Prüfbericht-Nr.: *Test Report No.:*	**CN20SMDK 001**	**Auftrags-Nr.:** *Order No.:*	**244268402**	**Seite 1 von 18** *Page 1 of 18*
Kunden-Referenz-Nr.: *Client Reference No.:*	**60051577**	**Auftragsdatum:** *Order date.:*	**23.09.2020**	
Auftraggeber: *Client:*	**IKEA of Sweden AB** BOX 702, SE-343 81 Älmhult, Sweden			
Prüfgegenstand: *Test item:*	**Ceiling Lamp**			
Bezeichnung / Typ-Nr.: *Identification / Type No.:*	**T2034 Kabomba**			
Auftrags-Inhalt: *Order content:*	**EMC test**			
Prüfgrundlage: *Test specification:*	**FCC 47 CFR Part 15, Subpart B:2019 Class B** **ICES-005:2018**			

Wareneingangsdatum: *Date of receipt:*	**10.11.2020**	Refer to the EUT photos file
Prüfmuster-Nr.: *Test sample No.:*	**A002945829-004**	
Prüfzeitraum: *Testing period:*	**Refer to test report**	
Ort der Prüfung: *Place of testing:*	**EMC laboratory**	
Prüflaboratorium: *Testing laboratory:*	**TÜV Rheinland (Shanghai) Co., Ltd.**	
Prüfergebnis*: *Test result*:*	**Pass**	

geprüft von / *tested by:*

Jessie Xu

Datum / Date	Name/Stellung / Name/Position	Unterschrift / Signature
23.12.2020	Jessie Xu/Senior project engineer	

kontrolliert von / *reviewed by:*

Hexiong Liu

Datum / Date	Name/Stellung / Name/Position	Unterschrift / Signature
23.12.2020	Hexiong Liu/Department manager	

Sonstiges / *Other:*

FCC ID: FHO-T2034
Test Firm Registration Number: 958801

Zustand des Prüfgegenstandes bei Anlieferung: *Condition of the test item at delivery:*
Prüfmuster vollständig und unbeschädigt
Test item complete and undamaged

* Legende:	1 = sehr gut	2 = gut	3 = befriedigend	4 = ausreichend	5 = mangelhalt
	P(ass) = entspricht o.g. Prüfgrundlage(n)		F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	N/A = nicht anwendbar	N/T = nicht getestet
Legend:	1 = very good	2 = good	3 = satisfactory	4 = sufficient	5 = poor
	P(ass) = passed a.m. test specifications(s)		F(ail) = failed a.m. test specifications(s)	N/A = not applicable	N/T = not tested

TEST SUMMARY

4.1.1 CONDUCTED EMISSION
Result:
Passed

4.2.1 RADIATED EMISSION
Result:
Passed

Contents

1 Test Sites

1.1 Test Facilities

Laboratory: TÜV Rheinland (Shanghai) Co., Ltd.
Address: No.177, 178, Lane 777 West Guangzhong Road, Jing'an District, Shanghai, China

The used test equipment is in accordance with CISPR 16-1 series standards for measurement of radio interference.

Refer to Clause 6 for test and measurement instruments.

2 General Product Information

2.1 Product Function and Intended Use

The EUT (equipment under test) is an ordinary ceiling lamp for household and similar use. For the further information, refer to the user's manual.

2.2 Ratings and System Details

System input : AC 120 V, 50-60 Hz
Rated power : 20 W
Protection class : II

2.3 Independent Operation Modess

The basic operation modes are: "ON" and "OFF".

2.4 Description of interconnecting cables

No.	Interface and name	Shielded or not	Specified length (mm)
1	AC power line	Unshielded	245 mm

2.5 Noise Generating and Noise Suppressing Parts

Refer to the circuit diagram for further information.

2.6 Highest frequency generated or used in the device or on which the device operates or tunes

The highest frequency used in the EUT is 65 kHz.

2.7 Submitted Documents

Circuit diagram, user's manual and rating label.

3 Test Set-up and Operation Modes

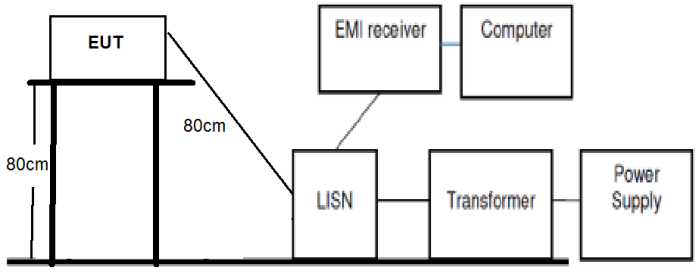
3.1 Principle of Configuration Selection

Emission: The equipment under test (EUT) was configured to measure its highest possible emission level. The test conditions were adapted accordingly in reference to the instructions for use.

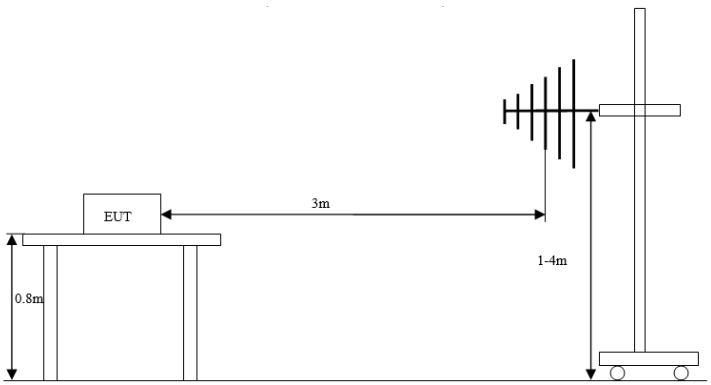
Refer to the related paragraph of this report.
The sequence of testing:
1. Radiated emission tests were performed on 16.11.2020.
2. Conducted emission tests were performed on 17.11.2020

3.2 Equipment and cable arrangement

Block diagram for both conducted emission and radiated emission tests is as follows:



(Conducted emission)



(Radiated emission)

Also refer to photographs on clause 5 for test setups for both conducted emission test and radiated emission test.

3.3 Test Software

No special test software was used during the tests.

3.4 Special Accessories and Auxiliary Equipment

None.

3.5 Countermeasures to achieve EMC Compliance

No other special measure is employed to achieve the requirement.

4 Test Results E M I S S I O N

4.1 Emission in the Frequency Range up to 30 MHz

4.1.1 Conducted emission

Result:	**Passed**

Date of testing	:	16.11.2020
Test procedure	:	FCC 47 CFR Part 15, Subpart B:2019, ICES-005:2018, ANSI C63.4-2014 and CISPR 16-1 series standards
Frequency range	:	0.15 – 30 MHz
Limits	:	Quasi-peak limit: 0.15 - 0.5 MHz, 66 to 56 dBµV (decrease with the logarithm of frequency); 0.5 - 5 MHz, 56 dBµV; 5 - 30 MHz, 60 dBµV Average limit: 0.15 - 0.5 MHz, 56 to 46 dBµV (decrease with the logarithm of frequency); 0.5 – 5 MHz, 46 dBµV; 5 – 30 MHz, 50 dBµV
Bandwidth of EMI receiver for final measurement	:	9 kHz
Measurement time for final measurement	:	1 s
Kind of test site	:	Shielded room
Input voltage	:	AC 120 V, 60 Hz
Operational mode	:	Power on
Ambient condition	:	Temperature: 22.3 °C; Relative humidity: 36.0 %
Expanded measurement uncertainty (k=2)	:	3.39 dB

The measurement setup was made according to ANSI C63.4-2014 in a shielded room.

The measurement equipment like test receivers, quasi-peak detector and artificial mains network (AMN) are in compliance with CISPR 16-1 series standards.

The tested object was set-up on a wooden support. The EUT was set 0.8 m away from the AMN. The cord longer than necessary to be connected to the AMN was folded forth and back parallel so as to form a bundle with a length between 0.3 m and 0.4 m.

The disturbance voltage test was performed on the neutral line and phase line of the power supply of the EUT respectively.

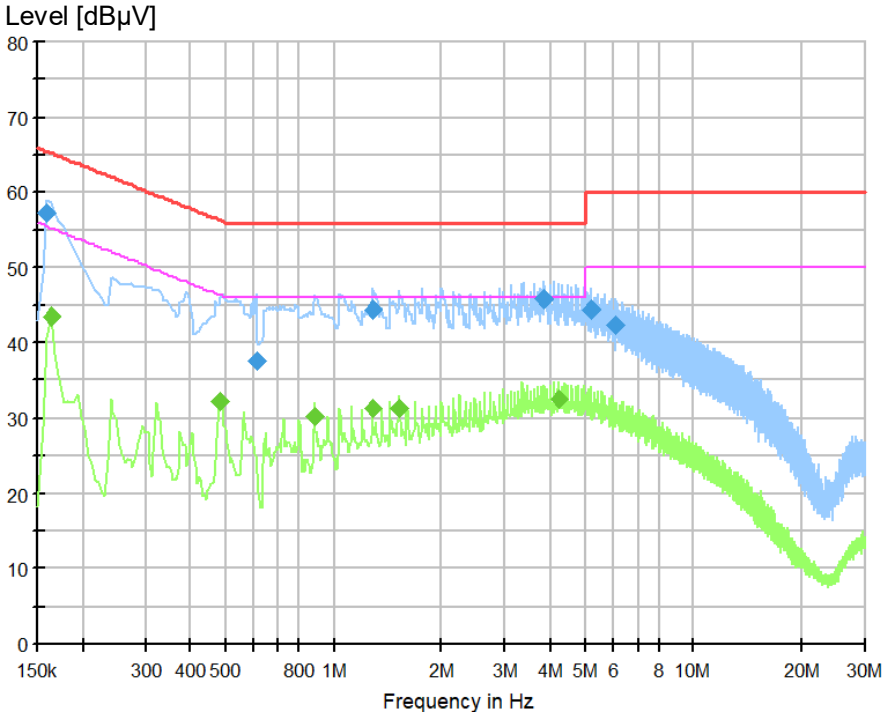
The following figures and tables were those measured by an automatic measuring system. Both quasi-peak and average measurements were performed. In the following spectral diagram, Blue "◆" means Quasi-Peak Value and green "◆" means Average Value results.

Notes on following tables of conducted emission results and conversions:

Level (dBµV): final measurement results by using quasi-peak detector and average detector
Transd (dB): transducer factor including cable loss, insertion loss of artificial mains network and gain of pre-amplifier (if used)

Margin: Limit (dBµV) - Level (dBµV)

Figure 1: Spectral Diagrams, Conducted Emission, 150 kHz-30 MHz, L



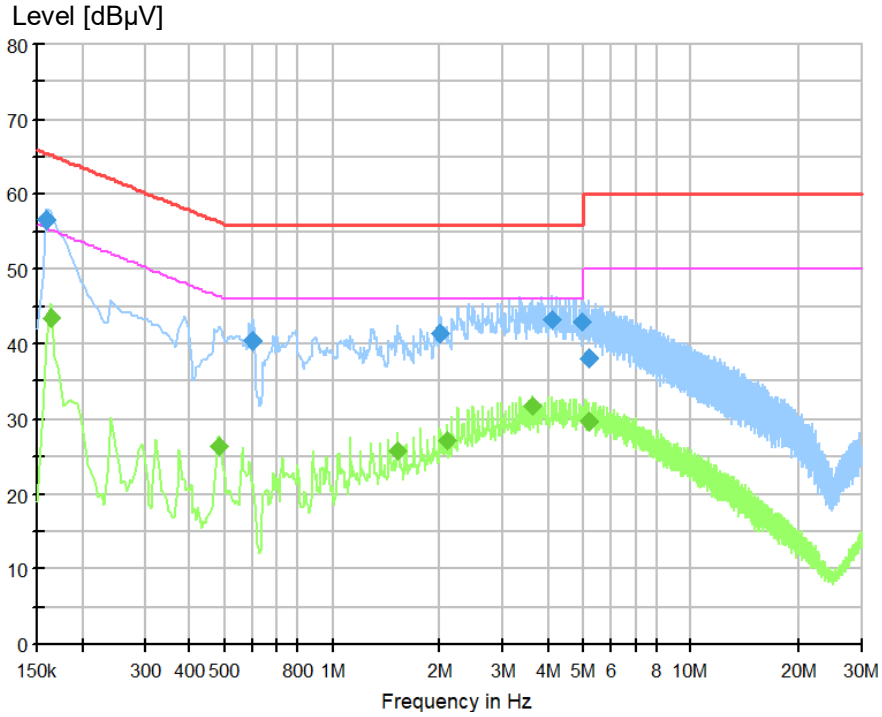
Final Quasi-peak measurement result:

Frequency (MHz)	QuasiPeak (dB µ V)	Limit (dB µ V)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.159000	57.40	65.52	8.12	1000.0	9.000	L1	10.4
0.609000	37.61	56.00	18.39	1000.0	9.000	L1	10.4
1.284000	44.55	56.00	11.45	1000.0	9.000	L1	10.5
3.844500	45.96	56.00	10.04	1000.0	9.000	L1	10.6
5.203500	44.53	60.00	15.47	1000.0	9.000	L1	10.6
6.090000	42.22	60.00	17.78	1000.0	9.000	L1	10.7

Final Average measurement result:

Frequency (MHz)	CAverage (dB µ V)	Limit (dB µ V)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.163500	43.51	55.28	11.78	1000.0	9.000	L1	10.4
0.483000	32.25	46.29	14.04	1000.0	9.000	L1	10.4
0.883500	30.26	46.00	15.74	1000.0	9.000	L1	10.5
1.279500	31.30	46.00	14.70	1000.0	9.000	L1	10.5
1.522500	31.29	46.00	14.71	1000.0	9.000	L1	10.5
4.249500	32.50	46.00	13.50	1000.0	9.000	L1	10.6

Figure 2: Spectral Diagrams, Conducted Emission, 150 kHz-30 MHz, N



Final Quasi-peak measurement result:

Frequency (MHz)	QuasiPeak (dB µ V)	Limit (dB µ V)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.159000	56.70	65.52	8.81	1000.0	9.000	N	10.4
0.600000	40.42	56.00	15.58	1000.0	9.000	N	10.5
2.004000	41.48	56.00	14.52	1000.0	9.000	N	10.5
4.083000	43.27	56.00	12.73	1000.0	9.000	N	10.6
4.969500	43.08	56.00	12.92	1000.0	9.000	N	10.6
5.199000	38.24	60.00	21.76	1000.0	9.000	N	10.6

Final Average measurement result:

Frequency (MHz)	CAverage (dB µ V)	Limit (dB µ V)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.163500	43.51	55.28	11.77	1000.0	9.000	N	10.4
0.483000	26.52	46.29	19.76	1000.0	9.000	N	10.4
1.522500	25.69	46.00	20.31	1000.0	9.000	N	10.5
2.080500	27.24	46.00	18.76	1000.0	9.000	N	10.5
3.606000	31.81	46.00	14.19	1000.0	9.000	N	10.6
5.199000	29.65	50.00	20.35	1000.0	9.000	N	10.6

4.2 Emission in the Frequency Range above 30 MHz

4.2.1 Radiated emission

Result:	**Passed**

Date of testing	:	17.11.2020
Test procedure	:	FCC 47 CFR Part 15, Subpart B:2019, ICES-005:2018, ANSI C63.4-2014 and CISPR 16-1 series standards
Product classification	:	Class B
Frequency range	:	30 – 1000 MHz (see Note 1)
Limits	:	Quasi-peak limits (3 m distance): 30 – 88 MHz, 40 dBµV/m; 88 – 216 MHz, 43.5 dBµV/m; 216 – 1000 MHz, 46 dBµV/m (see Note 2)
Bandwidth of EMI receiver for final measurement	:	120 kHz
Measurement time for final measurement	:	1 s
Kind of test site	:	Semi-anechoic chamber
Input voltage	:	AC 120 V, 60 Hz
Operational mode	:	Power on
Ambient condition	:	Temperature: 21.8 °C; Relative humidity: 36.4 %
Expanded measurement uncertainty (k=2)	:	5.49 dB

The radiated disturbance test was carried out in a semi-anechoic chamber. The test distance from the receiving antenna to the EUT is 3 m. The normalized site attenuation of the semi-anechoic chamber is regularly calibrated to ensure the radiated disturbance test results are valid. During the test, the EUT was placed on a 80 cm wooden support above the reference ground plane. The wooden support was rotated 360° around and the height of the antenna was varied from 1 m to 4 m to find the maximum disturbance. The test was performed with the antenna both in its horizontal and vertical polarizations.

The following figures and tables were those measured by an automatic measurement system. A preview test was firstly performed with peak detector. The final test was performed with quasi-peak at those critical frequencies during the preview test. In the following spectral diagram, "×" means quasi-peak test results.

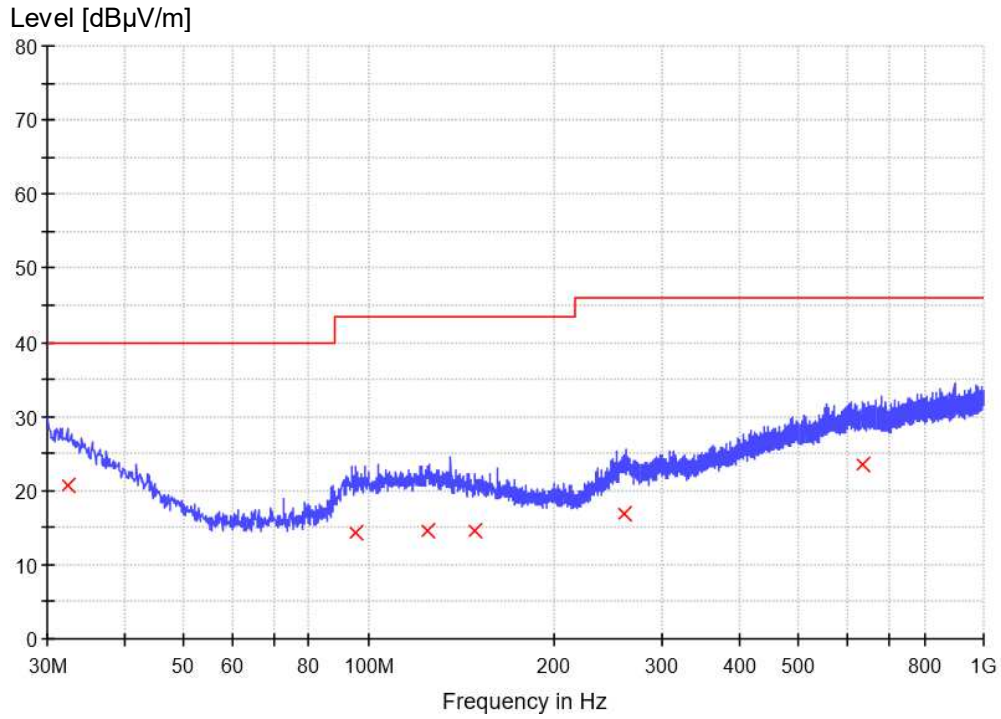
Note 1: The highest frequency in the EUT is 65 kHz. According to FCC Part 15 subpart B §15.33 (b) (1), the upper frequency for radiated emission measurement is 1000 MHz.

Note 2: The class B limits of ICES-005:2018 is stricter than those FCC 47 CFR Part 15, Subpart B:2019 for 3 m test distance. Therefore, the former limits are used in following figures and tables.

Notes on following tables of radiated emission results and conversions:

QuasiPeak (dBµV/m): final measurement results by using quasi-peak detector
Corr. (dB): correction factor including: antenna factor, cable loss, and gain of pre-amplifier (if used)
Margin: Limit (dBµV/m) - QuasiPeak (dBµV/m)

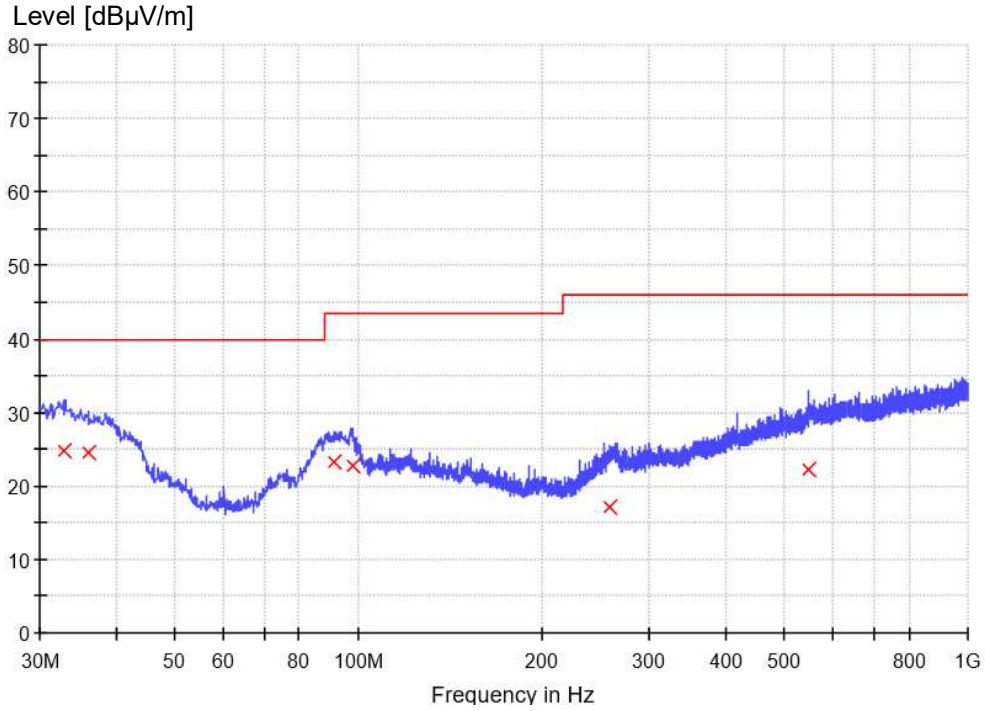
Figure 3: Spectral Diagrams, Radiated Emission, 30 MHz-1000 MHz, Horizontal polarization



Final quasi-peak measurement results:

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBµV/m)
32.425000	20.8	1000.0	120.000	123.0	H	12.0	24.2	19.2	40.0
95.111250	14.2	1000.0	120.000	140.0	H	5.0	16.6	29.3	43.5
124.453750	14.7	1000.0	120.000	133.0	H	1.0	18.7	28.8	43.5
148.340000	14.6	1000.0	120.000	150.0	H	48.0	17.4	28.9	43.5
260.981250	17.0	1000.0	120.000	133.0	H	2.0	20.7	29.1	46.0
635.886250	23.5	1000.0	120.000	150.0	H	33.0	26.4	22.5	46.0

Figure 4: Spectral Diagrams, Radiated Emission, 30 MHz-1000 MHz, Vertical polarization



Final quasi-peak measurement results:

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBµV/m)
32.788750	24.7	1000.0	120.000	100.0	V	12.0	23.9	15.3	40.0
36.062500	24.5	1000.0	120.000	100.0	V	5.0	22.2	15.5	40.0
91.352500	23.2	1000.0	120.000	100.0	V	1.0	15.8	20.3	43.5
97.657500	22.8	1000.0	120.000	100.0	V	30.0	17.0	20.7	43.5
259.041250	17.0	1000.0	120.000	102.0	V	69.0	20.6	29.0	46.0
548.465000	22.2	1000.0	120.000	110.0	V	2.0	26.2	23.8	46.0

5 Photographs of the Test Set-Up

Refer to the test setup file

6 List of Test and Measurement Instruments

Equip.	Description	Model	Manufacturer	Last Date DD.MM.YYYY	Due Date DD.MM.YYYY
G1811405	EMI test receiver	ESCI	Rohde&Schwarz	06.03.2020	06.03.2021
G1830003	Artificial mains network	ENV432	Rohde&Schwarz	02.11.2020	02.11.2021
G1824845	EMC measurement software	EMC32 (Ver 10.20.01)	Rohde&Schwarz	N/A	N/A
G1824248	Dual display multimeter	F45	Fluke	18.09.2020	18.09.2022
G1811378	3m modified semi-anechoic chamber	SAC3	Frankonia	27.06.2019	27.06.2022
G1811402	EMI test receiver	ESCI	Rohde&Schwarz	18.09.2020	18.09.2021
G1811425	Bilog antenna	CBL 6112D	Teseq	10.03.2020	10.03.2023

7 List of Figures

End of test report