	ESU 8	12866	2021-07-07	1 Year
AMN	Rohde & Schwarz	ESH3-Z5	2728	2021-07-05	1 Year
Power source	CHROMA	61604	31757	--	--
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	32455	2021-07-06	1 Year
Coaxial Cable	Suhner	G03232 D-01	9701	2021-06-07	1 Year
Coaxial Cable	Huber + Suhner	RG 223/U	9815	2021-06-07	1 Year
Multimeter	Gossen Metrawatt	Metra Hit 16S	8141	2021-07-09	1 Year
Thermo/Hygrometer	Vaisala	HMI41	8335	2020-11-06	1 Year

6. RADIATED RF EMISSION IN THE FREQUENCY-RANGE 30 MHz – 1 GHz

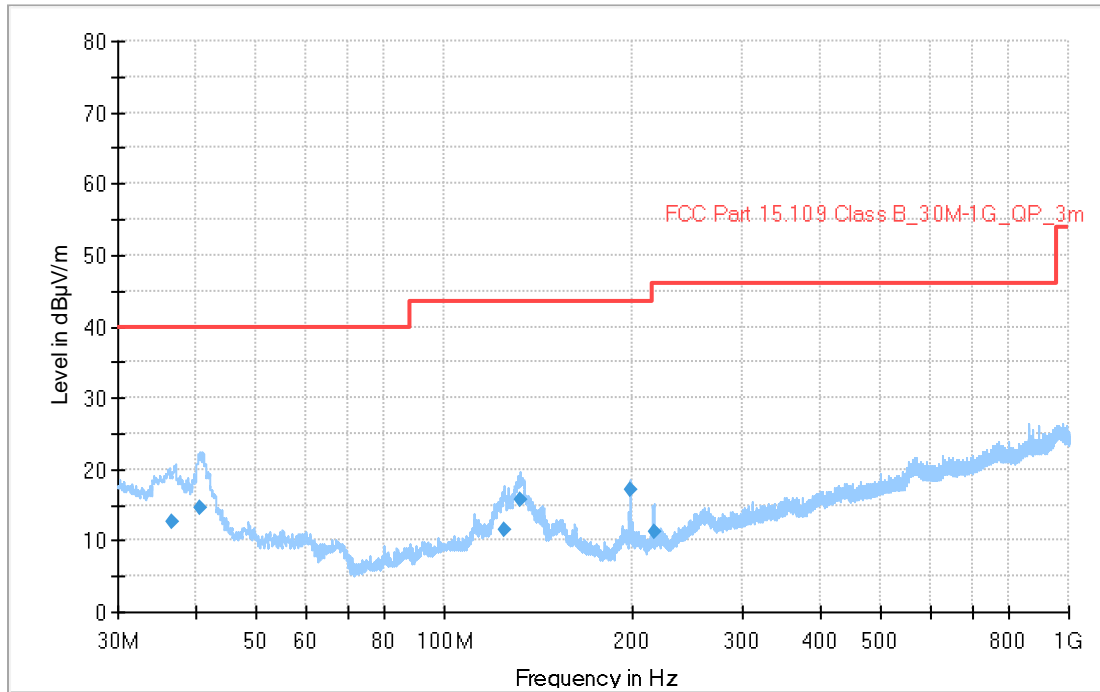
Date of test	Temp. [°C]	Humidity [%RH]	Tested by
November 18, 2021	21	25	VUU/PEG

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		-	1000	1000	3000
Final						-	1000	1000	-

Measurement distance [m]	Frequency [MHz]	Limits [dB μ V/m]		
		QP	PK	AV
Limits, FCC, Class A				
<input type="checkbox"/> 3 / <input type="checkbox"/> 10	30 – 88	49.5 / 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	-	-
	216 – 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	-	-
	216 – 1000	46.0 / 35.6	-	-

6.1 Test results, 30 – 1000 MHz, FCC, Class B

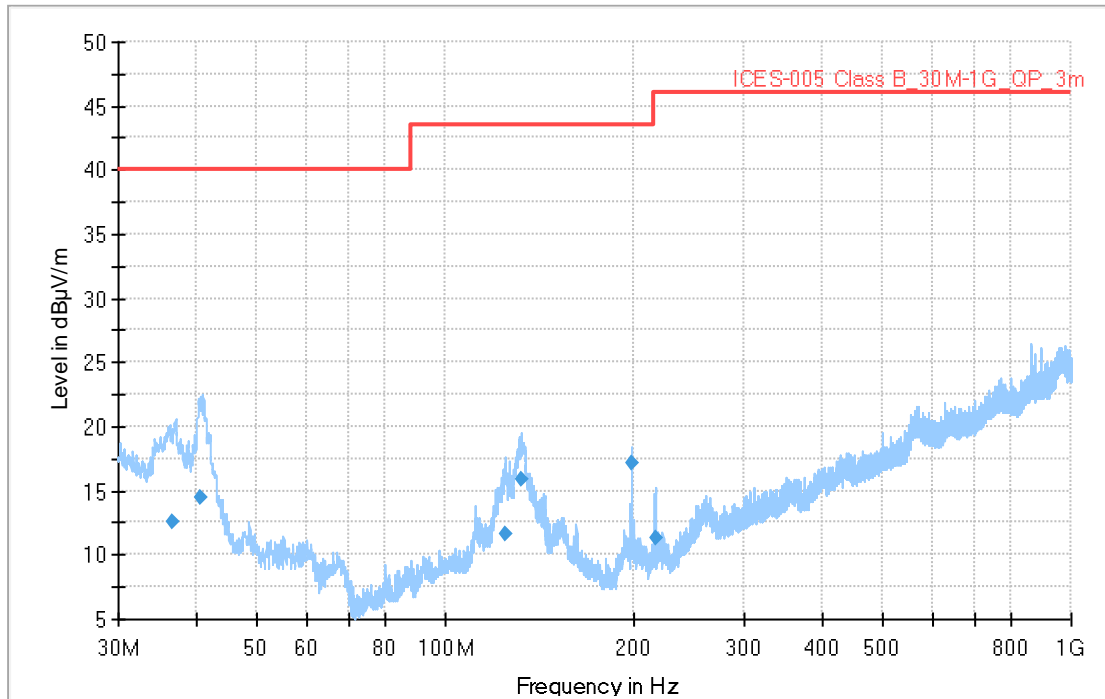


Diagram, Peak overview sweep

Measurement results, Quasi-peak

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
36.690	12.56	40.00	27.44	1000.0	120.0	122.0	V	139.0	-18
40.710	14.53	40.00	25.47	1000.0	120.0	124.0	V	165.0	-21
124.860	11.63	43.52	31.89	1000.0	120.0	124.0	V	246.0	-21
132.150	15.85	43.52	27.67	1000.0	120.0	104.0	V	242.0	-21
198.060	17.10	43.52	26.42	1000.0	120.0	105.0	V	247.0	-24
216.150	11.27	46.02	34.75	1000.0	120.0	170.0	H	203.0	-24

6.2 Test results, 30 – 1000 MHz, ICES-005, Class B



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)	Corr. (dB/m)
36.690	12.56	40.00	27.44	1000.0	120.0	122.0	V	139.0	-18
40.710	14.53	40.00	25.47	1000.0	120.0	124.0	V	165.0	-21
124.860	11.63	43.50	31.87	1000.0	120.0	124.0	V	246.0	-21
132.150	15.85	43.50	27.65	1000.0	120.0	104.0	V	242.0	-21
198.060	17.10	43.50	26.40	1000.0	120.0	105.0	V	247.0	-24
216.150	11.27	46.00	34.73	1000.0	120.0	170.0	H	203.0	-24

6.3 Test equipment

Equipment type	Manufacturer	Model	Inv. No.	Last Cal. date	Cal. interval
Multimeter	Fluke	187 True RMS	30919	2021-08-20	1 Year
Signal receiver	Rohde & Schwarz	ESW	33890	2021-07-21	1 Year
Cable	Huber + Suhner	Sucoflex 106	39122	2021-05-06	1 Year
Cable	Suhner	RG 214/U	9798	2021-04-02	1 Year
Thermo/hygrometer	Vaisala	HMI41	31215	2021-07-12	1 Year
Preamplifier	SEMKO	AM1331	S7992	2021-09-30	1 Year
Coaxial cable	Rosenberger	LA5-S003-8500	39148	2021-05-06	1 Year
Antenna, bilog	TESEQ	CBL 6111D	34200	2020-03-18	3 Years