TEST REPORT

According to FCC and ISED specifications
Electromagnetic compatibility of multimedia equipment

Report Number. .....:	122-31550-6 Rev. A
Date of issue .....:	2023-04-03
Total number of pages.....:	30
Name of Testing Laboratory preparing the Report.....:	FORCE Technology Venlighedsvej 4 2970 Hørsholm DENMARK
Applicant's name .....:	Glowforge Inc.
Address .....:	1938 Occidental Avenue S, Suite C WA 98134 Seattle Washington UNITED STATES
Test specification.....:	ANSI C63.10:2013
TRF template used .....:	IECEE OD-2020-F7:2020; ed. 2
Standards .....:	47 CFR Part 15, Subpart C (Specific rule part §15.249) ISED RSS-210:2019 AM1:2020 + RSS-Gen:2019 AM1:2019 + AM2:2021
Test procedure .....:	DANAK
Test Report Form No. .....:	According to OD -2020, Clause 3.3
Test Report Form(s) Originator ....:	FORCE Technology
Master TRF.....:	Dated 2022-06-02 (according to 3.3.4)

This report is not valid unless signed by FORCE Technology.

General disclaimer:

The test results presented in this report relate only to the object tested.
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The authenticity of this Test Report and its contents can be verified by contacting FORCE Technology.

Test item description .....:	Air filter
Trademark or brand name.....:	glowforge
Manufacturer.....:	Glowforge Inc.
Model/Type reference(s).....:	AF100
FCC ID .....:	2A83C-1JM2D
IC ID .....:	29844-1JM2D
Ratings .....:	100 - 240 VAC, 50 – 60 Hz, 2 A

Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):		
Testing Laboratory:	FORCE Technology	
Testing location/ address.....:	Venlighedsvej 4 2970 Hørsholm DENMARK	
Tested by (name, function, signature).....:	Peter Wolf Frandsen Specialist EMC	
Tested by (name, function, signature).....:	Dennis Dupont Hansen Specialist EMC	
Approved by (name, function, signature)...:	Karsten Kruse Jensen Senior Team Leader	

List of Attachments (including a total number of pages in each attachment): N/A

Summary of testing	
Tests performed (name of test and std. clause): **AC power-line conducted emission (6.2)** **Radiated emission 30 - 1000 MHz (6.5)** **Radiated emission above 1000 MHz (6.6)** **Occupied bandwidth (6.9)** **Band edge (6.10)** **Field strength of fundamental**	**Testing location:** FORCE Technology Venlighedsvej 4 2970 Hørsholm DENMARK

Summary of compliance

☒ **The product fulfils the requirements of the following standard, with respect to the test listed below:**

- USA: 47 CFR Part 15, Subpart C (Specific rule part §15.249)
- Canada: ISED RSS-210:2019 AM1:2020 + RSS-Gen:2019 AM1:2019 + AM2:2021

The given result is based on a shared risk principle with respect to the measurement uncertainty.

Use of uncertainty of measurement for decisions on conformity (decision rule) :

The decision rule is inherent in the requested specification.

For additional information see 6.2.

Information on uncertainty of measurement:

☒ **Internal procedure used for type testing through which traceability of the measuring uncertainty has been established:**

Calculations leading to the reported values are on file with the testing laboratory internal Quality Management System D4.

☐ **Statement not required by the standard used for type testing**

Possible test case verdicts:	
- test case does not apply to the test item .:	N/A (Not Applicable)
- test item does meet the requirement .....:	P (Pass)
- test item does not meet the requirement .:	F (Fail)
Date of receipt of test item .....:	2022-12-06
Date (s) of performance of tests .....:	2022-12-06 to 2022-12-22

General remarks:

"(See Enclosure #)" refers to additional information appended to the report.
"(See appended table)" refers to a table appended to the report.

Throughout this report a ☐ comma / ☒ point is used as the decimal separator.
Note: Throughout this TRF, numerical data taken from IEC standards are using a comma as the decimal separator.

Throughout this report, the term "Test item" is used over terms such as Test object, EUT or DUT.

General product information (GPI) and other remarks:

The AF100 is an air filter unit used with a 3D laser printer. The laser printer cuts, engraves, and scores different materials and the AF100 filters the air coming out from the 3D laser printer.

This report replaces previously issued test report 122-31550-6 dated 25 January 2023.

The changes in this report are:

Page 6:
Deleted: Photos
Inserted text: See internal and external photos

Page 12, 14, 16, 18, 21, 22, 24 and 25:
Deleted: Photos
Inserted text: Test setup photos: See internal and external photos

Table of Contents:

1 General description of test item

Note: The information in this section has been provided by the applicant.

1.1 Photo(s) of the test item

See internal and external photos

1.2 Test item(s)

No.	Test item name	Unique identification / type / description	Extent of test
1	AF100	Serial no. GFAF100-JVR-0087	Tested in full
2	AF100-PCB	EVT Build_RD20220907_00276 / PCB assembly with antenna replaced with coaxial cable with SMA connector	Temperature + supply voltage test
Supplementary information: -			

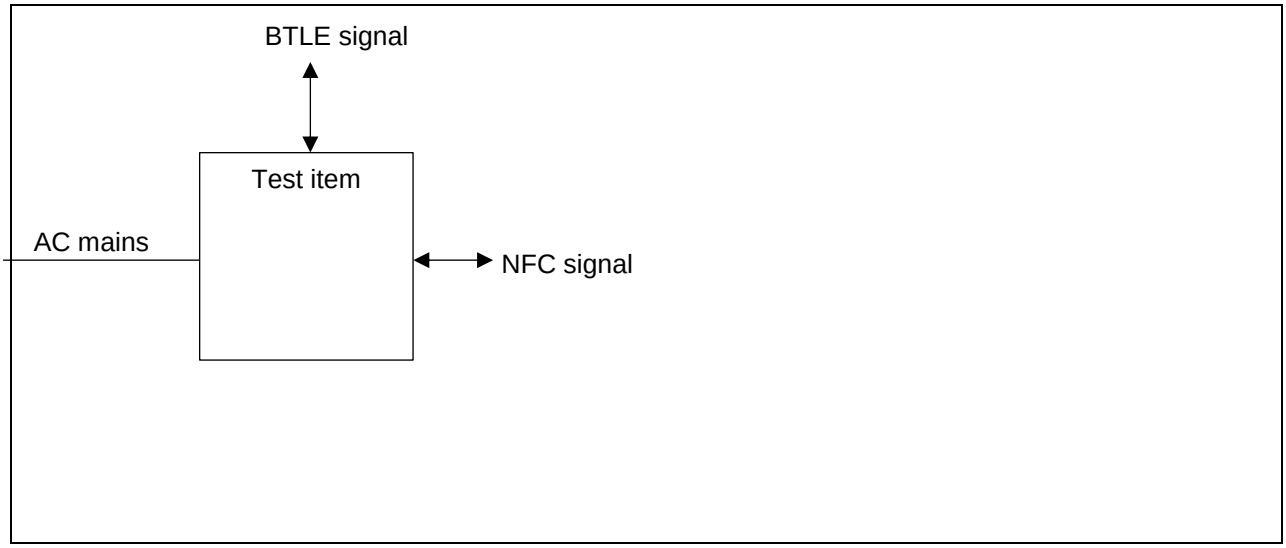
1.3 Port(s)

No.	Port Name	Type	Cable		
			Specified length in m	**Attached during test**	**Shielded**
1	Enclosure	Enclosure	-	-	-
2	Mains power	AC Mains	-	☒	☐
Supplementary information: -					

1.4 Power rating(s)

Power supply type ..... :	☒	AC, 1 phase
	☐	AC, 2 phases
	☐	AC, 3 phases
	☒	Neutral
	☒	Protective Earth
	☐	DC
	☐	Battery, not rechargeable in the device
	☐	Battery, rechargeable in the device
Rated voltage ..... :	100 - 240 VAC	
Rated frequency ..... :	50 – 60 Hz	
Rated power ..... :	75 W	

1.5 Configuration and Connections with Test item



1.6 Additional parameters

Radio type ..... :	BLE	
Antenna ..... :	Internal / Non removeable - PCB antenna	
Clock frequencies ..... :	2480 MHz	
Other parameters ..... :	N/A	
Software version ..... :	"dtm_with_peripherials_sweep_4resistance.hex" - (20221205)	
Hardware version ..... :	DVT Build_RD20221115_00295 - (20221205)	
Dimensions (W x H x D) ... :	460 x 342 x 253 mm	
Mounting position ..... :	☒	Tabletop equipment
	☐	Wall/Ceiling mounted equipment
	☐	Floor standing equipment
	☐	Hand-held equipment
	☐	Other:

1.7 Operating mode(s)

No.	Abbreviation	Detailed description of the operating mode	Used for testing	
			Radiated and Conducted Emission	Radio Parameter
1	Test mode1	BLE active in transmit mode. NFC active.	☒	☒
Supplementary information: Simultaneous transmission - BLE is active transmitting and is hopping between low, mid and high frequencies within a duty cycle of 25 ms and NFC active within a duty cycle of 1s.				

1.8 Auxiliary equipment

Advice to the TRF User: Include accessories which are not to be considered test items.

No.	AE Item Name	Type and description	Manufacturer (if not the same)
1	FSP075-RAAK3	External AC/DC adaptor	FSP Technology inc.
Supplementary information: -			

1.9 Modifications to the test item during testing

☒	No modifications done during testing	
☐	Modifications done during testing (see details below)	
No.	**Description of modification (if any)**	**Date of modification**
1	-	-
Supplementary information: -		

2 Verdict summary section

47 CFR Part 15, Subpart B and C (Specific rule part §15.249) Canada: ISED RSS-210:2019 AM1:2020 + RSS-Gen:2019 AM1:2019 + AM2:2021				
Clause	**Requirement – Test case**	**FCC rule part**	**Test methods**	**Results**
4.1	Measurement of radio frequency voltage on mains / Conducted limits	47 CFR Part 15 B + C Subpart 15.107 & 15.207 RSS-Gen:2019	ANSI C63.10:2013	P
4.2-4.3	Measurement of radiated emission / field strength of harmonics	47 CFR Part 15 B + C Subpart 15.109 & 15.209 47 CFR Part 15.249 RSS-Gen:2019 RSS-210:2019 Annex B.10	ANSI C63.10:2013	P
4.4	Measurement of occupied bandwidth	47 CFR Part 15.215(c) RSS-Gen:2019 clause 6.7	ANSI C63.10:2013	P
4.5	Measurement of band edge	47 CFR Part 15.209 & 15.249 RSS-210:2019 Annex B.10	ANSI C63.10:2013	P
4.6	Measurement of field strength of fundamental	47 CFR Part 15.249 RSS-210:2019 Annex B.10	ANSI C63.10:2013	P
Note: -				

3 Test conditions

3.1 General

<table>
<tr><td rowspan="4">Environmental reference conditions.....:</td><td colspan="3">The climatic conditions during the tests are within the limits specified by the manufacturer for the operation of the EUT and the test equipment.
The climatic conditions during the tests were within the following limits:</td></tr>
<tr><td>Temperature</td><td>Humidity (rh)</td><td>Atmospheric pressure</td></tr>
<tr><td>15 °C – 35 °C</td><td>30 % - 60 %</td><td>800 hPa – 1060 hPa</td></tr>
<tr><td colspan="3">If explicitly required in the basic standard or applied product standard the climatic values are recorded and documented separately in this test report.</td></tr>
<tr><td>Measurement uncertainties .....:</td><td colspan="3">For all measurements where guidance for the calculation of the instrumentation uncertainty of a measurement is specified in CISPR 16-4-2, the measurement instrumentation uncertainty has been calculated and applied in accordance with the standard.</td></tr>
</table>

3.2 Operational requirements during testing

The operation of the EUT shall conform to the following provisions:

a) The unlicensed wireless device shall be configured to operate at 100% duty cycle. For systems incapable of supporting 100% duty cycle, the unlicensed wireless device shall be operated using the maximum possible duty cycle, and this information shall be noted as such in the test report.

b) The unlicensed wireless device shall be tested operating at the highest transmit power allowed for each antenna configuration.

c) The system shall be tested with each modulation to identify the worst-case modulation that produces the highest level of emissions. Where a multi modulation scheme is used, justification for the single modulation chosen shall be provided in the test report.

d) The system shall be tested using the data rate that yields the highest fundamental emission levels for each modulation type. The data rate and rationale or supporting test data shall be included in the test reports.

e) For frequency hopping systems, the hopping sequence shall be stopped for certain test suites to allow for measurements on a single channel.

f) Where applicable, the device shall also be configured to transmit at the worst-case duty cycle under normal operating conditions to determine the average correction factor.

g) The software shall allow configuration and operation on all available unlicensed wireless device channels.

h) The software shall allow configuration and operation in the unmodulated carrier model, where applicable.

3.3 Test setups

Figure 3.3.1 .....:	Test setup 1

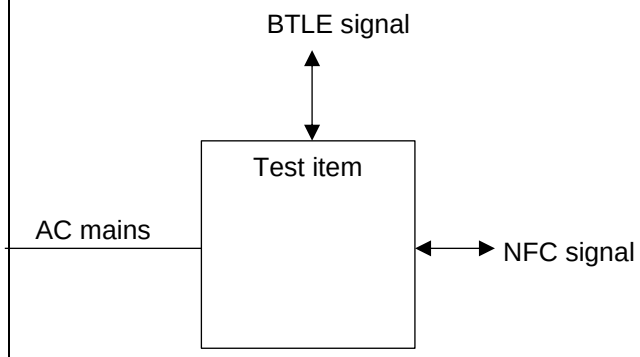
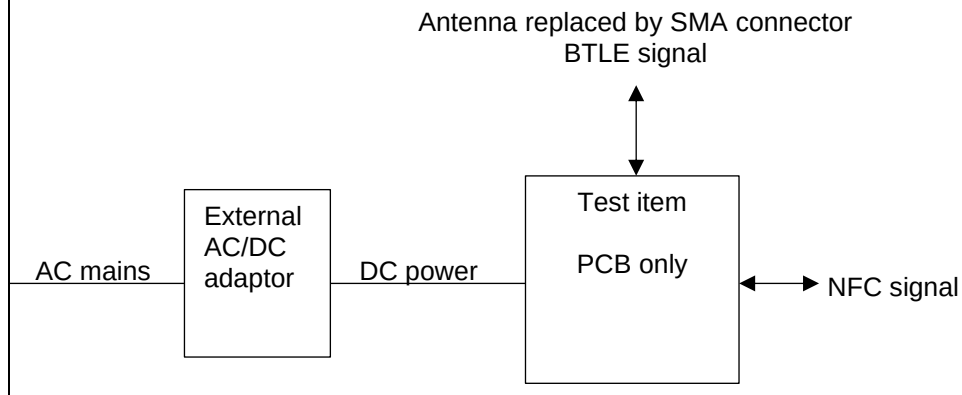


Figure 3.3.2 .....:	Test setup 2



4 Emission

4.1 Measurement of AC power-line conducted emission

Name..... :	Peter Wolf Frandsen	
Date..... :	2022-12-12	
Test location (stand)..... :	Hørsholm EMCRUM2	
Applied limit class or environment:	☐	Class A according to applied standard
	☐	Class B according to applied standard
	☒	Limit according to 47 CFR Part 15 C Subpart 15.207
	☐	Other: -
Test setup description ..... :	☒	40 cm distance to vertical ground plane, 80 cm over ground plane
	☐	Floor standing equipment setup (10 cm over ground plane)
	☐	Other: -
	☐	Artificial hand applied
Supplementary test setup description..... :	If the EUT is normally operated with a ground (safety) connection, then the EUT shall be connected to the ground at the LISN through a conductor provided in the lead from the ac power to the LISN. The excess length of the power cord between the EUT and the LISN receptacle shall be folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length. The system shall be arranged in one typical equipment arrangement for the test.	
Test method applied..... :	☒	Artificial mains network (AMN): 50 Ω, 50 μH
	☐	Other: -
Supplementary information ..... :	AC power-line conducted emission measurements shall be made, unless otherwise specified, over the frequency range from 150 kHz to 30 MHz, to determine the line-to-ground radio-noise voltage that is conducted from all of the EUT current-carrying power input terminals that are directly (or indirectly via separate transformers or power supplies) connected to a public power network. These measurements may also be required between 9 kHz and 150 kHz. If the EUT normally receives power from another device that in turn connects to the public utility ac power lines, measurements shall be made on that device with the EUT in operation to demonstrate that the device continues to comply with the appropriate limits while providing the EUT with power. If the EUT is operated only from internal or dedicated batteries, with no provisions for connection to the public utility ac power lines (600 VAC or less) to operate the EUT (such as an adapter), then ac power-line conducted measurements are not required. FCC part 15 B Class B limits are the same as Part 15 C limits	

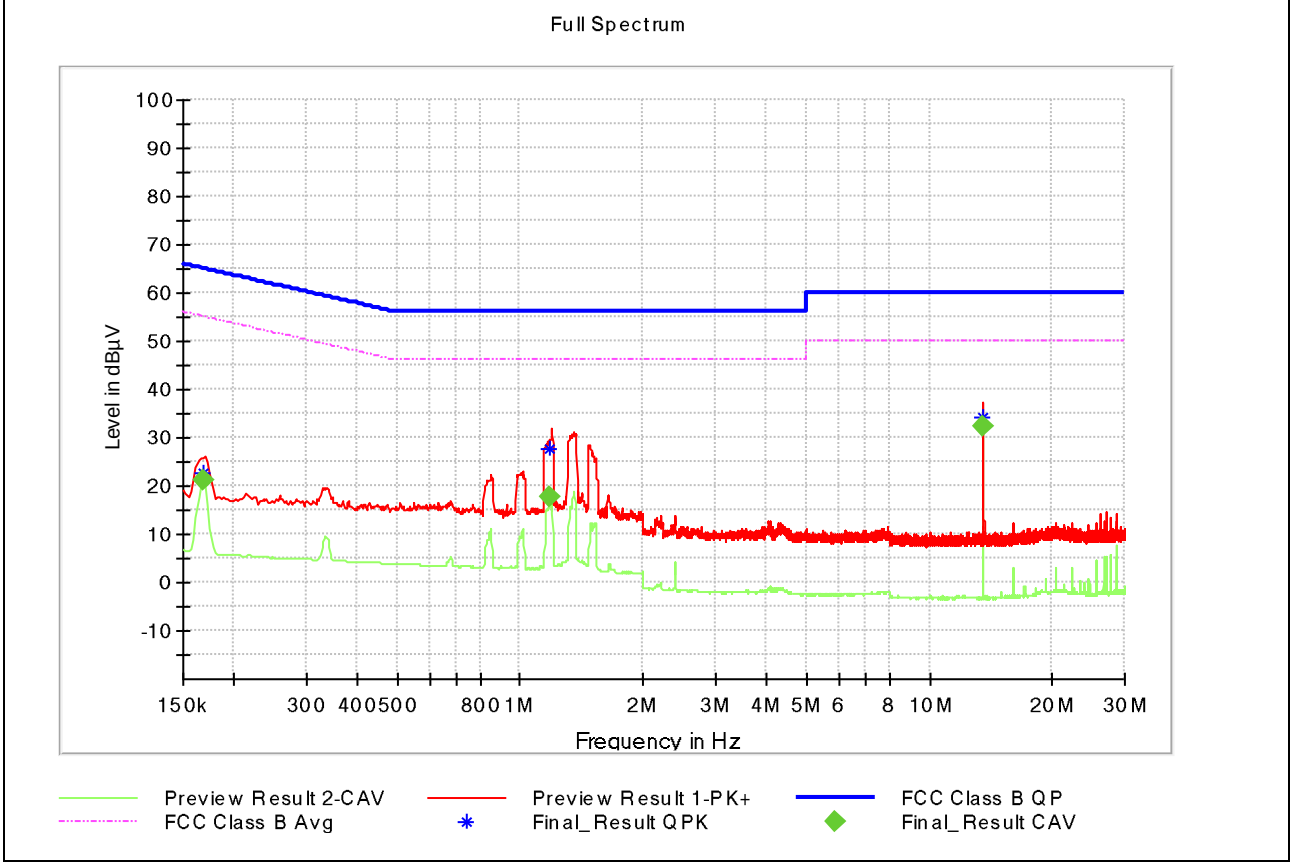
Test set-up photos: See internal and external photos

Test results for AC power-line conducted emission	
Test item no(s) ref. cl. 1.2 ..... :	1
Operating mode no(s) ref. cl. 1.7 :	1
Test setup no(s) ref. cl. 3.3 ..... :	1

Tabulated Results summary

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	PE	Corr. (dB)
0.168000	---	21.16	55.06	33.90	5000.0	9.000	L1	FLO	9.9
0.168000	22.81	---	65.06	42.25	5000.0	9.000	N	FLO	9.9
1.180500	---	17.62	46.00	28.38	5000.0	9.000	L1	FLO	10.2
1.185000	27.51	---	56.00	28.49	5000.0	9.000	N	FLO	10.2
13.560000	---	32.15	50.00	17.85	5000.0	9.000	L1	FLO	10.6
13.560000	34.30	---	60.00	25.70	5000.0	9.000	N	FLO	10.6

Graphical representation



4.2 Measurement of radiated emission 30 - 1000 MHz

Name..... :	Peter Wolf Frandsen	
Date..... :	2022-12-09	
Rationale for verdict N/A ..... :	-	
Test location (stand)..... :	Hørsholm EMIRUM	
Applied limit class..... :	☐	Class A according to applied standard
	☐	Class B according to applied standard
	☒	Limit according to 47 CFR Part 15 C Subpart 15.209 and Subpart 15.249
	☐	Other:
Test setup description ..... :	☒	Equipment on a table 80 cm height
	☐	Equipment on the floor (isolated from ground plane)
	☐	Other (e.g. height of pallet):
Supplementary test setup description..... :	-	
Test method applied..... :	☒	SAC with measurement distance [m]: 3
	☐	FAR with measurement distance [m]:
Supplementary information ..... :	Measurements were made in semi-anechoic chamber that complies to CISPR 16. Preliminary (peak) measurements. The EUT was rotated 360° about its azimuth with the receive antenna located at various heights in horizontal and vertical polarities. Final measurements (quasi-peak detector below 1GHz) were then performed by rotating the EUT 360° and adjusting the receive antenna height from 1 to 4 m. All frequencies were investigated in both horizontal and vertical antenna polarity, where applicable. FCC part 15 B Class B limits are the same as Part 15 C limits	

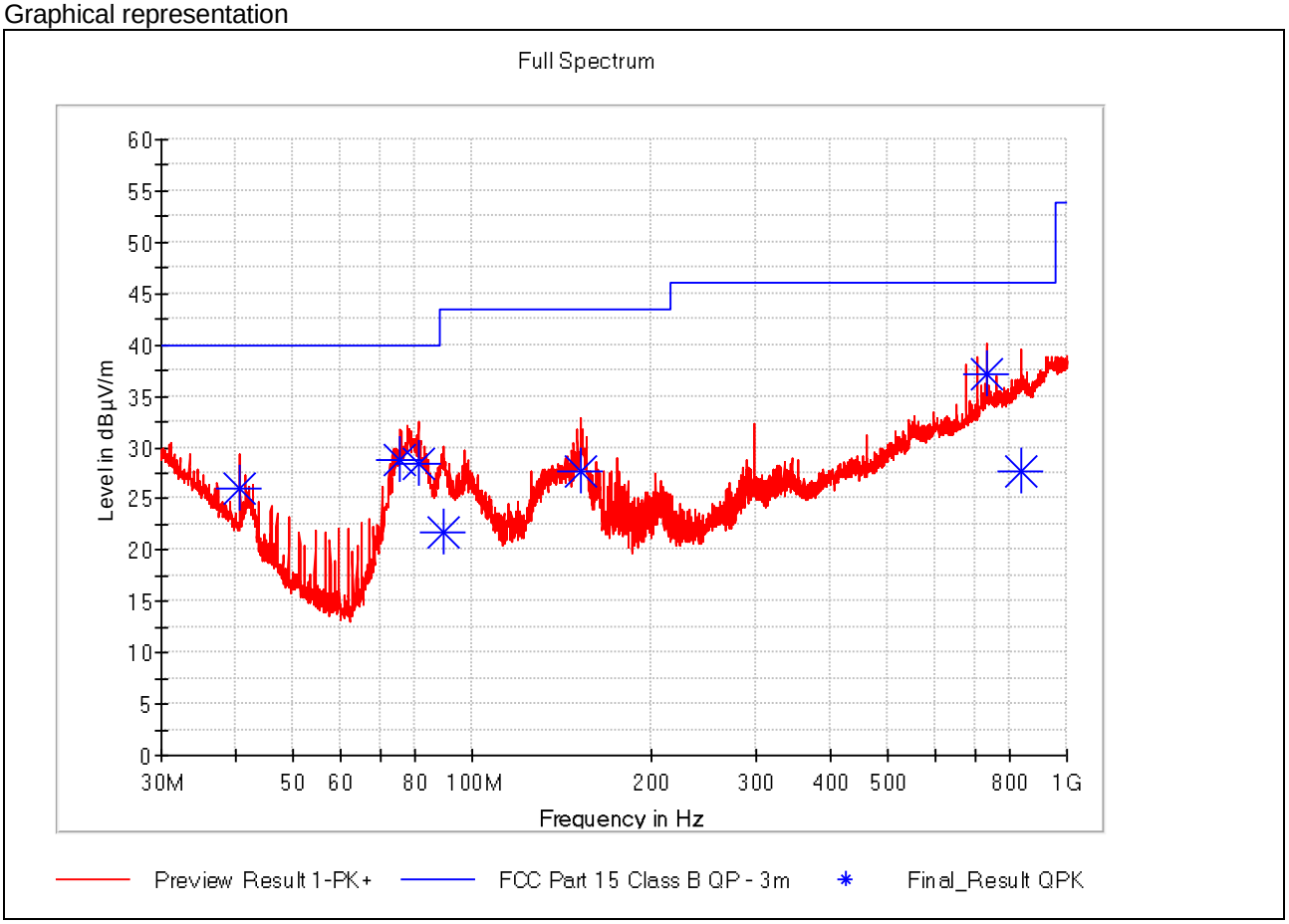
Test set-up photos: See internal and external photos

Test results for Radiated emission 30 - 1000 MHz	
Test item no(s) ref. cl. 1.2 ..... :	1
Operating mode no(s) ref. cl. 1.7 :	1
Test setup no(s) ref. cl. 3.3 ..... :	1

Tabulated Results summary

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
40.68	26.10	40.0	13.9	15000	120	106.0	V	87	20.0
75.72	28.72	40.0	11.3	15000	120	100.0	V	64	14.4
81.06	28.43	40.0	11.6	15000	120	100.0	V	88	15.5
89.61	21.76	43.5	21.7	15000	120	104.0	V	227	17.1
152.52	27.67	43.5	15.8	15000	120	200.0	H	98	19.2
732.24	37.09	46.0	8.9	15000	120	111.0	V	12	33.2
836.67	27.65	46.0	18.3	15000	120	245.0	V	149	34.1

Graphical representation



4.3 Measurement of radiated emission above 1000 MHz

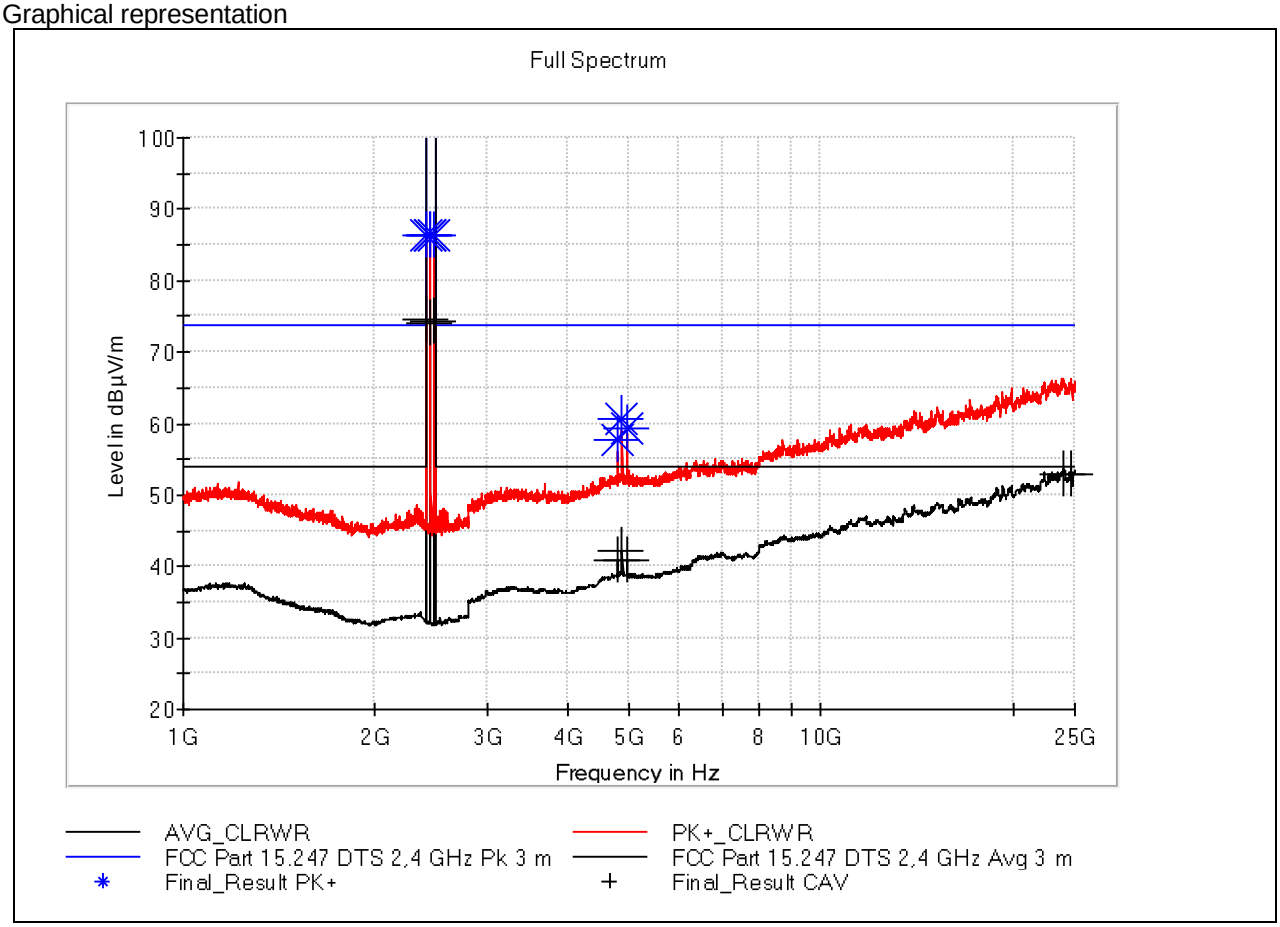
Name..... :	Peter Wolf Frandsen	
Date..... :	2022-12-09	
Rationale for verdict N/A ..... :	-	
Test location (stand)..... :	Hørsholm EMIRUM	
Applied limit class..... :	☐	Class A according to applied standard
	☐	Class B according to applied standard
	☒	Limit according to 47 CFR Part 15 C Subpart 15.209 and Subpart 15.249
	☐	Other:
Test setup description ..... :	☒	Equipment on a table 150 cm height
	☐	Equipment on the floor (isolated from ground plane)
	☐	Other (e.g. height of pallet):
Supplementary test setup description..... :	-	
Test method applied..... :	☒	FSOATS CISPR 16-2-3 with measurement distance [m]: 3
	☐	FAR with measurement distance [m]:
Supplementary information ..... :	Measurements were made in FAR or FSOATS Site that complies to CISPR 16. Preliminary (peak and average) measurements. The EUT was rotated 360°, spaced by 15°, with the receive antenna located in horizontal and vertical polarities. Final measurements (peak and average detector above 1GHz) were then performed by rotating the EUT 360° and adjusting the receive antenna height from 1 to 4 m. All frequencies were investigated in both horizontal and vertical antenna polarity, and antenna tilting, where applicable.	

Test set-up photos: See internal and external photos

Tabulated Results summary

Frequency (MHz)	MaxPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
2401.99	86.43	---	In Band	In Band	5000	1000	146.0	H	223	-28.5
2401.99	---	74.52	In Band	In Band	5000	1000	173.0	V	-10	-28.5
2440.05	86.40	74.11	In Band	In Band	5000	1000	144.0	H	223	-28.7
2440.05	86.40	---	In Band	In Band	5000	1000	144.0	H	223	-28.7
2480.10	86.46	---	In Band	In Band	5000	1000	161.0	H	219	-28.5
2480.10	---	74.30	In Band	In Band	5000	1000	172.0	H	-44	-28.5
4803.98	---	40.84	53.9	13.1	5000	1000	141.0	V	124	-19.5
4803.98	57.71	---	73.9	16.2	5000	1000	151.0	V	130	-19.5
4880.10	60.74	---	73.9	13.2	5000	1000	148.0	V	133	-19.0
4880.10	---	42.09	53.9	11.8	5000	1000	141.0	V	129	-19.0
4959.95	---	40.88	53.9	13.0	5000	1000	128.0	V	130	-18.9
4960.20	59.24	---	73.9	14.7	5000	1000	122.0	V	135	-18.9
23945.32	---	53.04	53.9	0.9	5000	1000	104.0	V	270	16.1
24649.43	---	52.98	53.9	0.9	5000	1000	137.0	V	-45	17.2

Graphical representation



4.4 Measurement of occupied bandwidth

Name ..... :	Peter Wolf Frandsen	
Date ..... :	2022-12-12	
Rationale for verdict N/A ..... :	-	
Test location (stand) ..... :	Hørsholm EMIRUM and SRD setup	
Applied limit ..... :	☐	6 dB bandwidth
	☒	20 dB bandwidth according to 47 CFR Part 15.215(c)
	☐	26 dB bandwidth
	☒	Other: 99 % emission bandwidth according to RSS-Gen:2019 clause 6.7
Test setup description ..... :	☒	Conducted measurement performed on SMA connector.
	☐	Other: -
Supplementary test setup description ..... :	A spectrum analyzer was used for the measurements, the video bandwidth was set to a value at least three times greater than the IF bandwidth of the measuring instrument to avoid the introduction of unwanted amplitude smoothing. Video filtering is not used during occupied bandwidth tests.	
Test method applied ..... :	☒	6.9.2 Occupied bandwidth—relative measurement procedure
	☒	6.9.3 Occupied bandwidth—power bandwidth (99%) measurement procedure
	☐	Other:
Supplementary information ..... :	-	
Photo 4.4.1 ..... :	Measurement of occupied bandwidth	

Test set-up photos: See internal and external photos

Test results for occupied bandwidth	
Test item no(s) ref. cl. 1.2 ..... :	2
Operating mode no(s) ref. cl. 1.7 :	1
Test setup no(s) ref. cl. 3.3 ..... :	2

Tabulated Results summary

20 dB bandwidth according to 47 CFR Part 15.215(c)

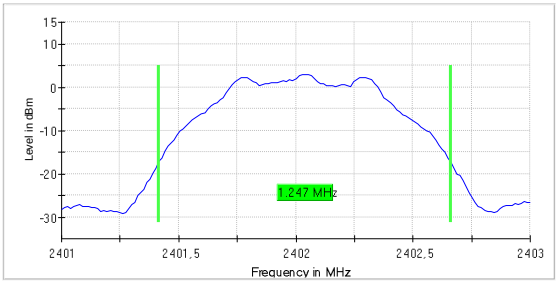
Test item Frequency (MHz)	Bandwidth (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)	Result
2402	1.246754	2401.415584	2402.662338	Passed
2440	1.246754	2439.415584	2440.662338	Passed
2480	1.246754	2479.415584	2480.662338	Passed

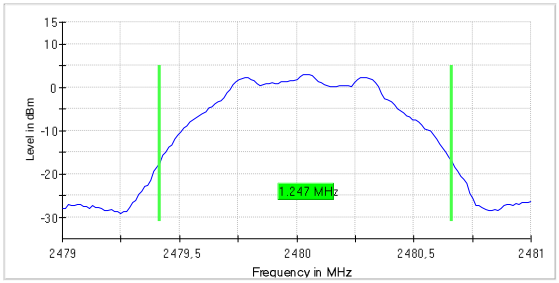
99% emission bandwidth according to RSS-Gen:2019 clause 6.7

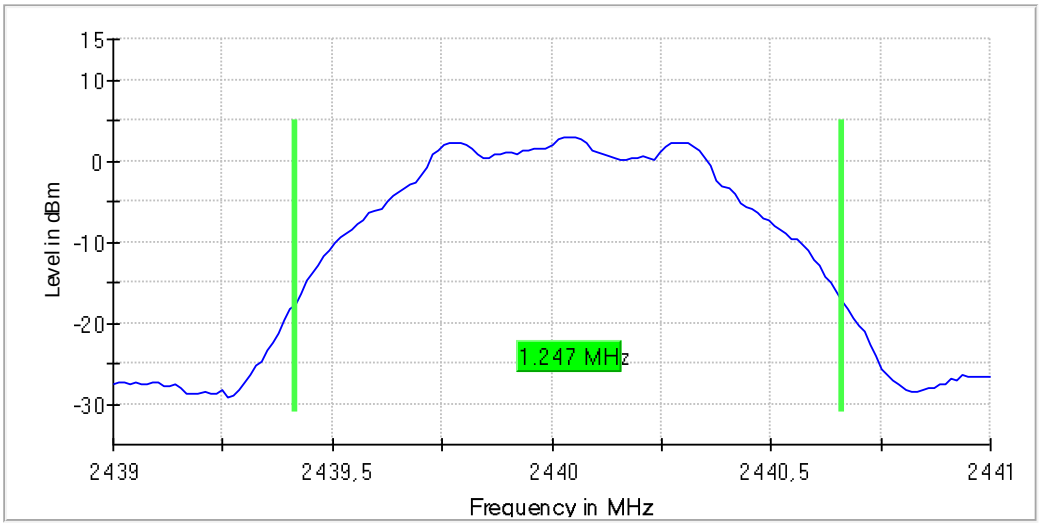
Test item frequency (MHz)	Bandwidth (99%) (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)	Result
2402	1.0705	2401.500	2402.570	Passed
2440	1.0762	2439.500	2440.576	Passed
2480	1.0705	2479.500	2480.571	Passed

Graphical representation

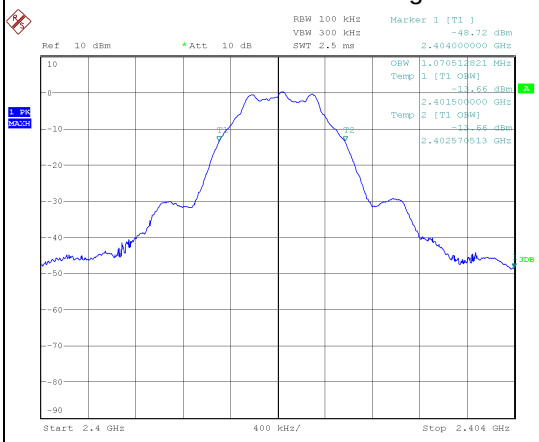
20 dB bandwidth according to 47 CFR Part 15.215(c)

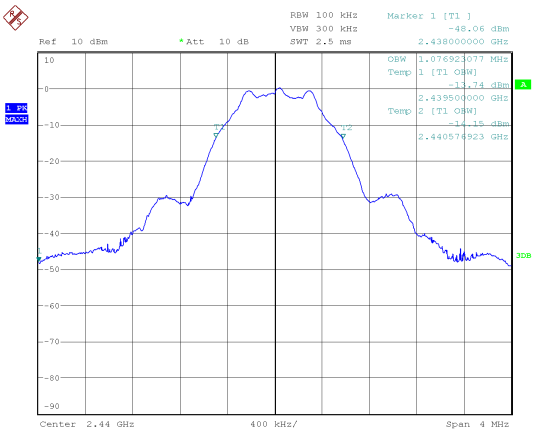


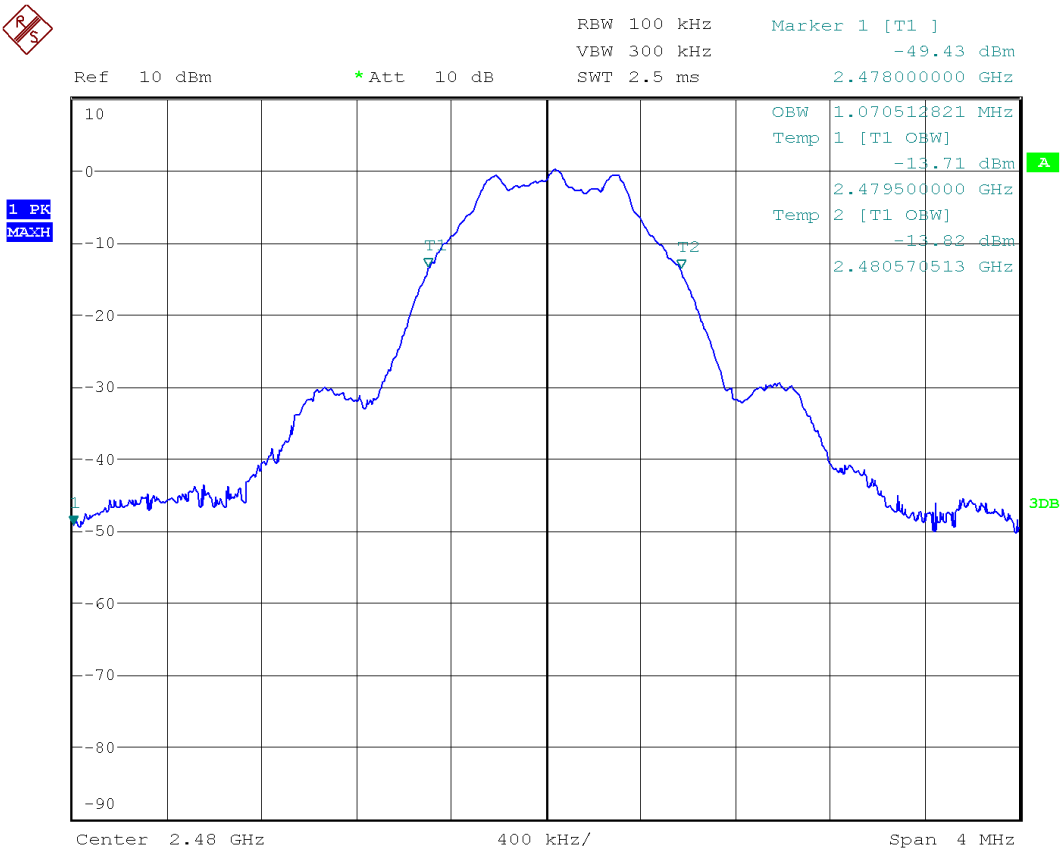




99% emission bandwidth according to RSS-Gen:2019 clause 6.7







4.5 Measurement of band edge

Name..... :	Peter Wolf Frandsen	
Date..... :	2022-12-09	
Rationale for verdict N/A ..... :	-	
Test location (stand)..... :	Hørsholm EMIRUM	
Applied limit class..... :	☒	Band edges according to 47 CFR Part 15.209 & 15.249.
	☐	Other:
Test setup description ..... :	☒	Equipment on a table 150 cm height
	☐	Equipment on the floor (isolated from ground plane)
	☐	Other:
Supplementary test setup description..... :	Radiated measurement	
Test method applied..... :	☒	6.10.5 Restricted-band band-edge measurements
	☐	6.10.6 Marker-delta method
	☐	Other:
Supplementary information ..... :	-	
Photo 4.5.1 .....:	Measurement of band edge	

a. Front view of EUT and AE on setup table

Test set-up photos: See internal and external photos

b. Rear oblique view of EUT

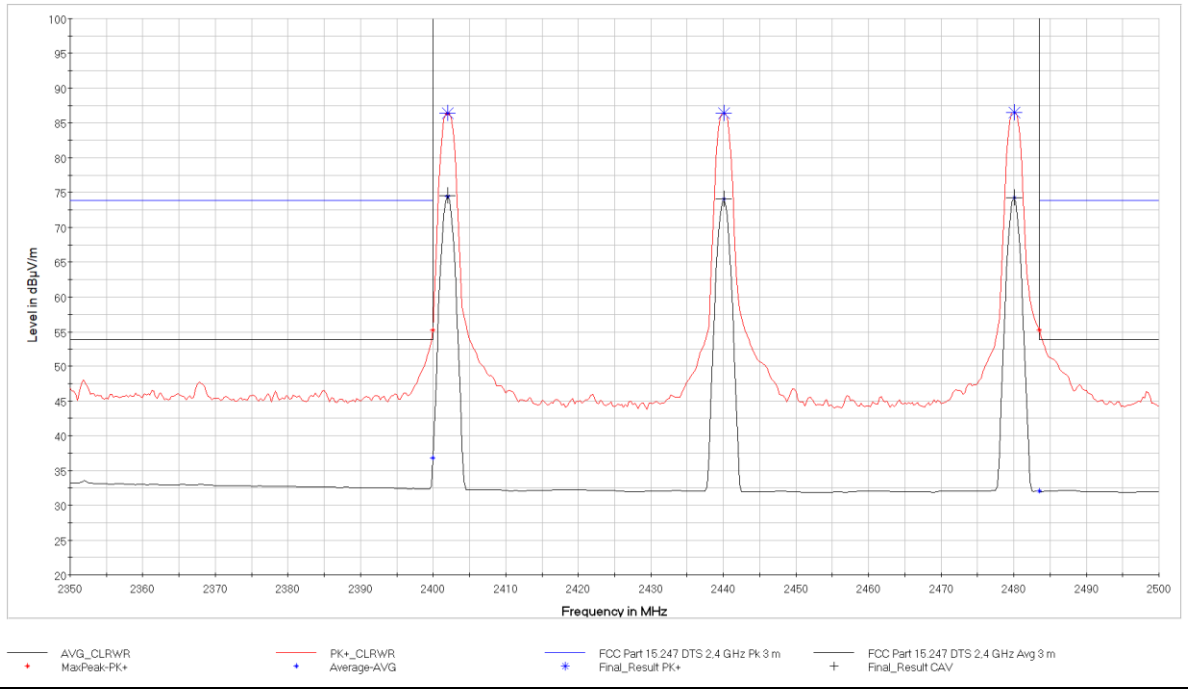
Test set-up photos: See internal and external photos

Test results for band edge	
Test item no(s) ref. cl. 1.2 ..... :	1
Operating mode no(s) ref. cl. 1.7 :	1
Test setup no(s) ref. cl. 3.3 ..... :	1

Tabulated Results summary

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azi mut	Corr. (dB)
2400.00	**---**	**36.84**	**53.9**	**17.1**	**150.0**	**H**	**315**	**-28.5**
2400.00	**55.23**	**---**	**73.9**	**18.7**	**150.0**	**H**	**315**	**-28.5**
2483.50	**---**	**32.00**	**53.9**	**21.9**	**150.0**	**H**	**90**	**-28.4**
2483.50	**55.28**	**---**	**73.9**	**18.6**	**150.0**	**H**	**225**	**-28.4**

Graphical representation



4.6 Measurement of field strength of fundamental

Name..... :	Peter Wolf Frandsen	
Date..... :	2022-12-09	
Rationale for verdict N/A ..... :	-	
Test location (stand)..... :	Hørsholm EMIRUM	
Applied limit class..... :	☒	Limit of field strength of fundamental according to 47 CFR Part 15.249
	☐	Other:
Test setup description ..... :	☒	Equipment on a table 150 cm height
	☐	Equipment on the floor (isolated from ground plane)
	☐	Other:
Supplementary test setup description..... :	-	
Test method applied..... :	☒	FSOATS CISPR 16-2-3 with measurement distance [m]: 3
	☐	Other:
Supplementary information ..... :	-	

Photo 4.6.1 .....:	Measurement of field strength of fundamental
a. Front view of EUT and AE on setup table Test set-up photos: See internal and external photos	

b. Rear oblique view of EUT

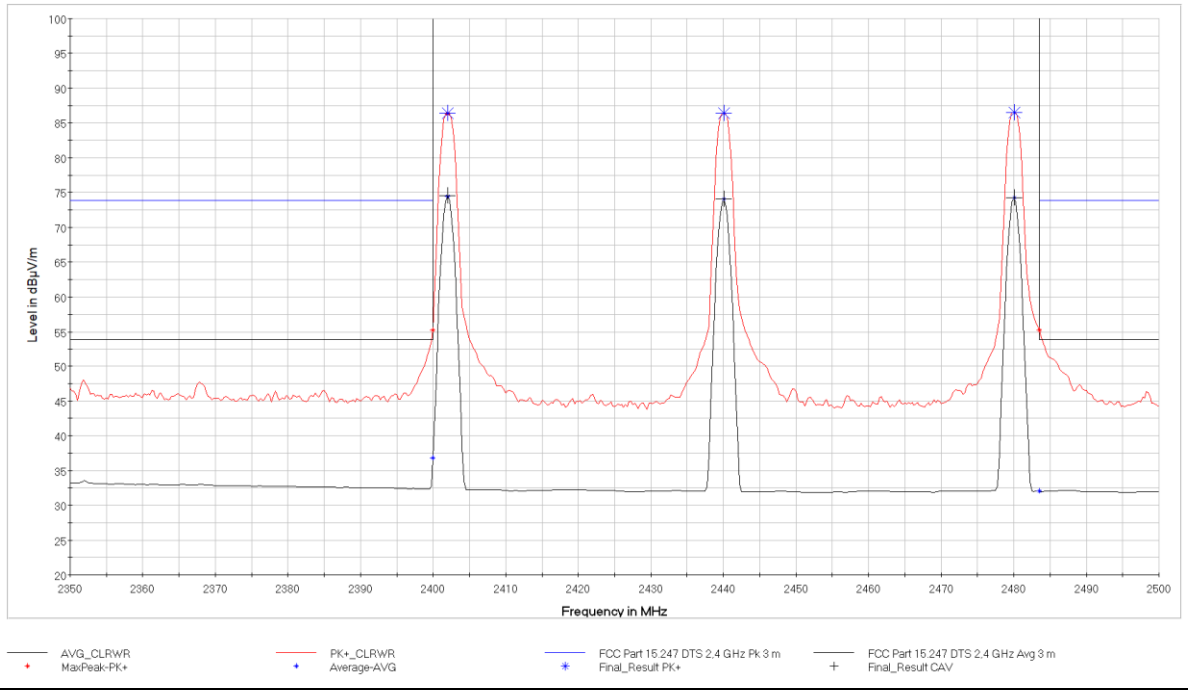
Test set-up photos: See internal and external photos

Test results for field strength of fundamental	
Test item no(s) ref. cl. 1.2 ..... :	1
Operating mode no(s) ref. cl. 1.7 :	1
Test setup no(s) ref. cl. 3.3 ..... :	1

Tabulated Results summary

Frequency (MHz)	MaxPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
2401.99	86.43	---	In Band	In Band	5000	1000	146.0	H	223	-28.5
2401.99	---	74.52	In Band	In Band	5000	1000	173.0	V	-10	-28.5
2440.05	86.40	74.11	In Band	In Band	5000	1000	144.0	H	223	-28.7
2440.05	86.40	---	In Band	In Band	5000	1000	144.0	H	223	-28.7
2480.10	86.46	---	In Band	In Band	5000	1000	161.0	H	219	-28.5
2480.10	---	74.30	In Band	In Band	5000	1000	172.0	H	-44	-28.5

Graphical representation



5 Measurement instrumentation uncertainties and decision rule

5.1 Measurement uncertainty

Where relevant, the following measurement instrumentation uncertainty levels have been estimated for tests performed on the apparatus:

Test method	Calculated expanded uncertainty U_{Lab}		$U_{CISPR/ETSI}$
	Aarhus	**Hørsholm**	
AC power-line conducted emission (6.2)	2.68	2.68	3.4
Radiated emission below 30 MHz (6.4)	4.64	2.65	3.3
Radiated emission 30 - 1000 MHz (6.5)	5.72 / 5.56	6.15 / 4.9	6.3
Radiated emission above 1000 MHz (6.6)	4.2	4.9	5.2
Antenna port conducted signals (6.7)	1.7	1.7	±1.5
Frequency stability (6.8)	0.3 Hz	0.3 Hz	±1 ppm
Occupied bandwidth, 20 dB (6.9)	1.7	1.7	±1.5
Band edge (6.10)	1.7	1.7	±1.5
Field strength of fundamental	4.64	2.65	6.3
Environment measurements			
Temperature	1°C	< 1°C	1°C

5.2 Decision rule

1) General

When reporting statement compliance (e.g. Pass / Fail) the following general decision rules are applied where relevant.

International guidelines for Decision rules are amongst other given in

· The BIMP JCGM 106 "Evaluation of measurement data – The role of measurement uncertainty in conformity assessment" section 8 and

· The attached ILAC G8 "Guidelines on Decision Rules and Statements of Conformity" section 4

· IEC Guide 115 "Application of measurement uncertainty to conformity assessment activities in the electrotechnical sector in the IECEE CB Scheme"

1.1) Other Decision rules

Other decision rules may be applied according to

· Customers own decision rules

· Applicable Directives, e.g. essential requirement of MDD

· Requirement of an authority

· Applicable Legislation

Such decision rules shall be agreed upon with the client in the quotation documents.

2) Decision Rule

A decision rule describes how measurement uncertainty is accounted for when stating conformity with a specified requirement.

Note: Decision rule may be referred to as criterion for compliance

ISO 17025 cl. 3.7

2.1) General Testing

The general approach for application of decision rules is given in the ILAC Guide 8.

The laboratories aim at applying standards, which include "guard banded" test limits. I.e. the applied test limit(s) inherent in the applicable test requirement includes concerns on measurement uncertainty in relation to the decision of compliance.

Specific decision rules may be given in the individual test procedures or standards.

Clients' acceptance of decision rules is agreed upon in per terms of delivery in the quotation documents.

Rationale for applicable decision rules for specific areas are given below.

2.2) Rules / Criteria for compliance - EMC Testing - Emission

The test standards for electromagnetic emission testing state use of "shared risk" for the decision of compliance. Given test limits take Measuring Uncertainty (MU) into account.

The laboratory reports as follows:

The test standards state, that the given requirement for compliance, i.e., test limits, include consideration of MU, in case the MU is within the allowed MU given in U_{CISPR}

1) If the MU is within the max U_{CISPR} any decision of compliance (P/F) shall not include the MU

2) If the MU exceed the max U_{CISPR} any decision of compliance (P/F) shall include the added MU.

Reporting

The measured value and its MU are reported. Compliance with requirement is reported based on the measured values.

6 List of test equipment

AC power-line conducted emission (6.2):

No	Category/Action	Manufacturer	Type no	Cal. date	Cal. exp
49167	Artificial Mains Network	ROHDE & SCHWARZ	ESH2-Z5	2022-01-13	2023-01-13
49555	Spectrum Aanalyzer / Measurement Receiver	ROHDE & SCHWARZ	ESU26	2022-08-25	2023-08-25
49691	CABLE 5 m BNC-BNC CABLE 5m BNC-BNC	SUHNER	RG 223/U	2022-03-21	2023-03-21
49994	EMC32-Software SRD setup	ROHDE & SCHWARZ	Ver. 10.50.10	2022-08-16	2023-08-16

Radiated emission 30 - 1000 MHz (6.5):

No	Category/Action	Manufacturer	Type no	Cal. date	Cal. exp
29797	BILOG ANTENNA, 30-2000 MHz	CHASE ELECTRICS LTD	CBL 6111A	2021-08-16	2023-08-16
29953	ANTENNA TOWER/TURNTABLE CONTROLLER	EMCO	2090	N/A	N/A
49590	CABLE, LOW-LOSS uWAVE CABLE, N-N, 8.0 m "EMI"	SUHNER	SUCOFLEX 104 PB	2022-02-02	2023-02-02
49674	MATURO CONTROLLER	MATURO	NCD	N/A	N/A
49704	CABLE 3 m SMA-N	SUHNER	SUCOFLEX 104	2022-02-02	2023-02-02
49817	CABLE, LOW-LOSS uWAVE CABLE, N-N, 8.0 m "EMI"	SUHNER	SUCOFLEX 104 PB	2022-02-02	2023-02-02
49900	Spectrum Aanalyzer / Measurement Receiver	ROHDE & SCHWARZ	ESW26	2022-01-13	2023-01-13
49999	EMC32-Software EMIroom	ROHDE & SCHWARZ	Ver. 10.40.10	N/A	N/A

Radiated emission above 1000 MHz (6.6), Band edge (6.10), Field strength of fundamental:

No	Category/Action	Manufacturer	Type no	Cal. date	Cal. exp
29953	ANTENNA TOWER/TURNTABLE CONTROLLER	EMCO	2090	N/A	N/A
49624	DUAL RIDGE HORN ANTENNA – 1GHZ-26GHZ (2GHZ-32GHZ)	SATIMO	SH2000	2021-08-02	2023-08-02
49625	SRD COAX SWITCH MATRIX USED IN 1GHZ TO 26GHZ SRD ANTENNASYSTEM	DELTA	COAX SWITCH MATRIX	2022-04-28	2023-04-28
49674	MATURO CONTROLLER	MATURO	NCD	N/A	N/A
49869	CABLE 3 M PC3.5 MALE-FEMALE SUCOFLEX 126 CABLE 3.25 M PC3.5 MALE-FEMALE SUCOFLEX 126	HUBER+SUHNER	Sucoflex 126	2022-04-28	2023-04-28
49870	CABLE 13 M PC3.5 MALE-MALE SUCOFLEX 126EA	HUBER+SUHNER	SUCOFLEX 126EA	2022-04-28	2023-04-28
49900	Spectrum Aanalyzer / Measurement Receiver	ROHDE & SCHWARZ	ESW26	2022-01-13	2023-01-13
49999	EMC32-Software EMIroom	ROHDE & SCHWARZ	Ver. 10.40.10	N/A	N/A

Occupied bandwidth (6.9):

No	Category/Action	Manufacturer	Type no	Cal. date	Cal. exp
29141	RADIATING LOOP	EC	MIL-STD 462	N/A	N/A
49467	CABLE 1m BNC-BNC	SUHNER	RG 223/U	2022-03-21	2023-03-21
49550	Signal Analyzer	ROHDE & SCHWARZ	FSQ8	2022-01-12	2023-01-12